BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
AMENDMENTS TO	)	R18-20
35 ILL. ADM. CODE 225.233	)	(Rulemaking – Air)
MULTI-POLLUTANT STANDARDS	)	
(MPS)	)	

NOTICE OF FILING

PLEASE TAKE NOTICE that on this 1st day of June 2018, I have filed with the Clerk of the Illinois Pollution Control Board, the Post-Hearing Comments of the Illinois Attorney General's Office in the above-referenced case, a copy of which is hereby served upon you.

Respectfully submitted,

PEOPLE OF THE STATE OF ILLINOIS
By LISA MADIGAN,
Attorney General of the State of Illinois

BY: /s/ Stephen J. Sylvester
STEPHEN J. SYLVESTER
Senior Assistant Attorney General
Illinois Attorney General's Office
69 W. Washington St., 18th Floor
Chicago, IL 60602
(312) 814-2087
ssylvester@atg.state.il.us

SERVICE LIST

Don Brown, Assistant Clerk
Mark Powell, Hearing Officer
Marie Tipsord, Hearing Officer
Illinois Pollution Control Board
100 W. Randolph Street, Suite 11-500
Chicago, IL 60601
don.brown@illinois.gov
Mark.Powell@Illinois.Gov
Marie.Tipsord@Illinois.Gov

Eric Lohrenz
Office of General Counsel
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
217-782-1809
Eric.lohrenz@illinois.gov

Amy C. Antoniolli
Joshua R. More
Ryan Granholm
Caitlin Ajax
Schiff Hardin LLP
233 S. Wacker Drive, Suite 6600
Chicago, IL 60606
312-258-5769
aantioniolli@schiffhardin.com
jmore@schiffhardin.com
rgranholm@schiffhardin.com
cajax@schiffhardin.com

Justin Vickers
Jean-Luc Kreitner
Environmental Law and Policy Center
35 E. Wacker Drive, Suite 1600
Chicago, IL 60601
jvickers@elp.org
jkreitner@elp.org

Katherine Hodge
Hepler Broom LLP
4340 Acer Drive
Springfield, IL 62711
khodge@heplerbroom.com

Greg Wannier
Sierra Club Environmental Law Program
2101 Webster Street, Suite 1300
Oakland, CA 94612
greg.wannier@sierraclub.org

Faith E. Bugel
1004 Mohawk
Wilmette, IL
fbugel@gmail.com

Gina Roccaforte
Dana Vetterhoffer
Antonette R. Palumbo
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276
gina.roccaforte@illinois.gov
dana.vetterhoffer@illinois.gov
antonette.palumbo@illinois.gov

Katy Khayyat
Dept. of Commerce and Economic Opportunity
Small Business Office
500 East Monroe Street
Springfield, IL 62701
Katy.Khayyat@illinois.gov

CERTIFICATE OF SERVICE

I, STEPHEN J. SYLVESTER, an attorney, do certify that on June 1, 2018, I caused the foregoing Post-Hearing Comments of the Illinois Attorney General's Office and the Notice of Filing to be served upon the persons listed in the attached Service List by email for those who have consented to email service and by U.S. Mail for all others.

/s/ Stephen J. Sylvester
STEPHEN J. SYLVESTER

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R18-20
AMENDMENTS TO 35 ILL. ADM.	)	(Rulemaking-Air)
CODE 225.233, MULTI-POLLUTANT	)	
STANDARDS	)	

POST-HEARING COMMENTS
OF THE ILLINOIS ATTORNEY GENERAL'S OFFICE

The Illinois Attorney General's Office, on behalf of the People of the State of Illinois ("People"), hereby files its Post-Hearing Comments in this proceeding. The People respectfully request that the Illinois Pollution Control Board ("Board") reject the Illinois Environmental Protection Agency's ("Illinois EPA") proposal. Illinois EPA's proposal would not restore, maintain, or enhance air quality in Illinois, 415 ILCS 5/8, but instead would weaken an important State public health program. Illinois EPA has failed to adequately consider the technical feasibility and economic reasonableness of simply holding Dynegy Midwest Generation, Inc. and related companies ("Dynegy")[1]—and their new parent company, Vistra Energy Corporation ("Vistra")—to current limits on sulfur dioxide ("SO_2") and nitrogen oxides ("NOx") pollution from their eight Illinois coal-fired power plants. *See* 415 ILCS 5/27(a). The record developed in this proceeding is inadequate to support Illinois EPA's proposal to scrap rate-based emission limits in favor of mass-based limits that are set so high as to allow Dynegy and Vistra to immediately increase

---

[1] On April 9, 2018, Vistra Energy Corporation announced that it had completed a merger with Dynegy Inc. *See* https://www.vistraenergy.com/vistra-dynegy-merger/. Prior to the merger, Dynegy Inc., through wholly-owned subsidiaries, had owned and operated the eight Illinois coal-fired power plants subject to the MPS. R18-20, PC #3, Dynegy Public Comment (Oct. 31, 2017), at 1. Illinois Power Generating Company owned and operated the Newton and Coffeen power stations. *Id*. Illinois Power Resources Generating, LLC owned and operated the Duck Creek and E.D. Edwards power stations. *Id*. Electric Energy, Inc. owned and operated Joppa Power Station. *Id*. Dynegy Midwest Generation, LLC owned and operated the Baldwin, Havana and Hennepin power stations. *Id*.

Based on testimony by Vistra's representatives during the April 17, 2018 hearing, it is the People's understanding that the former Dynegy Inc. subsidiaries continue to exist, and to own and operate the power stations identified above, s*ee* Apr. 17, 2018 Trans. at 201, line 11, to 202, line 4, though themselves are now owned by parent company Vistra. Accordingly, in these comments, the People refer to the subsidiaries owning and operating the plants both before and after the Vistra-Dynegy merger using the shorthand term "Dynegy."

pollution from their uncontrolled plants.

I. **INTRODUCTION**

A brief recitation of the history of the Multi-Pollutant Standards ("MPS") demonstrates how significantly Illinois EPA's current proposal departs from its past policies on the MPS. *Cf. Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 506 (1988) ("While an agency is not required to adhere to a certain policy or practice forever, sudden and unexplained changes have often been considered arbitrary.").

The Board adopted the MPS in 2006, in connection with an Illinois state rule requiring significant reductions in mercury emissions from Illinois coal-fired power plants, beyond those required under federal law. *See In the Matter of Proposed New 35 Ill. Adm. Code 225, Control of Emissions from Large Combustion Sources (Mercury)*, R06-25 (Nov. 2, 2006), at 6-10. Illinois EPA proposed the MPS in joint submissions with both Ameren and Dynegy. R06-25, Joint Statement (Jul. 28, 2006) and Corrected Joint Statement (Aug. 23, 2006). The MPS "provided additional time to comply with the mercury limitations in exchange for compliance with mercury control technology requirements and emission limits for sulfur dioxide ('SO_2') and nitrogen oxides ('NOx')." R18-20, IEPA Statement of Reasons ("SOR"), at 1-2. As Ameren stated, the MPS provided power plant owners who opted in to the standards "compliance flexibility in exchange for the commitment to make significant and specified reductions in NOx and SO_2 emissions." R06-25, Ameren Post-Hearing Comments (Sept. 20, 2006) at 4.

In Illinois EPA and Dynegy's joint submission to the Board in R06-25, they justified the proposed MPS by informing the Board that "**<u>the installation and operation of pollution control equipment required to achieve the [MPS] NOX and SO2 standards</u>**" would achieve emissions reductions that "will contribute to reductions in the ambient levels of ozone and PM 2.5 [particulate matter less than 2.5 microns in diameter] and will benefit the residents of the State of Illinois." R06-25, Corrected Joint Statement at 4 (Aug. 23, 2006) (emphasis added). Illinois EPA, Ameren, and Dynegy all agreed that meeting the MPS's NOx and SO_2 limits was technically feasible and economically reasonable. R06-25, Joint Statement (Jul. 28, 2006) at 3; Corrected Joint Statement (Aug. 23, 2006) at 5. After the Board adopted the MPS, both Ameren and Dynegy opted in. R18-20, IEPA SOR, at 2.

The MPS's SO_2 rate-based emission limits were phased in over time, becoming more stringent over the following decade to allow for the gradual investment in and installation of new pollution controls. Over the next seven years, though, first Ameren, then Dynegy (which purchased Ameren's fleet in 2013), came before the Board **three times** seeking more time to comply with the SO_2 limit on the Ameren fleet: 1) PCB R09-10 (*In the Matter of Amendments to 35 Ill. Adm. Code 225, Control of Emissions from Large Combustion Sources (Mercury Monitoring)*; 2) PCB 12-126 (*Ameren Energy Resources v. IEPA*); and 3) PCB 14-10 (*Illinois Power Holdings, LLC v. IEPA*). Each time, first Ameren, then Dynegy, advised the Board that it could not install pollution controls quickly enough to meet the MPS's declining SO_2 limit, but that, given more time, it could and would install all pollution controls necessary to comply.[2] And, each time Ameren and Dynegy sought new relief from the MPS, they offered the Board an alternative compliance plan, the environmental impact of which was judged—by Illinois EPA and the Board—on its projected impact on actual emissions, based on the Ameren fleet's historical

[2] *See*, *e.g*., R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 10 ("Ameren's proposed revision does not eliminate Ameren's regulatory obligation to comply with the MPS through the installation of pollution control equipment."); PCB 14-10, Dynegy Post-Hearing Brief (Oct. 7, 2013), at 7 ("As determined in [PCB 12-126], the Newton [FGD] Project will allow the owners of the MPS Group to meet the MPS rate at the end of the variance term. Here, [Dynegy] is poised to assume the compliance plan [Ameren] committed to last year . . . .").

operations.[3] Finally, each time that Ameren and Dynegy sought relief, Illinois EPA remained neutral, stating, for example, in R09-10:

> [T]he Illinois EPA believes that the original agreement reached with Ameren and contained in the MPS was negotiated and agreed to in good faith. Both parties made some concessions in those agreements and accepted some risk. **The Illinois EPA wants to make clear that our position is that the language in the MPS should not generally be amended**, and that our neutral position in this case is not indicative of how we will treat any future attempt to further amend the MPS.

R09-10, IEPA Post-Hearing Comments (Mar. 6, 2009), at PDF p. 13 (emphasis added); *see also* PCB 12-126, IEPA Recommendation (Jul. 23, 2012), at 1; PCB 14-10, IEPA Recommendation (Sept. 5, 2013), at 1.

Illinois EPA's current proposal to remove the MPS's rate-based emission limits ignores all of this history. *Cf. Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 505-06 (1988) ("Agency action is arbitrary and capricious if the agency . . . entirely fails to consider an important aspect of the problem."). Illinois EPA does not recall that reducing ozone and PM2.5 in Illinois was one of the primary reasons for adopting the MPS. *Compare* R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4-5, *with* Apr. 17, 2018 Trans. at 124, line 16, to 125, line 5. While Illinois EPA twelve years ago recognized that the "installation and operation of pollution control equipment" would be "**required to achieve**" compliance with MPS SO_2 limits, R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4 (emphasis added), Illinois EPA now rejects the notion that Dynegy should be required to install any additional pollution controls at this juncture because, in Illinois EPA's words, "controls are not cheap," Jan. 17, 2018 Trans. at 53, lines 10-20—without any actual analysis of how much such controls would cost. *See* Apr. 17, 2018 Trans. at 155, lines 18-24, and 159, lines 6-12. Illinois EPA asserts it has no understanding of whether Dynegy's ability to operate

[3] R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 13-14 ("To assess the overall environmental effect of Ameren's proposal . . . the Agency and Ameren evaluated projected mass emissions under the MPS and the proposal over an eleven-year period."); PCB 12-126 (Sept. 20, 2012), at 54; PCB 14-10 (Nov. 21, 2013), at 82.

in compliance with the MPS is constrained by the Old Ameren Group's[4] inadequate controls for SO_2, even though **Ameren and Dynegy have told the Board three times over the past ten years** that would be the precise result if they did not install additional pollution controls on that fleet. *Compare*, *e.g.*, *Illinois Power Holdings, LLC v. IEPA*, PCB 14-10, Petition for Variance, Ex. 8, Thompson Aff., at 6 (Jul. 22, 2013), *with* Jan. 17, 2018 Trans. at 48, lines 13-24. Illinois EPA does not even recall the methodology it used to analyze the environmental impacts of the proposed MPS amendments in PCB R09-10—the first, and only other, time that the MPS's SO_2 limits were amended—and it certainly has not followed its earlier methodology in this proceeding. April 17, 2018 Trans. at 77, line 20, to 78, line 17.

These four about-faces and analytical gaps in Illinois EPA's current proposal are merely examples. Illinois EPA's most fundamentally erroneous premise for its proposed amendments to the MPS, however, is that the rule is somehow flawed or broken because it does not allow Dynegy the unfettered ability to operate its plants without SO_2 controls, whenever Dynegy deems that to be to its economic advantage.[5] That result is not a malfunction in the effect of the MPS; **it is the MPS working exactly as it was intended**. The purpose of the MPS was to clean up Illinois's coal-fired power plants. Dynegy has not made the necessary investments needed to clean up its plants, so now it finds it difficult to comply with the MPS. Any need for relief on Dynegy's part is not due to the MPS, but rather to Ameren and Dynegy's years of delaying "the installation and operation of pollution control equipment required to achieve the [MPS] NOx and SO2 standards." R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4.

---

[4] The People refer to the two MPS groups as the "Old Ameren Group" (currently units at Coffeen, Duck Creek, E.D. Edwards, Joppa, and Newton), and the "Dynegy Group" (currently units at Baldwin, Havana, and Hennepin).

[5] Illinois EPA seeks a rule that would allow Dynegy "to operate the [MPS] units as they are called upon by the market without being forced to operate certain units strictly for the purpose of meeting a fleet-wide rate-based limit." *See* Ex. 6, IEPA Responses to Pre-filed Question (Jan. 12, 2018), at 14; *see also* Jan. 17, 2018 Trans. at 57, lines 3-13.

Compounding the flaws in Illinois EPA's approach, Dynegy and Vistra's participation in this proceeding has in no way aided in elucidating the issues before the Board. Viewed charitably, their testimony has been incomplete and misleading on several crucial points. Most importantly, Dynegy and Vistra would have the Board believe that the crux of Illinois EPA's proposal is simply to allow Dynegy to stop offering two controlled plants in the Old Ameren Group—Coffeen and Duck Creek—into the energy market below cost, for the purpose of complying with the MPS's current SO_2 limit.[6] Dynegy has maintained to the Board that it does not expect to retire or mothball any of its controlled plants solely as a result of the Board's adoption of Illinois EPA's proposal. *See*, *e.g*., Jan. 18, 2018 Trans. at 122, lines 9-11.

Outside of this proceeding, though, Vistra's CEO, Curt Morgan, has publicly contradicted this testimony on at least three occasions. As Mr. Morgan has been telling investors since even before the Dynegy-Vistra merger closed, the purpose of this rulemaking is and has been to allow Dynegy to determine "what assets were in" and "what assets were out," Ex. 30, IAGO Pre-filed Questions (Mar. 2, 2018), at 4—to allow Dynegy and, now, Vistra to shut down MPS units with pollution controls that are, in Mr. Morgan's words, "hugely out of the money." *See* Ex. 41, *Weak MISO prices compound Ill. coal plant woes*, E & E NEWS (Apr. 13, 2018), at 2. Since the last hearing, Mr. Morgan has spoken even more directly to the public, explaining to investors that, by the end of this year, he expects to have made decisions toward "**a smaller, more focused business in MISO**[7] **at the end of the day**," or, as he also put it, a "nice little business in MISO that we can make money on." *See* Attachment 1, Vistra Energy's (VST) CEO Curtis Morgan on Q1 2018

[6] *See* Jan. 18, 2018 Trans. at 162, lines 15-17 ("The purpose of the rule change is to ensure that we can offer the units in at their short-run marginal costs."); and 131, lines 7-9 ("Generally, we operate the Duck Creek and Coffeen units at a loss to maintain compliance with the MPS.").

[7] "The electric capacity market mechanisms for Downstate Illinois are operated by the Midcontinent Independent System Operator ('MISO'), which is the electric grid operator covering Downstate Illinois and the plants that are

Results - Earnings Call Transcript, *Seeking Alpha* (May 5, 2018), at PDF p. 25 (*available at* https://seekingalpha.com/article/4170210-vistra-energys-vst-ceo-curtis-morgan-q1-2018-results-earnings-call-transcript?part=single) (emphasis added).

Dynegy and Vistra's failure to be forthcoming–including regarding new pollution control equipment installed at the Newton plant over the past two years, but never disclosed to the Board, *see* Ex. 37, Armstrong Test., at 3-4 and Atts. 8 and 9—has hindered all parties from discussing, debating, or designing rational, well-supported modifications to the MPS, if necessary, that could take into account the imminent changes to the MPS fleet that Mr. Morgan has described to investors. Instead, Illinois EPA's proposal would simply allow Dynegy and Vistra to shut down clean plants; increase utilization of dirty plants; and avoid installing pollution controls, as promised for over a decade—all contributing to higher pollution than would be allowed by the MPS in its current form.

In sum: the record before the Board does not support adoption of Illinois EPA's proposal. Illinois EPA's proposal departs without explanation from its past policies regarding the MPS; is not supported by rational explanations; and ignores important issues—all hallmarks of arbitrary agency action. *Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 505-06 (1988). Based on the record developed after five days of hearings in this matter, and due to the unsound reasons for these amendments, the Board should deny Illinois EPA's proposal in its entirety.

II. THE BOARD SHOULD NOT ADOPT ANY AMENDMENTS TO THE MPS UNLESS THEY OFFER AN ENVIRONMENTAL BENEFIT IN THE FORM OF ACTUAL EMISSIONS REDUCTIONS.

The remainder of these comments is divided into three sections. This Section II discusses the legal standards by which the Board should judge Illinois EPA's proposal, including the Board's

subject to the MPS. The plants subject to the MPS are located in the local resource zone or load zone of MISO known as MISO Zone 4." Ex. 15, Ellis Test. (Dec. 11, 2017), at 6.

analysis of earlier MPS amendments proposed by Ameren in PCB R09-10. Section III addresses Illinois EPA's stated reasons for its proposal, and demonstrates that they cannot support its sweeping rewrite of the MPS. Section IV addresses the environmental impact of Illinois EPA's proposal, contending, as in the People's earlier pre-filed testimony, that Illinois EPA's proposed mass caps are set unreasonably high.

The Illinois Supreme Court has made clear that the Board's rulemaking authority under the Illinois Environmental Protection Act ("Act") "is a general grant of very broad authority and encompasses that which is necessary to achieve the broad purposes of the Act." *Granite City Div. of Nat. Steel Co. v. IPCB*, 155 Ill. 2d 149, 182 (1993). The overall purpose of the Act is "to establish a unified, state-wide program supplemented by private remedies, **<u>to restore, protect and enhance the quality of the environment, and to assure that adverse effects upon the environment are fully considered and borne by those who cause them</u>**." 415 ILCS 5/2(b) (emphasis added). More specifically, when enacting our state's bedrock environmental law concerning air pollution, the General Assembly specifically found the following:

> [P]ollution of the air of this State constitutes a menace to public health and welfare, creates public nuisances, adds to cleaning costs, accelerates the deterioration of materials, adversely affects agriculture, business, industry, recreation, climate, and visibility, depresses property values, and offends the senses.

415 ILCS 5/8. Accordingly, the purpose of Title II of the Act is to "restore, maintain, and enhance the purity of the air of this State." *Id.* Moreover, these provisions are consistent with the Constitution's guarantee of the "right to a healthful environment." Ill. Const.1970, art. 11, § 2.

Dynegy's questioning of the People during the January hearings in this proceeding implied skepticism that the Board should evaluate Illinois EPA's proposal in light of the Act's stated purpose to "restore, maintain, and enhance the purity of the air of this State." 415 ILCS 5/8. That is precisely what the Act instructs, though. Section 10(A) of the Act, 415 ILCS 5/10(A), also in

Title II of the Act, provides that:

> The Board, pursuant to procedures prescribed in Title VII of this Act, **<u>may adopt regulations to promote the purposes of this Title</u>**.

In evaluating Illinois EPA's proposal, then, the Board certainly must consider if it will serve to "restore, maintain, and enhance the purity of the air of this State." 415 ILCS 5/8. *See also Granite City*, 155 Ill. 2d at 183 (holding that the Board may adopt even "technology-forcing standards which are beyond the reach of existing technology," if the Board "determines that a proposed regulation is necessary to carry out the purpose of the Act").

Section 27(a) of the Act, 415 ILCS 5/27(a), further instructs that:

> In promulgating regulations under this Act, the Board shall take into account the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality, or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution.

With respect to the MPS, the Board has twice before found that it is "technically feasible and economically reasonable." *See* R06-25 (Dec. 21, 2006), at 54; R09-10 (Apr. 16, 2009), at 29. As discussed above, in R06-25, the Agency, Ameren, and Dynegy all agreed that the MPS as they had jointly proposed it was technically feasible and economically reasonable. R06-25, Joint Statement (Jul. 28, 2006), at 3; Corrected Joint Statement (Aug. 23, 2006), at 5.

In R09-10, Ameren (not Illinois EPA)[8] proposed revisions seeking more time to install pollution controls on its fleet to comply with the MPS's declining SO_2 limit.[9] Specifically, Ameren

[8] When asked why Illinois EPA had determined to make its current proposal, instead of putting the responsibility on Dynegy to advocate for amendments to the MPS, David Bloomberg testified for Illinois EPA that: "I cannot recall very many, if any, company proposed rulemakings in my time at the Agency, at least for air." Jan. 17, 2018 Trans. at 128, lines 11-14. Mr. Bloomberg apparently did not recall, although he participated in and testified in R09-10 (*see*, *e.g.*, R09-10, Feb. 10, 2009 Trans.) that **<u>the only other time</u>** the MPS NOx and SO_2 limits were amended, it had been the result of a "company-proposed rulemaking" brought by Ameren.

[9] Ameren proposed to amend the MPS after the Board rejected Ameren's request for a variance in *Ameren Energy Generating Co. v. IEPA*, PCB 09-21 (Jan. 22, 2009).

requested a deferral of meeting 2013-14 SO_2 standards in exchange for agreeing to, among other things, a more stringent 0.23 pounds per million British thermal units ("lb/mmBtu") standard for 2017 onward. In support of its proposed amendment, Ameren testified the revised standards would result in a "net environmental benefit" and assured the Board that "[o]ver the next eight years, Ameren intends to install and operate additional pollution control equipment necessary for it to achieve compliance with the proposed amendment." R09-10, Ameren Test. of Michael L. Menne (Feb. 2, 2009), at 3-4.

The Agency agreed that Ameren's proposed revisions offered a "slight environmental benefit." R09-10, IEPA Post-Hearing Comments (Mar. 6, 2009), at PDF p. 13. Based on that "environmental benefit," the Board found that Ameren's proposed amendment was technically feasible and economically reasonable:

> On the basis of its review of the record, particularly the projected environmental benefit and the absence of any objection on the part of the Agency, the Board finds that the proposal by Ameren is technically feasible and economically reasonable . . . .

R09-10 (Apr. 16, 2009), at 29.

The methodology used to demonstrate a "projected environmental benefit," *id*., in R09-10, was described in detail by Ameren, where it stated:

> To assess the overall environmental impact of Ameren's proposal, in conjunction with Ameren's petition for a variance (R09-21) [sic], the Agency and Ameren evaluated **projected mass emissions under the MPS and the proposal over an eleven-year period.** From data derived by reports provided by Ameren, **the Agency calculated an average heat input for the Ameren MPS Group from 2000 through 2007 and multiplied that constant value by SO_2 and NOx emission rates to determine the total tons of SO_2 and NOx for the given period (2010 through 2020).** The total tonnage of SO_2 and NOx calculated for this time period assumed Ameren's compliance with the original MPS rates and then compared that amount with the total tonnage for SO_2 and NOx projected under the proposed amendment **in order to determine if compliance with the proposed amendment afforded a net environmental benefit** . . . . In conjunction with its testimony submitted in this rulemaking, Ameren repeated the analysis performed by the Agency but used updated data to include calendar year 2008.

See R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 13-14 (emphasis added).

To summarize: in R09-10, the environmental impact of proposed MPS amendments was analyzed based upon projected actual emissions. The Agency and Ameren projected future emissions based on actual historical heat inputs. Because the analysis demonstrated that Ameren's "compliance with the proposed amendment," *id.*, would yield less SO_2 and NOx pollution, both the Agency and the Board agreed that it offered an environmental benefit. Quite simply: **less pollution equaled an environmental benefit**, while more pollution would not have offered any environmental benefit. And because it concluded that Ameren's proposal offered an environmental benefit, the Board also found it to be technically feasible and economically reasonable. R09-10 (Apr. 16, 2009), at 29.

As discussed in Section III, below, the Board should not even entertain Illinois EPA's proposal to amend the MPS, because Illinois EPA and Dynegy have done nothing to dispel the Board's earlier conclusions that the MPS as it stands is technically feasible and economically reasonable. If the Board does consider the merits of Illinois EPA's proposal, though, the Board certainly should undertake the same analysis employed in R09-10, and deny Illinois EPA's proposal unless it finds an environmental benefit, in the form of actual emissions reductions from the current MPS, based upon Dynegy's compliance with a revised MPS.

III. ILLINOIS EPA'S RATIONALES FOR ITS PROPOSAL DO NOT JUSTIFY ITS ADOPTION.

Before assessing the environmental impact of Illinois EPA's proposal, a threshold issue is whether Illinois EPA has presented any credible reason for amending the MPS in the first place. As stated above: the Board has twice found the MPS's current rate-based emission limits to be technically feasible and economically reasonable. *See* R06-25 (Dec. 21, 2006), at 54; R09-10

(Apr. 16, 2009), at 29. Dynegy, for its part, has testified that it "is in compliance with the current MPS and is able to demonstrate compliance with the MPS." Ex. 18, Dynegy's Responses to Pre-Filed Questions of the Illinois Attorney General's Office for Dynegy's Witnesses (Jan. 18, 2018), at 3, ¶ 11. This echoes Dynegy's September 2016 statement to the Board that the variance granted to it in PCB 14-10 could be terminated because "[the Old Ameren] MPS Group can comply with the SO_2 emission limit [of 0.23 lb/mmBtu] . . . in calendar year 2017 and each calendar year thereafter." PCB 14-10, Mot. to Terminate Variance (Sept. 2, 2016), at 4. Illinois EPA earlier informed the Board that its position "is that the language in the MPS should not generally be amended." R09-10, IEPA Post-Hearing Comments (Mar. 6, 2009), at PDF p. 13. If Illinois EPA now wishes to amend "one of the most important environmental and public health advances in Illinois in recent decades," Ex. 14, Diericx Test. (Dec. 11, 2017), Ex. A (2009 testimony of former Illinois EPA Director Douglas P. Scott to the United States Congress), at 2, then the Board should require Illinois EPA to present a compelling justification.

The People's position since the beginning of this proceeding has been consistent: the Board should reject Illinois EPA's proposal. *See* Ex. 9, Gignac Test. (Dec. 11, 2017), at 2. Illinois EPA's rationale for its proposal boils down to three sentences in its SOR:

> [I]n or around November 2016, Dynegy approached the Illinois EPA, requesting that changes be made to the MPS. Specifically, Dynegy requested that the Dynegy and Ameren MPS Groups be combined into a single MPS Group to allow the company the flexibility of using its entire fleet to meet emissions standards and to simplify compliance. Dynegy also requested that the NOx annual, NOx seasonal, and SO_2 annual emission rates be replaced with mass emission limits to provide the company with additional operational flexibility and economic stability.

R18-20, IEPA SOR, at 3. These explanations do not bear scrutiny, for two primary reasons. *Cf. Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 505-06 (1988) ("Agency action is arbitrary and capricious if the agency . . . offers an explanation for its decision which runs counter to the evidence before the agency, or which is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."). **First**, Illinois EPA's and Dynegy's explanations fail to justify any need to change the MPS standards that apply to the Dynegy Group, whatsoever. **Second**, with respect to the Old Ameren Group, Illinois EPA has failed to adequately consider the technical feasibility and economic reasonableness of simply holding Dynegy to current MPS standards.

A. Illinois EPA Has Not Justified Any Amendments of the MPS Standards That Apply to the Dynegy Group, Based on Its Current Operations.

Of the handful of rationales identified by Illinois EPA in its SOR, certainly the focus of this proceeding has been on Dynegy's claimed need for "operational flexibility and economic stability." R18-20, IEPA SOR, at 3. *See*, *e.g.*, Jan. 18, 2018 Trans. at 162, lines 15-17 (Dynegy's testimony that "[t]he purpose of the rule change is to ensure that we can offer the units in at their short-run marginal costs"). As became clear over five days of hearings, though, Dynegy's claimed need for "operational flexibility," as defined by Illinois EPA and Dynegy, could not in any case warrant modification of the MPS standards applicable to the Dynegy Group.

During the hearings in this proceeding, Illinois EPA testified that its sole understanding of "operational flexibility" is a rule that allows Dynegy to avoid bidding its plants into the energy market below cost, "strictly for the purpose of meeting a fleet-wide rate-based limit." *See* Ex. 6, IEPA Responses to Pre-filed Questions (Jan. 12, 2018), at 14; Jan. 17, 2018 Trans. at 57, lines 3-13. Upon cross-examination, though, Illinois EPA conceded it had no knowledge of how often Dynegy actually required this "operational flexibility." Jan. 17, 2018 Trans. at 57, line 14, to 58, line 4. Dynegy, for its part, testified that, of the two MPS groups, it presently is **only** the Old Ameren Group in which plants are bid into the energy market below cost for purposes of MPS compliance. Specifically, Dynegy claimed, it must bid in the well-controlled Coffeen and Duck

Creek plants below cost to meet the MPS SO_2 rate for the Old Ameren Group. *See* Jan. 18, 2018 Trans. at 131, line 3, to 133, line 6 (including Dynegy's testimony that "we operate the Duck Creek and Coffeen units at a loss to maintain compliance with the MPS.").

By contrast, the Dynegy Group has no need for any such "operational flexibility." As Mr. Diericx testified for Dynegy:

> As demonstrated in our MPS compliance submittals to the Illinois EPA, the [Dynegy] fleet has a compliance margin. So, therefore, does not need to operate units at a loss for the sake of compliance with the MPS rate rule.

Jan. 18, 2018 Trans. at 132, lines 15-19. In other words: Illinois EPA's primary rationale for its rule—providing Dynegy with "additional operational flexibility and economic stability"—supplies no basis, whatsoever, for any change to the MPS limits applicable to the Dynegy Group. The Dynegy Group has a "compliance margin," *id*., and Dynegy therefore has no problems "offer[ing] the units in at their short-run marginal costs." *Id*. at 162, lines 15-17. Dynegy has testified that the Dynegy Group as a whole operated at a $90 million loss for the nine months ending September 30, 2017. Jan. 18, 2018 Trans. at 144, lines 17-20. This loss, though, **cannot** be attributed to Dynegy being required to offer the Dynegy Group plants below cost for MPS compliance—Illinois EPA's and Dynegy's sole explanation for the supposed need for "operational flexibility" under the current MPS. Dynegy clearly testified to the Board that the two plants in the Dynegy Group that are controlled for SO_2—Baldwin and Havana—"are not operated at a loss solely for MPS compliance." *Id*. at 132, line 21, to 133, line 6.

Neither do any other rationales identified by Illinois EPA in its SOR—allowing Dynegy to "us[e] its entire fleet to meet emissions standards" and "simplify[ing] compliance"—justify any amendments to the MPS standards based on the Dynegy Group's operations. Simply put: there is nothing complicated about the Dynegy Group's compliance with the MPS, because Dynegy earlier completed the "installation and operation of pollution control equipment" that was "required to achieve" compliance with MPS SO_2 limits. R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4.[10] For 2017, the Dynegy Group's SO_2 emission rate was 0.137 lb/mmBtu, well below its 0.19 lb/mmBtu limit. *See* Ex. 37, Armstrong Test. (Apr. 3, 2018), Att. 6. Dynegy testified during the March 6, 2018 hearing that, "[b]y adding the six [Dynegy] units with the [Old Ameren] units, the fleet would have more operating options." Mar. 6, 2018 Trans. at 22, lines 11-13. The Dynegy Group does not need more operating options, though; it is able to comply with the MPS without difficulty.

Accordingly, Illinois EPA and Dynegy have failed to supply any credible rationale for amending the MPS standards applicable to the Dynegy Group, based on its current operations. Therefore, the Board should reject the proposed MPS amendments.

B. Illinois EPA Has Failed to Adequately Consider the Option of Simply Maintaining Current MPS Standards for the Old Ameren Group.

Neither have Illinois EPA or Dynegy provided any good reason for modifying the MPS standards applicable to the Old Ameren Group. Dynegy's criticism of the current MPS, as it applies to the Old Ameren Group essentially is that it "could force you to make bad business decisions like running the units that are losing money more and running profitable units less to lower the annual emission rate." Mar. 6, 2018 Trans. at 26, lines 7-11.

Based on the history of the MPS described in Section I, above, though, Dynegy is flatly wrong. The MPS does not "force" any operator to make such business decisions. Rather, as Dynegy acknowledged over a decade ago, the intent of the MPS was to compel "**the installation**

[10] It is important to bear in mind, though, that Dynegy's installation of this pollution control equipment also was driven by the Consent Decree entered in *United States v. Illinois Power Company*, 99-833-MJR (S.D. Ill.), to resolve federal Clean Air Act violations alleged by the United States and the State of Illinois. *See* https://www.epa.gov/enforcement/consent-decree-united-states-america-et-al-v-illinois-power-company-et-al-civil-action.

<u>and operation of pollution control equipment required to achieve the [MPS] NOX and SO2 standards.</u>" R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4 (emphasis added). Just five years ago, in PCB 14-10, Dynegy advised the Board that the installation of new pollution controls at Newton would "allow the owners of the MPS group to meet the MPS rate" and that it was "poised to assume the compliance plan [Ameren] committed to last year." PCB 14-10, Dynegy Post-Hearing Brief (Oct. 7, 2013), at 7. Based on the historical record, then, the path to MPS compliance is clear: installing and operating new pollution controls. Despite this clear record, Illinois EPA has failed to provide any testimony or analysis showing why Dynegy could not—and should not—simply finish the job of installing pollution control equipment on the Old Ameren Group, as was promised to the Board in PCB R09-10, PCB 12-126, and PCB 14-10.

Dynegy has asserted that it sometimes operates the Old Ameren Group's Coffeen and Duck Creek units—both controlled for SO_2 with flue gas desulfurization ("FGD")—"at a loss to maintain compliance with the MPS." Jan. 18, 2018 Trans. at 131, line 4, to 133, line 6 (including Dynegy's testimony that "[w]e operate the Duck Creek and Coffeen units at a loss to maintain compliance with the MPS."). Dynegy also has asserted that it has run its uncontrolled Joppa units less at various times, also to maintain compliance with the MPS rate-based SO_2 limit. *See* Mar. 6, 2018 Trans. at 33, lines 7-9.

Even taking Dynegy at its word, it is difficult to see the urgent need for a rule change that Dynegy claims. Dynegy has testified that, of the two MPS groups—it is actually the Old Ameren Group that generates a positive operating income—$40 million, for the nine months ending September 30, 2017. Jan. 18, 2018 Trans. at 144, lines 17-24. In other words: the only MPS Group that purportedly is negatively impacted by MPS compliance performs better economically than the MPS Group that is not.

Certainly, the Old Ameren Group's operations are constrained by its lack of pollution controls to comply with the MPS's current SO_2 emission rate of 0.23 lb/mmBtu, which went into effect in 2017. This constraint is demonstrated by the analysis in Table 10 of the People's December 11, 2017 pre-filed testimony, which showed that the Old Ameren Group could not operate at maximum capacity in compliance with the MPS's currently applicable SO_2 rate, given the Group's unit-level emission rates for 2016. Ex. 9, Gignac Test. (Dec. 11, 2017), at 18. In Attachments 3 through 6 of the People's April 3, 2018 pre-filed testimony, we repeated the analysis using 2013 through 2015 and 2017 unit-level emission rates, and reached the same result. Ex. 37, Armstrong Test. (Apr. 3, 2018), Atts. 3-6. Table 10 in each of these spreadsheets shows the maximum system-wide heat input for the Old Ameren Group while maintaining compliance with the current SO_2 rate of 0.23 lb/mmBtu, assuming that all of the Group's cleanest units are run first. This scenario—which, to be clear, all parties agree is totally impracticable in the real world—is used only as an analytical tool to show that the Old Ameren Group cannot be run at full capacity and comply with the current MPS SO_2 emission rate, even if it were operated in the very most optimal fashion for maximizing system-wide heat input.

This result should not surprise any participant in this case. It was this very SO_2 limit that prompted Dynegy to seek a variance from the MPS in PCB 14-10. In that case, Dynegy's witness Daniel P. Thompson testified that complying even with the MPS's **2015** SO_2 emission rate of 0.25 lb/mmBtu for the Old Ameren Group would "effectively require each of the Newton, E.D. Edwards and Joppa energy centers to limit its respective generation to approximately one-third of its capacity." PCB 14-10, Petit. for Variance (July 22, 2013), Ex. 8, Thompson Aff., at 6. In exchange for more time to comply with MPS SO_2 emission limits, Dynegy "assume[d] the compliance plan [Ameren] had committed to" in 2012, to install new pollution controls (specifically, FGD) at Newton. PCB 14-10, Dynegy Post-Hearing Brief (Oct. 7, 2013), at 7.

While it has been understood for over a decade that MPS compliance within the Old Ameren Group would require installation of additional pollution controls, Illinois EPA now shrugs off that approach because "controls are not cheap." Jan. 17, 2018 Trans. at 53, lines 10-20. Illinois EPA's position departs without explanation from its past policies and ignores a crucial issue under Section 27(a) of the Act, 415 ILCS 5/27(a). *See Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 505-06 (1988).

Specifically, Section 27(a) of the Act, 415 ILCS 5/27(a) (emphasis added), instructs the Board to consider "the technical feasibility and economic reasonableness **<u>of measuring or reducing the particular type of pollution</u>**." Dynegy can simply continue to dispatch its plants as it has done in recent years to meet the current MPS's SO_2 emission limits, or as Illinois EPA acknowledges, Dynegy could comply with the current MPS by installing pollution controls to reduce emission rates. Apr. 17, 2018 Trans. at 155, lines 18-24. Illinois EPA's witness qualified that answer, as follows: "I suppose you could say that about anybody, that anybody could just spend several million dollars to put controls on." *Id*. The glaring problem with this answer is that Illinois EPA actually has not provided any testimony or analysis of how much SO_2 controls **<u>would</u>** cost to install and operate on the Old Ameren Group, much less that it would be infeasible or unreasonable for Dynegy to do so. Indeed, Illinois EPA did not recall even discussing with Dynegy the possibility of installing additional pollution controls, as they developed the current proposal together. Jan. 17, 2018 Trans. at 53, line 21, to 54, line 2. Illinois EPA's inadequate consideration of "the technical feasibility and economic reasonableness of measuring or reducing [SO_2] pollution," 415 ILCS 5/27(a), is also apparent from its October 2, 2017 Technical Support Document ("TSD"). The TSD's analysis is limited to the following paragraph:

> **4.0 Technical Feasibility and Economic Reasonableness**
> The proposed amendments are both technically feasible and economically reasonable. **The owner/operator of the affected sources has agreed that the emission limits contained in the proposed amendments are achievable**. The proposed amendments are likewise economically reasonable, as they have been proposed to provide operational flexibility to the affected sources, and will not cause adverse economic impact.

R18-20, IEPA TSD, at 8. In other words: Illinois EPA concludes that the proposal is reasonable because Dynegy says it is. Illinois EPA's failure to consider the possibility that Dynegy simply comply with the current MPS by: 1) installing needed (and promised) pollution controls, or 2) operating its plants with an appropriate level of controlled unit operation to meet the emission standard, is unreasonable.

Even more problematic is that Dynegy did, construct and operate new SO_2 pollution control equipment at its Newton plant over the past two years, pursuant to construction permits issued by Illinois EPA. The People included as Attachments 8 and 9 to the People's April 3, 2018 pre-filed testimony (Ex. 37) a May 24, 2016 construction permit and a June 9, 2017 revised construction permit issued by Illinois EPA to Dynegy. The June 9, 2017 revised permit authorizes "ductwork sorbent injection . . . to be conducted on an on-going basis on [Newton] Boiler 1, no longer limiting the use of this equipment to evaluation of sorbent injection." Ex. 37, Armstrong Test., Att. 9 at 1.b.i. In other words: Illinois EPA has authorized Dynegy to operate sorbent injection at Newton on a permanent basis—completely belying Illinois EPA's implication that it is cost-prohibitive to install any additional pollution controls on the Old Ameren Group. Despite issuing two construction permits for sorbent injection at Newton, including for permanent operation of the equipment, Illinois EPA did not disclose this equipment to the Board when asked in January 2018.[11] Illinois EPA further was unable at hearing to answer even basic questions about how much

[11] The Board specifically asked Illinois EPA to "[p]rovide a table listing each facility and unit along with the current pollution control equipment." Ex. 6, IEPA Responses to Pre-filed Questions (Jan. 12, 2018), at 7.

the pollution controls had cost to install; what level of control they could achieve; or whether it would be possible to install similar equipment at other units in the Old Ameren Group. Apr. 17, 2018 Trans. at 159, line 6, to 160, line 13.

Illinois EPA's failure to consider the technical feasibility and economic reasonableness of Dynegy complying with the existing MPS through the installation of long-promised SO_2 controls or operating its plants with an appropriate level of controlled unit operation to meet the emission standard, ignores one of Section 27(a)'s key requirements. As with the Dynegy Group, the record does not justify any modification to the standards applicable to the Old Ameren Group, based on current operations. Consequently, the Board should reject the proposed MPS amendments.

C. Dynegy and Vistra's Evasive Answers Have Further Frustrated the Development of an Adequate Record.

Just taking Illinois EPA's and Dynegy's testimony at face value, it is puzzling why these amendments needed to be proposed in the first place. Dynegy has testified that it "is in compliance with the current MPS and is able to demonstrate compliance with the MPS." Ex. 18, Dynegy's Responses to Pre-Filed Questions of the Illinois Attorney General's Office for Dynegy's Witnesses (Jan. 18, 2018), at 3, ¶ 11. The Dynegy Group apparently needs no relief at all from its MPS emission rate limits. Jan. 18, 2018 Trans. at 132, line 21, to 133, line 6. While the operations of the Old Ameren Group are constrained by its MPS SO_2 limit, it actually performs better financially than the Dynegy Group, according to Dynegy's testimony. Jan. 18, 2018 Trans. at 144, lines 17-24. Dynegy has maintained to the Board that it does not expect to retire or mothball any of its controlled plants solely as a result of the Board's adoption of Illinois EPA's proposal. *See*, *e.g.*, Jan. 18, 2018 Trans. at 122, lines 9-11. And Vistra has adopted all of Dynegy's testimony by reference. *See* Apr. 17, 2018 Trans. at 192, lines 5-6 ("[W]e support the statements and testimony provided to the Board by Dynegy in this matter to date.").

Of course, though, one of the central problems with this rulemaking is that it has always been about much more than what Illinois EPA and Dynegy have told the Board. Vistra's CEO Curt Morgan first made this clear in an investor call even before the Vistra-Dynegy merger had closed, stating that the purpose of this rulemaking was to determine what plants were "in" and what plants were "out." Ex. 30, IAGO Pre-filed Questions (Mar. 2, 2018), at 4 (transcript of February 26, 2018 Vistra investor call). Days after the Vistra-Dynegy merger closed on April 9, 2018, Mr. Morgan made additional comments to the media, referring to some of Dynegy's plants with pollution controls as "hugely out of the money," and stating, "[w]e're likely going to have to retire some facilities there." *See* Ex. 41, *Weak MISO prices compound Ill. coal plant woes*, E & E NEWS (Apr. 13, 2018), at 2.

Vistra's representative was not nearly so loquacious in testimony before the Board, though; when asked about Mr. Morgan's public statements just the week before, about retiring Dynegy plants, she stated simply, "I can't comment on that." Apr. 17, 2018 Trans. at 194, line 20, to 195, line 3. In other words: Vistra sees no problem in talking about its real intent for this rulemaking in public—just not in sworn testimony before the Board.

Even since the latest hearings in April, Vistra's CEO Curt Morgan has doubled down on Vistra's intent to shrink the Dynegy fleet:

> And so I would expect balance of this year [sic], you guys are going to hear a lot more from us about what we're going to do with our MISO generation. I do think though at the end, when we get all that done, the retail business and **<u>what's left of the assets</u>**, we could have a little – nice little business in MISO that we can make money on, and that's the real goal on this. And so that's what I think, you'll see us probably **<u>a smaller, more focused business in MISO at the end of the day</u>**.

See Attachment 1, Vistra Q1 2018 Earnings Call (May 5, 2018), at PDF p. 25.

One could imagine this rulemaking having proceeded very differently if Dynegy had been upfront, from the beginning, with Illinois EPA, the Board, and all of the participants to this rulemaking, about its intentions for the MPS fleet. Dynegy—and, now, Vistra—could have disclosed, as Mr. Morgan has to the media, that some of Dynegy's plants with advanced pollution controls are "hugely out of the money." *See* Ex. 41, *Weak MISO prices compound Ill. coal plant woes*, E & E NEWS (Apr. 13, 2018), at 2. Dynegy—and, now, Vistra—could have explained that it does have SO_2 pollution controls available to it—indeed, that it had obtained a construction permit allowing it to operate sorbent injection at its Newton plant to control SO_2 on an "ongoing basis," and had actually operated the equipment during 2017. Ex. 37, Armstrong Test., Att. 9 at 1.b.i.[12] Dynegy—and, now, Vistra—could have made clear that the real purpose of this rulemaking is to allow closure of Illinois coal plants, in order to make a "nice little business in MISO," not to "ensure the viability **of the entire Illinois fleet**," as Dynegy earlier told the Board in sworn testimony. Ex. 15, Ellis Test. (Dec. 11, 2017), at 2.

If Dynegy and Vistra had not been so evasive before the Board, this rulemaking could have proceeded in a much more efficient and rational manner. The parties could have discussed, debated, and potentially designed modifications to the MPS that reflected the substantial changes that Vistra's CEO says are imminent. If, as seems likely, Vistra will close down multiple MPS plants, then the parties could have considered what plants are expected to remain by the end of this year; what existing and potential new pollution controls were available to those plants; and, ultimately, what level of pollution control would be technically feasible and economically reasonable for that "smaller, more focused" fleet. Attachment 1, Vistra Q1 2018 Earnings Call, at

[12] Compare with Dynegy's testimony at the January 18, 2018 hearing, Jan. 18, 2018 Trans. at 178, lines 8-12:

Q [Ms. Bugel] And has Dynegy explored the installation of dry absorbent injection as an option to meet the current MPS in a more or less costly way than operating Duck Creek and Coffeen at a loss?

A [Mr. Diericx] No.

By January 2018, Dynegy had done more than "explore" the installation of sorbent injection—it actually installed it at the Newton plant. Yet Dynegy did not disclose this upon direct questioning.

PDF p. 25. Those considerations did not, and cannot occur, on the present record.

The record's deficits support the People's conclusion: this rulemaking should be rejected. The Board has twice found the MPS's current rate-based emission limits to be technically feasible and economically reasonable. Dynegy itself has made clear that it can comply with the current MPS. Illinois EPA and Dynegy have provided no justification for rewriting it.

IV. ILLINOIS EPA'S PROPOSAL TO SCRAP RATE-BASED LIMITS IN FAVOR OF UNREASONABLY HIGH MASS CAPS SHOULD BE REJECTED BECAUSE OF ITS NEGATIVE ENVIRONMENTAL IMPACT.

As discussed in Section III, Illinois EPA has failed to provide any reasonable justification for amending the MPS, and the Board should deny Illinois EPA's proposal outright. The case against Illinois EPA's proposal becomes even stronger when its negative environmental impact is considered. Because Illinois EPA's proposal does not promote the Act's purposes to "restore, maintain, and enhance the purity of the air of this State," 415 ILCS 5/8, the Board should reject it.

Illinois EPA's proposed mass-based caps are inherently less protective than the MPS's current rate-based limits. The MPS's current limits are flexible, "real-world" limits that "ensure that [plants] are properly controlling their emissions over the course of the year, no matter how much or how little they actually run." Ex. 9, Gignac Test. (Dec. 11, 2017), at 21. By contrast, Illinois EPA's proposed mass caps would authorize—immediately upon adoption and at all times thereafter—levels of SO_2 and NOx pollution so high that they would be permitted under the current MPS only if all current units were collectively operating at a higher heat input than any reached during the past decade. Dynegy, with its current fleet, clearly could never operate in that manner under the current MPS, though—including because, under the current MPS SO_2 emission rate limit, the Old Ameren Group's heat input is restricted due to its lack of pollution controls. Accordingly, the proposed regulatory sleight of hand would instantly transform the MPS from a standard that requires additional pollution controls on the Old Ameren Group—*see* PCB R09-10, PCB 12-126, and PCB 14-10—into one that does not.

If Illinois EPA's proposal were adopted, Dynegy immediately would be allowed to increase pollution by: (1) no longer curtailing operations of higher-polluting units in the Old Ameren Group that it cannot currently operate under the MPS; (2) discontinuing use of the new sorbent injection pollution control equipment installed at Newton; and (3) shutting down better controlled, but more costly-to-operate units, thereby facilitating more run-time for remaining uncontrolled units. The combined effect would be to permit Dynegy to immediately increase pollution from the MPS units by tens of thousands of tons per year, relative to its operations under the current MPS. Illinois EPA's proposal therefore should be rejected as contrary to the Act's purposes.

If, despite the record's inadequate support, the Board does determine to accept the proposal to scrap the MPS's currently applicable and effective rate-based emission limits, then the People strongly urge the Board to revise Illinois EPA's proposed caps downward. Illinois EPA's proposed caps lack any rational basis, but instead unreasonably defer—without any independent analysis—to Dynegy's representations of what limits it could meet while operating, as Illinois EPA put it, "in a financially reasonable way." April 17, 2018 Trans. at 209, line 15, to 210, line 4. The People also urge that the Board should provide that any mass-based limits will decline upon Dynegy's mothballing or retirement of any MPS unit.

A. Illinois EPA's Proposed Mass-Based Caps Are Inherently Less Protective Than Current Rate-Based Limits, and Would Permit Additional Pollution.

Illinois EPA's proposed caps of 49,000 tons of SO_2 and 25,000 tons of NOx, annually, exceed any reasonable projection of Dynegy's actual emissions under the current MPS. If Illinois EPA's proposed caps are adopted, Dynegy immediately would be permitted to increase pollution by tens of thousands of tons per year. This would result in a negative environmental impact, contrary to some of Illinois EPA's inconsistent testimony in this proceeding.

1. Illinois EPA's Proposed "Worse Than Worst-Case Scenario" Mass Caps Are Inherently Less Protective Than the MPS's Current Rate-Based Limits.

In describing its use of "allowable emissions" to analyze its proposal's environmental impact, Illinois EPA testified that "[u]se of allowable emissions is the most conservative way to do modeling and planning," and that "modeling is often done using allowable emissions to represent the **worst case scenario**." *See* Jan. 17, 2018 Trans. at 23, lines 8-18 (emphasis added). As a consequence: "[A]llowable emissions often have very little to do with actual emissions throughout all of the Board's rules." Jan. 17, 2018 Trans. at 47, lines 11-13.

Section IV.B.1, below, discusses in greater detail the deficits of Illinois EPA's reliance upon allowable emissions in this proceeding to analyze environmental impact, in direct conflict with its use of projected actual emissions in R09-10. As an initial point, though, Illinois EPA's above testimony helps sum up why its proposed mass-based caps are not as protective as the current MPS rate-based limits. The amount of pollution permitted by a rate-based cap varies with the amount of a facility's usage (its heat input, in this case.) *See* Apr. 17, 2018 Trans. at 161, lines 19, to 163, line 7). In other words: with a rate-based limit, a facility's compliance is assessed by its emissions under actual operating conditions, not in comparison to what pollution **could have been** emitted under more extreme, "worst-case" conditions. By contrast, the amount of pollution permitted by a mass-based cap does not vary with the amount of a facility's usage. It is set at one number that applies to the facility at all times, regardless of operating conditions for any given period.

Accordingly, just by switching from rate-based to mass-based caps, Illinois EPA's proposal strips the current MPS of its capacity to closely regulate the MPS units no matter how much or how little they actually operate. For that reason, alone, Illinois EPA's proposal can and should be rejected. Even more, though, Illinois EPA has proposed inordinately high mass-based caps that reflect three sets of unsupported assumptions:

(1) future operation of the MPS units at an overall heat input level that exceeds levels reached at any point over the past ten years, all at a time when coal usage in the United States has declined overall, and specifically in the power generating sector, where it has declined by 61 million short tons or 8 % from 2015 – 2016;[13]

(2) more specifically, future operation of the Old Ameren Group at that higher heat input level, even though the Group, as currently controlled, could barely increase heat input even marginally and remain in compliance with the MPS SO_2 limit that went into effect in 2017; and

(3) operation of **all** current MPS units, even though one (Baldwin Unit 3) is currently mothballed, and Vistra has advised its investors that shutdowns are forthcoming.

The end result is that Illinois EPA's proposed caps reflect not even just a "worst-case scenario," but a "worse than worst-case scenario."

First, with respect to the MPS Groups' overall heat input, one simple but clear indication of how Illinois EPA's proposed caps reflects a "worse than worst-case scenario" is to compare them with the MPS units' actual emissions during recent years:

Year	SO_2 Annual Tons	NOx Annual Tons
2013	43,324	18,849
2014	44,382	18,085
2015	35,706	15,309
2016	27,621	13,925
2017	30,578[14]	15,900

The disparity between Illinois EPA's proposed annual caps of 49,000 tons of SO_2 and 25,000 tons of NOx, and the MPS units' actual emissions over the past five years should concern the Board.

[13] *U.S. energy consumption rose slightly in 2016 despite a significant decline in coal use,* U.S. Energy Information Administration (April 5, 2017). Available at: https://www.eia.gov/todayinenergy/detail.php?id=30652.

[14] Notably, the MPS units' 2016 and 2017 SO_2 emissions reflect the fact that Dynegy took efforts in both 2016 and 2017 to show compliance with declining MPS SO_2 limits of 0.25 lb/mmBtu (2016) and 0.23 lb/mmBtu (2017), *see* R14-10, Mot. to Terminate Variance (Sept. 2, 2016), at 4, and in fact met the 0.23 lb/mmBtu limit in 2016. *See* Ex. 9, Gignac Test. (Dec. 11, 2017), Exhibit 1.

These five years even include two years—2013 and 2014—of relatively higher heat inputs. The 2017 data shows Illinois EPA's proposed SO_2 and NOx caps are respectively 60% and 57% higher than MPS units' actual emissions in 2017. The proposed caps bear little relation to the MPS fleet's real-world operations. To paraphrase Illinois EPA, its proposed limits "have very little to do with actual emissions." Jan. 17, 2018 Trans. at 47, lines 11-13.

That Illinois EPA's proposed caps are unreasonably high also is evident when they are compared to what level of pollution would have been permitted under currently applicable MPS rates, looking at the MPS units' historical heat inputs for the past ten years. This analysis is included in Attachment 2 to the People's April 3, 2018 pre-filed testimony (Exhibit 37).

Attachment 2 includes, for the years 2008 through 2017: (1) a table showing historical capacity factors for the current MPS units; (2) historical annual unit-level heat inputs, and (3) historical annual heat inputs for the current MPS Groups, overall. Based on those historical heat inputs, Attachment 2 then calculates what levels of annual SO_2 and NOx emissions **would have been** permissible under the overall group MPS emission rate limits currently applicable to the Dynegy and Old Ameren Groups, disregarding the Groups' actual unit-level emission rates.

As Attachment 2 shows, if the current MPS emission rate limits had been in place over the past ten years, then the current MPS units would **at no point during the past ten years** have been permitted to emit either 49,000 tons of SO_2 or 25,000 tons of NOx annually, based on the actual overall heat inputs for the Dynegy and Old Ameren Groups for each year in that period. To be clear: as discussed immediately below, when the current MPS's requirement to average together unit-level emission rates is taken into account, the Old Ameren Group would struggle to even marginally increase current heat input and still comply with the now-effective 2017 MPS SO_2 emission rate limit. Even assuming, though, that the current MPS units could otherwise return to their past-decade peak overall heat input (from 2011) of 445,904,570 mmBtu (194,717,709 mmBtu for the Dynegy Group and 251,186,861 for the Old Ameren Group), in compliance with MPS emission rate limits, the MPS would still limit the units to no more than 47,385 tons of SO_2 emissions and 23,551 tons of NOx emissions, annually. So, even disregarding the units' actual emission rates, Illinois EPA's proposed annual caps on SO_2 and NOx exceed what the current MPS would have permitted, even under the highest actual heat inputs of the past ten years.[15] Based strictly on overall historical heat inputs, then, Illinois EPA's proposed caps reflect not even a "worst-case scenario," but a "worse-than-worst-case scenario."

Second, Illinois EPA's proposed caps also fail to take into account that the Old Ameren Group's operations under the current MPS are constrained by its lack of SO_2 pollution controls. When asked during the January 17, 2018 hearing if the MPS fleet as currently controlled could actually operate at maximum capacity in compliance with the MPS's fleet-wide emission rate limits, Illinois EPA's witness testified that he did not know. Jan. 17, 2018 Trans. at 48, lines 13-24. In other words, Illinois EPA completely disregarded one of the MPS's central features when it developed its current proposal.

The reality is that the Old Ameren Group, as currently controlled, cannot operate at maximum capacity and comply with the MPS SO_2 emission rate limit. This was true when Dynegy said it in 2013, R14-10, Petition for Variance, Ex. 8, Thompson Aff., at 6, and it remains true today. The People established this point in Table 10 to our December 11, 2017 pre-filed testimony, which showed that the Old Ameren Group could not operate at maximum capacity in compliance with the MPS at its unit-level emission rates from 2016—the most recent available emission rates at the time we prepared the testimony. Ex. 9, Gignac Test. (Dec. 11, 2017), at 18. Illinois EPA

---

[15] The 2011 combined heat input of 445,904,570 mmBtu is 42% higher than 2017's combined heat input of 314,776,210 mmBtu.

and Dynegy then, at various points during subsequent hearings, implied that use of only 2016 emission rates presented a myopic view of the MPS units' operations—though failed to present any evidence of their own on historical emission rates. *See*, *e.g.*, Jan. 17, 2018 Trans. at 49, lines 4-12 (Illinois EPA stating that it could not consider the MPS units' actual emission rates without making "assumptions about the emission rates of other units that they are not required to meet on a unit or source-specific basis").

To address these purported concerns, the People calculated the actual annual unit-level emission rates for each of the current MPS units for 2013 through 2015 and 2017, in the same manner described on page 8 of the December 11, 2017 pre-filed testimony. *See* Ex. 37, Armstrong Test. (Apr. 3, 2018), Atts. 3-6. In short: annual unit-level SO_2 and NOx emission rates have been consistent over the past five years throughout both the Dynegy and Old Ameren Group. Expressed to two decimal points—as are the emission rates in the MPS—the units at each MPS plant has had the following range of annual SO_2 emission rates:[16]

Plant	**Range of Annual SO_2 Emission Rates, 2013-2017 (lb/mmBtu)**
Baldwin	0.07 – 0.08
Havana	0.07 – 0.08
Hennepin	0.42 – 0.50
Coffeen	0.00 – 0.01
Duck Creek	0.00 – 0.02
Edwards	0.41 – 0.45
Joppa	0.39 – 0.51
Newton	0.40 – 0.51 (2013-2016); 0.29 (2017)

As shown by these historical rates, the four plants identified by Illinois EPA in its testimony to have controls for SO_2—Baldwin, Havana, Coffeen, and Duck Creek—have remained nearly identical from year to year. *See* IEPA Responses to Pre-Filed Questions (Jan. 12, 2018) at 7 (table

[16] The NOx emission rates are more unit-specific, as opposed to plant-specific, relative to SO_2 emission rates, but nevertheless also are consistent from year to year. *See* Ex. 9, Gignac Test. (Dec. 11, 2017), Exhibit 1; Ex. 37, Armstrong Test. (Apr. 3, 2018), Atts. 3-6.

identifying SO_2 and NOx controls at MPS plants). Plants for which Illinois EPA has not identified controls—Hennepin, Edwards, Joppa, and Newton—have slightly more variation, based on the sulfur content of coal burned that year, but still remain bounded between 0.39 lb/mmBtu and 0.51 lb/mmBtu SO_2, at the most extreme ranges.[17] Thus, there is no need for Illinois EPA to make any "assumptions" about emission rates, (Jan. 17, 2018 Trans. at 49, lines 4-12); these are the plants' actual historical emission rates for five years, and they are steady.

As the Tables 10 in Exhibit 1 to the People's December 11, 2017 pre-filed testimony and Attachments 3 through 6 of the People's April 3, 2018 pre-filed testimony demonstrate, the Old Ameren Group cannot operate at maximum heat input and comply with the MPS. Moreover, though, Attachments 3 (2013 data) and 4 (2014 data) to the People's April 3, 2018 pre-filed testimony further show that Dynegy cannot operate **even at marginally higher heat inputs** and comply with the current MPS SO_2 rate that went into effect in 2017.

Again: MPS unit-level emission rates for SO_2 were largely consistent from 2013 through 2017 (with the sole exception of the "mystery" sorbent injection equipment operational during 2017 at Newton Unit 1). During 2017, the Old Ameren Group was able to comply with the 2017 MPS SO_2 emission rate limit of 0.23 lb/mmBtu with a heat input of 186,288,664 mmBtu. As Dynegy finally admitted after lengthy cross-examination during the March 6, 2018 hearing in this proceeding, its compliance strategy in 2017 included reducing heat input to its uncontrolled Joppa units, in order to maintain compliance with the MPS's SO_2 emission rate limit. *See* Mar. 6, 2018 Trans. at 33, lines 4-9; 52, lines 9-12.

By contrast, at the marginally higher heat inputs in 2013 (219,033,299 mmBtu) and 2014 (225,448,494 mmBtu), the Old Ameren Group blew past the current MPS SO_2 limit, with emission

[17] Sole exception is Newton Unit 1's 2017 SO_2 emission rate, which was influenced by newly installed sorbent injection control equipment that was operational in 2017 but never disclosed to the Board by Illinois EPA or Dynegy.

rates of 0.302 lb/mmBtu (2013) and 0.310 lb/mmBtu (2014).[18] *See* Ex. 37, Armstrong Test. (Apr. 3, 2018), Atts. 3 and 4. Simply put: Dynegy can no longer operate the Old Ameren Group as it did in 2013 and 2014. The Old Ameren Group cannot operate at even those years' modestly higher levels and still comply with the MPS, because Dynegy did not install the pollution controls it needed to keep up with the MPS's increasingly stringent SO_2 limit.[19]

Again, the Old Ameren Group's operational constraints should not surprise any participant in this rulemaking. The Old Ameren Group's heat input level is restricted under the current MPS because Dynegy has not invested in "the installation and operation of pollution control equipment required to achieve the [MPS] NOX and SO2 standards." R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4. By attempting to set "worse than worst-case" standards that ignore this well-established constraint, Illinois EPA eliminates the MPS and erases its pollution-control requirements.

Third, Illinois EPA's proposed caps reflect a "worse than worst-case scenario" because they are premised on the continued operation of all current MPS units, and do not decline upon the retirement or mothballing of a unit. Indeed, even today, one of the "current MPS units," Baldwin Unit 3 (which is also a controlled unit), is mothballed. *See* Mar. 6, 2018 Trans. at 50, lines 16-17. Yet Illinois EPA insists that its proposed caps should be assessed based on the potential operations of all current units, including Baldwin Unit 3. *See*, *e.g*., R18-20, IEPA TSD, at 9-10.

Illinois EPA's proposal would eliminate the environmental benefits of the MPS. Under the

---

[18] One telling detail is that Coffeen—which due to its FGD control equipment emits virtually no SO_2—actually had a significantly higher heat input during 2017 (59,040,683 mmBtu) (32% of overall Group heat input) than in 2013 (50,679,190 mmBtu) (23% of overall Group heat input) or 2014 (50,679,190 mmBtu) (22% of overall Group heat input). To achieve higher heat input now, Dynegy would have to lean largely on the uncontrolled E.D. Edwards and Joppa plants, which it could not do in compliance with the current MPS SO_2 emission rate.

[19] This point also is made by Attachment 10 to the People's April 3, 2018 pre-filed testimony (Exhibit 37), applying 2017 MPS unit-level emission rates to historical heat inputs from 2002 (the base year for the Regional Haze SIP).

current MPS, if a unit is retired or mothballed, it simply does not factor into MPS compliance; if there is no heat input to a plant, there is no allowance for pollution from that plant. Yet Illinois EPA's proposal would lock in an allowance for pollution for all current MPS units, at all times going forward. Illinois EPA's position is particularly unreasonable in light of Vistra's multiple statements to its investors and the media regarding retirement of MPS units—including most recently stating that it intends to make closure decisions by the end of the year. *See* Attachment 1, Vistra Q1 2018 Earnings Call, at PDF p. 25. If the MPS fleet will shrink, then why should permanent pollution limits be set based upon the operations of the entire current fleet? The Board faces the prospect of adopting rules that would authorize levels of pollution based on the operations of a full MPS fleet—only for Vistra to then shrink that MPS fleet into a "smaller, more focused business" by the end of the year. *Id*.

In sum: Illinois EPA's proposed mass caps are inherently less protective than the current MPS. The current MPS is a flexible standard created by the Illinois EPA that ensures adequate pollution control no matter how often the MPS units run. Illinois EPA's proposed caps instead are rigid limits reflecting a "worse than worst-case scenario" resting on unreasonable and unsupported assumptions regarding how the MPS units have operated, and will operate. Illinois EPA's proposal does not promote the Act's purposes to "restore, maintain, and enhance the purity of the air of this State," 415 ILCS 5/8, and the Board should reject it.

2. Illinois EPA's Proposed Caps Would Allow Dynegy to Immediately Increase Pollution.

Illinois EPA and Dynegy's argument apparently is that there is nothing wrong with the Board's basing MPS rate-based limits on a "worst-case scenario," because, they assert, the MPS as it stands now would allow such emission levels if and when, for example, market conditions for Dynegy's plants improved. *See*, *e.g*., IEPA TSD, at 11-12. As shown in Section IV.A.1., above, though, Illinois EPA's proposed caps represent not just a "worst-case scenario," but a "worse-than-worst-case scenario." Illinois EPA's proposal would change the MPS in a manner that would immediately permit Dynegy to emit significantly more pollution than under the current MPS, regardless of broader market conditions.

First, switching from rate-based to mass-based limits immediately would remove the Old Ameren Group's current heat input restriction, caused by its lack of sufficient pollution controls to comply with the MPS's SO_2 emission rate limit. One consequence would be that Dynegy no longer would have any need to curtail its operation of its Joppa units (or units of other higher-emitting plants) in order to comply with the Old Ameren Group emission rate. *See* Mar. 6, 2018 Trans. at 33, lines 4-9; 52, lines 9-12. Illinois EPA's proposal therefore would immediately facilitate higher utilization of any of the Old Ameren Group units that are uncontrolled for SO_2. Relative to operations under the current MPS, then, these uncontrolled units could run more, and thereby emit more SO_2 and NOx. And, given the difference between the MPS Groups' current overall SO_2 emissions (30,578 tons during 2017, of which the Old Ameren Group's E.D. Edwards, Joppa, and Newton plants accounted for 21,675) and Illinois EPA's proposed cap of 49,000 tons, the uncontrolled units would have a large amount of room under the cap to increase operations. *See* Ex. 37, Armstrong Test. (Apr. 3, 2018), Att. 6.

Second, and related to the first point, Illinois EPA's proposal would allow Dynegy to discontinue use of the sorbent injection equipment installed at Newton during the past two years, and operated during 2017. As Illinois EPA testified during the April 17, 2018 hearing in this proceeding, "there is no requirement for it to be operated." Apr. 17, 2018 Trans. at 157, lines 4-5. Clearly, Dynegy installed this equipment to ease the Old Ameren Group's compliance with the MPS's SO_2 emission rate limit—to provide "operational flexibility," one might say. If the emission rate limit is removed, though, then so would Dynegy's need to operate this pollution control. Dynegy's discontinuance of sorbent injection would increase the Newton plant's SO_2 emission rate and thereby also its SO_2 emissions.

Third, by scrapping the MPS's emission rate limits, Illinois EPA's proposal would newly allow Dynegy to shut down controlled plants—Baldwin, Coffeen, Duck Creek, and Havana—while increasing the utilization of other uncontrolled MPS units. *See*, *e.g.*, Mar. 6, 2018 Trans. at 140, line 1, to 141, line 16. In this way, Illinois EPA's proposal would impact both MPS Groups, either one of which may contain controlled plants that are, as Vistra CEO Curt Morgan puts it, "hugely out of the money." *See* Ex. 41, *Weak MISO prices compound Ill. coal plant woes*, E & E NEWS (Apr. 13, 2018), at 2.

While Dynegy's retirement of controlled units would reduce pollution from those units, it also would facilitate increased operations of Dynegy's remaining uncontrolled units. As Dynegy testified: "[w]hen units are retiring, there is no corresponding change in electricity demand, and the remaining units, therefore, may be called upon to replace the lost generation." Jan. 18, 2018 Trans. at 163, lines 4-7. For example, Dynegy testified, if Exelon's Clinton Power Station were to go off-line, "it would drive production at Dynegy's plants higher." *See* Mar. 6, 2018 Trans. at 47, lines 2-21. To put Dynegy's testimony in context, per the U.S. Energy Information Administration, the Clinton Power Station's nameplate capacity is 1,138 megawatts ("MW"). *See* www.eia.gov/nuclear/generation/xls/usreact17.xlsx. By comparison, the combined nameplate capacity of Baldwin, Coffeen, Duck Creek, and Havana is 3,830 MW—over three times more. *See* Ex. 37, Armstrong Test. (Apr. 3, 2018), Att. 2. Even given that coal plants tend to run at a lower capacity factor than nuclear plants, Dynegy's closure of controlled plants would certainly allow for higher utilization of its uncontrolled plants, thereby increasing SO_2 pollution that would significantly offset any reductions realized from closure of the controlled plants. As Illinois EPA's proposal would immediately permit increased pollution, it should be denied.

3. Changing the MPS to Permit More Pollution From Dynegy's Plants Would Have a Negative Environmental Impact.

In the People's view, it should be noncontroversial to say that any amendments to the MPS that would permit more pollution from Dynegy's plants would have a negative environmental impact. At hearing, Illinois EPA appeared to be unconcerned with the potential of increased emissions, questioning, for example, whether NOx emissions from the MPS units have any discernible downwind impact on ozone concentrations. *See* Apr. 17, 2018 Trans. at 124, lines 4-13. Illinois EPA's statements outside of this proceeding, however, demonstrate what was established in R09-10: less pollution from Dynegy's plants entails an environmental benefit.

When the Board adopted the MPS in 2006, it was agreed by all parties, including Illinois EPA, that the emissions reductions required by the MPS would provide an environmental benefit, even though the rule itself was not mandated by the federal Clean Air Act. There was no specific federal law requirement that the State of Illinois adopt the MPS. Instead, the Board adopted the MPS at the joint request of Illinois EPA, Ameren, and Dynegy, and with support from the public, because, among other things, all parties projected that the MPS would "contribute to reductions in the ambient levels of ozone and PM2.5" and thereby "benefit the residents of the State of Illinois." R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4. In 2009 testimony to the United States Congress, then-Director Douglas P. Scott echoed that assessment, calling the MPS "one of the most important environmental and public health advances in Illinois in recent decades," Ex. 14, Diericx Test. (Dec. 11, 2017), Exhibit A, at 2.

Three years later, when Illinois EPA and the Board evaluated the MPS amendment proposed by Ameren in PCB R09-10, they assessed the amendment's environmental impact based upon projected actual emissions of SO_2 and NOx, proceeding from the premise that less pollution equaled an environmental benefit. Illinois EPA and Ameren projected future emissions based on actual historical heat inputs. Because the analysis demonstrated that Ameren's "compliance with the proposed amendment," R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 14, would yield less SO_2 and NOx pollution, both Illinois EPA and the Board agreed that it offered an environmental benefit. R09-10 (Apr. 16, 2009), at 29.

Indeed, at the outset of this proceeding, Illinois EPA and Dynegy both seemed to agree with the reasonable premise that reducing air pollution is beneficial. In its analysis of environmental impact in its TSD, Illinois EPA justified its proposal by concluding that it would "result in lower **allowable** emissions from the operating units that comprise the proposed combined MPS Group." R18-20, IEPA TSD, at 8. Dynegy concurred in its response to Illinois EPA's motion to expedite the rulemaking, stating that "[e]xpedited rulemaking will accelerate **the realization of the environmental benefits of, among other things, lowering the SO_2 and NOx emissions Dynegy is allowed to emit.**" R18-20, Dynegy Resp. in Support of Mot. for Expedited Review (Oct. 16, 2017), at 3. In other words: when this rulemaking began, both Illinois EPA and Dynegy appeared to agree that limiting MPS fleet emissions below "allowable emissions"—calculated by Illinois EPA as 66,354 tons of SO_2 and 32,841 tons of NOx, annually—was environmentally beneficial. R18-20, IEPA TSD, at 9-10. Neither Illinois EPA nor Dynegy has provided any evidence to suggest why it would be environmentally beneficial to reduce MPS emissions below the so-called current maximum emissions limits of 66,354 tons of SO_2 and 32,841 tons of NOx, annually—but that those benefits all of a sudden would stop accruing at Illinois EPA's proposed caps of 49,000 tons of SO_2 and 25,000 tons of NOx.[20]

[20] Dynegy's NOx emissions for 2017 were 9,100 tons less than Illinois EPA's proposed annual NOx cap, while the Illinois EPA's projects its use of the $109 million Volkswagen Settlement fund will amount to an annual reduction of

There is no basis for the Board to depart from the analysis employed in R09-10, which was based on the simple principle that reducing air pollution is beneficial. Indeed, outside of this proceeding, Illinois EPA itself in recent years has reiterated that the MPS continues to help lower ozone and PM2.5 concentrations statewide—the same environmental concerns that prompted the MPS's adoption. Specifically, Illinois EPA has relied upon the MPS as one of the State's "primary emissions reduction measures for demonstrating attainment" of the National Ambient Air Quality Standards ("NAAQS") for ozone. *See* Attachment 2, *Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard* (Oct. 2016), at PDF p. 27. *See also id*. at 26 ("[S]ignificant reductions of statewide NOx emissions resulting from implementation of Illinois' multi-pollutant standards affecting electric utilities will also help to ensure continued attainment of the 8-hour ozone NAAQS."). Illinois EPA also identified the MPS as a statewide PM2.5 control measure in its most recent PM2.5 maintenance plan submittal, for the 1997 PM2.5 NAAQS. See Attachment 3, *Maintenance Plan for the Chicago Nonattainment Area for the 1997 PM2.5 National Ambient Air Quality Standards (Revised)* (Jul. 7, 2011), at PDF p. 18 ("[S]ignificant reductions of statewide NOx and SO_2 emissions resulting from implementation of Illinois' multi-pollutant standards affecting electric utilities during the maintenance period . . . will also help to ensure continued attainment of the PM2.5 NAAQS.")

There is no doubt that the MPS, along with other standards applicable to the State's coal-fired power plants, have led to significant reductions in air pollution over the past decade. But progress to date is no justification for amending the MPS to once again permit more pollution. As

---

1,800 tons of NOx emissions statewide—a tiny fraction of the MPS plants' annual NOx emissions. *See* Attachment 4, IEPA *Draft Beneficiary Mitigation Plan—Volkswagen Environmental Mitigation Trust Agreement* (Feb. 2018), at 23.

to ozone, Illinois EPA has testified that portions of the State again will be designated as nonattainment with the most recent 2015 NAAQS. *See* Apr. 17, 2018 Trans. at 123, line 23, to 124, line 3. As to PM 2.5, the entire State remains designated as unclassifiable, per the United States Environmental Protection Agency's ("USEPA") website. *See* https://www.epa.gov/particle-pollution-designations/particle-pollution-designations-where-you-live#state.

Moreover, though, even if the entire State were designated as being in attainment with current ozone and PM2.5 NAAQS, that would be not a sufficient basis for the Board to then adopt MPS amendments that would permit Dynegy to reverse the past decade's progress, and again emit higher levels of pollution. For one thing, as stated above, Illinois EPA has advised USEPA that the reductions required by the MPS help reduce ambient ozone and PM2.5 concentrations statewide; loosening the MPS's restrictions would have the opposite effect. Neither should the Board accept Illinois EPA and Dynegy's apparent contention that there can be no environmental benefits, whatsoever, associated with reducing ambient levels of air pollution below NAAQS levels. USEPA has made clear, repeatedly, that the NAAQS are not "zero-risk" levels. *See*, *e.g.*, *Review of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen*, 83 Fed. Reg. 17226, 17228 (Apr. 18, 2018); *Supplemental Finding That It Is Appropriate and Necessary To Regulate Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units*, 81 Fed. Reg. 24420, 24440 (Apr. 25, 2016). For example, in setting NAAQS, USEPA has taken the position that it "is not required to take into account the health effects experienced by the most susceptible individual within at-risk populations." 81 Fed. Reg. 24440. Plainly, the USEPA does not set NAAQS with the intent of absolutely eliminating all health risks from air pollution.[21] Pointing this out does not criticize the NAAQS as a regulatory concept under

[21] During the April 17, 2018 hearing, Illinois EPA appeared to be unaware of USEPA's consistent position that the NAAQS are not "zero-risk" standards. *See* Apr. 17, 2018 Trans. at 166, line 9, to 167, line 5.

the Clean Air Act, nor USEPA's decision in setting any particular NAAQS. What it does entail, though, is that even Illinois's attainment of the current NAAQS for ozone and PM2.5—a feat not yet acknowledged by USEPA—would not justify the Board's rejection of the analysis earlier employed in R09-10, based on the simple premise that less pollution is an environmental benefit.

In sum: Illinois EPA's proposed amendments to the MPS would permit increased air pollution. The Board should reject Illinois EPA's proposal because it does not promote the Act's purposes to "restore, maintain, and enhance the purity of the air of this State" 415 ILCS 5/8, but instead would yield a negative environmental impact, which is also contrary to the Board's analysis regarding the MPS it employed in PCB R09-10.

B. If the Board Were to Entertain Adopting Mass-Based Caps, Illinois EPA's Proposed Caps Should Be Significantly Revised Downward and Be Made to Decline Upon Shutdown or Mothballing of a Plant.

As the People have consistently argued through this proceeding, and in these post-hearing comments, the Board should reject Illinois EPA's proposal. If the Board does determine to follow Illinois EPA's suggestion to scrap the current highly-effective pollution-reducing MPS rate-based emission limits, though, the People urge the Board to revise Illinois EPA's proposed mass caps downward. Illinois EPA's proposed caps:

- disregard the MPS units' actual historical heat inputs, contrary to the analytical approach employed in R09-10;

- ignore the constraints placed on the highly-polluting Old Ameren Group's operations by the current MPS SO_2 emission rate limit, with the end result of giving Dynegy a "free pass" on installing pollution controls that have been promised since 2006; and

- unreasonably defer—without any independent analysis—to Dynegy's representations of what limits it could meet while operating "in a financially reasonable way." April 17, 2018 Trans. at 209, line 15, to 210, line 4.

As an initial point, it should be noted: **<u>none</u>** of the rationales for an MPS revision asserted by Illinois EPA in its SOR, and discussed in Section II, above, provide the Board any guidance in setting any specific mass-based limits. With respect to "operational flexibility," the central reason for Illinois EPA's proposal, Illinois EPA has defined the concept as a rule that would allow Dynegy "to operate the [MPS] units as they are called upon by the market without being forced to operate certain units strictly for the purpose of meeting a fleet- wide rate-based limit." *See* Ex. 6, IEPA Responses to Pre-filed Questions (Jan. 12, 2018), at 14; *see also* Jan. 17, 2018 Trans. at 57, lines 3-13. That single criterion could be met by replacing the current MPS rate-based limits with **<u>any</u>** mass-based limit—be it 10 tons or 100,000 tons. Simply put: if there is no fleet wide rate-based limit, there is no need to run any unit "for the purpose of meeting a fleet wide rate based limit." *Id*. Neither do the Agency's stated goals of allowing Dynegy to "us[e] its entire fleet to meet emissions standards" or "simplify compliance" have any bearing on what level mass-based limits could be set at. R18-20, IEPA SOR, at 3. An agency decision that "offers an explanation for its decision which runs counter to the evidence before the agency, or which is so implausible that it could not be ascribed to a difference in view or the product of agency expertise," should be rejected as arbitrary, capricious or unreasonable. *Waste Mgmt. of Ill., Inc. v. PCB*, 231 Ill. App. 3d 278, 285 (1st Dist. 1992) (citing *Greer*, 122 Ill. 2d at 506).

If the Board determines to replace current MPS rate-based limits with mass-based limits, then, these new limits must be based on some other defensible justification. And, if the Board follows the approach it did in R09-10—as it certainly should—the Board should adopt new limits only if they offer an "environmental benefit," in the form of **<u>actual emissions reductions</u>**. R09-10 (Apr. 16, 2009), at 29.

Illinois EPA's proposed caps miss that mark, by a significant margin. As stated in April 3, 2018 pre-filed testimony, the People urge if the Board adopts mass-based caps, it reduce Illinois

EPA's proposed annual caps to no more than 34,094 tons for SO_2 and 18,920 tons for NOx. These caps would take into account both historical heat inputs, as well as the Old Ameren Group's current operational limitations due to its inadequate controls for SO_2. Alternatively, the Board could take those same considerations into account by adopting annual caps totaling 44,920 tons of SO_2 and 22,469 tons of NOx for the two current MPS Groups, but declining to combine the Groups. Specifically, the Board could adopt annual caps for the Dynegy Group of 16,972 tons of SO_2 and 9,000 tons of NOx, and, for the Old Ameren Group, of 27,948 tons of SO_2 and 13,469 tons of NOx. Under either approach, the caps should decline when an MPS unit is mothballed or retired.

1. Illinois EPA's Proposed Mass Caps Fail to Consider the MPS Units' Actual Operations.

In its TSD for R18-20, Illinois EPA asserts that:

> Determining precise estimates for the environmental impact of the proposed amendments, in terms of actual emissions from the affected sources, is problematic as a number of factors independent of the MPS can impact actual emissions, as discussed below.

R18-20, IEPA TSD, at 8. Illinois EPA therefore proposes to use "allowable emissions" under the current MPS (i.e., projected emissions assuming that all MPS units operate at maximum capacity, year-round, in precise compliance with the fleetwide MPS emission rate limits) as a benchmark for assessing the environmental impact of its proposed mass caps. *Id*. Illinois EPA's approach is unreasonable and an unexplained departure from its position in R09-10.

As discussed in Section I, above, in PCB R09-10, Illinois EPA's **first** step in assessing the environmental impact of revisions to the MPS's SO_2 emission limit proposed by Ameren was to determine an "average heat input" for the Old Ameren Group. *See* R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 14. **Second**, Illinois EPA used that average heat input to project actual mass emissions "assum[ing] Ameren's compliance with the original MPS rates and then compared that amount with the total tonnage for SO_2 and NOx projected under the proposed amendment in order **to determine if compliance with the proposed amendment afforded a net environmental benefit**." *Id*. (emphasis added).

Illinois EPA's approach in R09-10 was reasonable to assess the environmental impact of Ameren's proposed amendments. As noted above, the Board found the amendments to the MPS adopted under this approach in R09-10 to be "technically feasible and economically reasonable." *See* R09-10 (Apr. 16, 2009), at 29. The Board similarly should consider the MPS units' actual heat inputs in analyzing the environmental impact of the amendments proposed in this proceeding. Coal-fired power plants do not operate all of the time. In a chart attached to the Illinois Attorney General's Responses to Questions Raised During First Set of Hearings, the People provided capacity factors for current MPS units, from 2008 through 2017, calculated using publicly available data. *See* Ex. 26, IAGO Responses (Feb. 16, 2018) at 2-3 (explaining methodology) and Ex. 1 thereto. For 2008 through 2014, the overall capacity factors for current MPS units ranged from 71% to 78%—significantly below maximum capacity. Over the past three years, the units' overall capacity factors declined, ranging between only 55% to 59% (2015: 59%; 2016: 55%; 2017: 57%).

As this actual heat input data, and Illinois EPA's analytical approach in R09-10 demonstrate, Illinois EPA's current position that it is "problematic" to project actual emissions under the current MPS, (R18-20, TSD, at 8), lacks any basis. It is true that no one can predict with absolute certainty the heat input for the MPS units in any particular future year. But Illinois EPA can use—and, indeed, has in the past used—actual heat input data to determine a representative "average heat input" for the MPS units. *See* R09-10, Ameren Post-Hearing Comments (Mar. 6, 2009), at 14. In this proceeding, Illinois EPA has arbitrarily departed from its earlier approach without any justification. *See Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 506 (1988) ("While an agency is not required to adhere to a certain policy or practice forever, sudden and unexplained changes have often been considered arbitrary.").

The concept of using actual heat input data to project future emissions should be nothing foreign to Illinois EPA. Indeed, one of the foundations of the Clean Air Act's New Source Review permitting program is that regulators can assess facility conditions that are "representative of normal source operation." *See*, *e.g*., 35 Ill. Adm. Code 203.104 (definition of "actual emissions"). Illinois EPA's insistence in this matter that determining representative conditions for Dynegy's plants is "problematic," when Illinois EPA would be **required** to make that determination in a permitting context, further shows its current position is unreasonable.

One thing can be predicted with absolute certainty: the MPS units **will never** operate at maximum capacity. Moreover, though, the problems with Illinois EPA's approach to heat input go further. Illinois EPA also fails to recognize that the current MPS's SO_2 limit for the Old Ameren Group provides an additional restriction on heat input to that Group, beyond the "factors independent of the MPS" considered by Illinois EPA in developing its proposal. R18-20, IEPA TSD, at 8. This consequence of Dynegy's failure to install needed pollution controls on the Old Ameren Group is discussed in detail in Section III.A.1., above, on pages 28 to 32. In short, due to the imbalance of controlled and uncontrolled capacity in the Old Ameren Group, Dynegy could not return that Group even to 2013-14 levels of heat input and still comply with the MPS's SO_2 limit that went into effect in 2017. Accordingly, Illinois EPA's calculated "allowable emissions" are not a suitable benchmark by which to assess mass-based limits; they must be assessed instead by actual heat inputs.

2. Illinois EPA's Proposed Mass Caps Lack a Rational Basis and Must Be Rejected.

Under any analysis of the MPS units' actual emissions, Illinois EPA's proposed annual caps of 49,000 tons of SO_2 and 25,000 tons of NOx are unreasonable. This conclusion is bolstered by Illinois EPA's admission that it had set its revised SO_2 cap of 49,000 tons based on its perception of what pollution limits Dynegy needed to "operate in a financially reasonable way," Apr. 17, 2018 Trans. at 209, line 15, to 210, line 4—even though it earlier testified repeatedly that it **had not** considered Dynegy's "overall financial situation" in developing its proposal. *Id*. at 183, lines 3-6. The Board should reject the proposed caps because Illinois EPA cannot supply a plausible reason for them. *Cf. Greer v. Illinois Hous. Dev. Auth.*, 122 Ill. 2d 462, 505-06 (1988).

First, Illinois EPA's proposed caps do not reflect a considered appraisal of the MPS units' actual heat inputs. As discussed in detail in Section III.A.1., above, at pages 26 to 28, Illinois EPA's proposed caps reflect a "worse-than-worst-case scenario," representing emissions that would only be permitted under the current MPS if the MPS units reached an overall heat input higher than that of any of the past ten years. The historical heat input data for the MPS units is laid out in Attachment 2 to the People's April 3, 2018 pre-filed testimony. Granted, there are different ways in which this data could be used to predict future emissions; as examples, one could average all ten years, or select only the most recent years as being most representative of the units' operations. But there is no possible way that this data could be used to predict actual emissions as high as Illinois EPA's proposed caps. That is because Illinois EPA's proposed caps exceed what the current MPS emission rates would have permitted even under the past-decade peak overall heat input, from 2011. Illinois EPA's proposed caps lack any reasoned basis—even without confronting the additional issue that the MPS units could not again reach that 2011 peak heat input, due to the Old Ameren Group's inability to increase heat input without violating the 2017 MPS SO_2 rate.

Second, with respect specifically to its revised SO_2 cap of 49,000 tons, Illinois EPA has supplied no rationale, whatsoever, beyond "Dynegy said it could meet it." *See* Apr. 17, 2018 Trans. at 107, lines 17-24. Specifically, referring to its proposed cap (reduced downward from 55,000 tons in its initial proposal), Illinois EPA testified:

> The 49,000, by reviewing our information and as we would always do, discussing with the affected industry, we determined that although Dynegy might not be thrilled, as I said, with going down to 49,000, we believed that the company could meet that and, therefore, bring it down to that number.

Id. When pressed by the People and the Board's Hearing Officer as to what Illinois EPA meant when it said it needed to talk to Dynegy to determine whether Dynegy could "comply" with any given mass cap, Illinois EPA responded that it meant if Dynegy "could operate into the future in a financially reasonable way." April 17, 2018 Trans. at 209, line 15, to 210, line 4.

Illinois EPA's testimony is problematic for several reasons. Illinois EPA has testified repeatedly in this proceeding that **<u>it has not</u>** considered Dynegy's "overall financial situation" in developing its proposal—only whether Dynegy currently bids in specific units at below operating costs in an effort to comply with the current MPS's rate-based limits. *See*, *e.g*., *id*. at 183, lines 3-6. Accordingly, Illinois EPA has no basis to conclude what revised mass-based limits Dynegy could meet while operating "in a financially reasonable way." This is particularly so given that, when the MPS was adopted, all parties agreed it was technically feasible and economically reasonable. R06-25, Corrected Joint Statement (Aug. 23, 2006), at 5. Moreover, as discussed in detail in Section II.B.1., above, at pages 17 to 20, Illinois EPA also has not considered at all the possibility of Dynegy installing additional pollution controls, including how much they would cost to install or operate or what reductions they could achieve. Accordingly, Illinois EPA's consideration of what pollution limits Dynegy could meet while operating "in a financially reasonable way" ignored a central issue—and, instead, apparently deferred entirely to Dynegy's opinion of what would be "reasonable."

Illinois EPA's proposed mass caps lack any rational basis. Even if the Board determines determines—despite the inadequate record before it—to replace the MPS's rate-based limits with mass caps, it must reject Illinois EPA's proposed caps, because any agency decision that "offers an explanation for its decision which runs counter to the evidence before the agency, or which is so implausible that it could not be ascribed to a difference in view or the product of agency expertise," should be rejected as arbitrary, capricious or unreasonable. *Waste Mgmt. of Ill., Inc. v. PCB*, 231 Ill. App. 3d 278, 285 (1st Dist. 1992) (citing *Greer*, 122 Ill. 2d at 506).

3. If the Board Sets Mass Caps, They Should Account for Both Actual Heat Inputs and the Old Ameren Group's Operational Restrictions.

In April 3, 2018 pre-filed testimony, the People suggested that, if the Board does adopt mass caps, that those caps be set at no more than 34,094 tons for SO_2 and 18,920 tons for NOx. *See* Ex. 37, Armstrong Test., at 17-19. As discussed in that testimony, these caps would reflect both actual heat inputs and unit-level emission rates for the current MPS units. Specifically, heat inputs from 2002 were utilized because: (1) that data previously has been relied upon by Illinois EPA to show compliance with the Regional Haze Rule; and (2) the overall 2002 heat input of 420,531,000 mmBtu is comparable to actual overall heat inputs during 2008 through 2014, years which Illinois EPA and Dynegy have asserted are more representative of the MPS fleet's operations than 2015 through 2017 (though, as stated in the People's April 3, 2018 testimony, this assertion is questionable given sweeping changes in the energy market).

The People continue to believe that these caps would be reasonable based on the analysis earlier provided, as long as the caps decline when an MPS unit is mothballed or retired. Alternatively, though, the Board could similarly take into account actual heat inputs and unit-level emission rates by adopting caps totaling 44,920 tons of SO_2 and 22,469 tons of NOx for the two current MPS Groups, but declining to combine the Groups. Also, with this approach, the caps should decline when an MPS unit is mothballed or retired. Specifically, the Board could adopt annual caps for the Dynegy Group of 16,972 tons of SO_2 and 9,000 tons of NOx, and, for the Old Ameren Group, of 27,948 tons of SO_2 and 13,469 tons of NOx.

Unlike Illinois EPA's proposed caps, these caps **would** take into account the MPS units' actual heat inputs. These caps are based on the actual emissions under the MPS that Illinois EPA projected for purposes of the Regional Haze Rule, based on 2002 heat inputs, for the current MPS units. They are reflected in Attachment 7 to Illinois EPA's January 12, 2018 pre-filed answers (Exhibit 6). Notably, Illinois EPA has testified that it originally had considered caps of 44,000 tons for SO_2 and "approximately" 23,000 tons for NOx when developing its proposal. Ex. 6, IEPA Responses to Pre-filed Questions (Jan. 12, 2018), at 32.

The People would agree that caps totaling 44,920 tons of SO_2 and 22,469 tons of NOx would reasonably reflect historical heat inputs to the MPS, overall. However, if the Board were to allow the MPS Groups to be combined under those caps, it would ignore the operational restrictions that the current MPS's SO_2 limit imposes on the Old Ameren Group, because of Dynegy's failure to install the "pollution control equipment required to achieve" that standard. R06-25, Corrected Joint Statement (Aug. 23, 2006), at 4. As discussed in Section III.A.1., above, on pages 28 to 32, the inception of the 2017 SO_2 emission limit meant that Dynegy could no longer "kick the can down the road"; absent additional pollution controls, it must significantly restrict heat input to the Old Ameren Group. Combining the Groups would allow Dynegy to increase utilization of uncontrolled units in the Old Ameren Group while avoiding installing pollution controls that have been promised for over a decade, thereby dramatically increasing pollution.

The People further continue to urge that any caps the Board sets should decline when an

MPS unit is mothballed or retired. As discussed in Section III.A.1., above, at pages 32 to 33, that is how the current MPS works. If there is no heat input to an MPS unit, there is no allowance of pollution from it. By contrast, Illinois EPA's proposal would lock in an allowance for pollution for all current MPS units, at all times going forward. To retain the full benefit of the current MPS, any revision should ensure that mothballing or retiring a plant is treated in the same fashion as selling a plant to a new operator.

V. CONCLUSION

The People respectfully request that the Board reject Illinois EPA's proposal because it fails to "restore, maintain, [or] enhance the purity of the air of this State," 415 ILCS 5/8, and would instead weaken an important State public health program. Further, Illinois EPA has failed to adequately consider the technical feasibility and economic reasonableness of simply holding Dynegy to the MPS's current rate-based emission limits for SO_2 and NOx. Illinois EPA has not articulated any compelling justification for its proposal, which would immediately allow for increased pollution from the MPS units.

Nonetheless, if the Board does proceed, it must significantly reduce Illinois EPA's proposed mass-based limits to no more than 34,094 tons for SO_2 and 18,920 tons for NOx, including that the caps decline when an MPS unit is mothballed or retired. Alternatively, if the Board does proceed with the mass-based caps and does not adopt the People's well-supported proposed caps, the Board should still account for both historical heat inputs, as well as the Old Ameren Group's current operational limitations due to its inadequate controls for SO_2. This could be achieved by adopting annual caps totaling 44,920 tons of SO_2 and 22,469 tons of NOx for the two current MPS Groups, however, **without combining the two MPS Groups**. Specifically, the Board could adopt annual caps for the Dynegy Group of 16,972 tons of SO_2 and 9,000 tons of

NOx, and, for the Old Ameren Group, of 27,948 tons of SO_2 and 13,469 tons of NOx, including that the caps decline when an MPS unit is mothballed or retired.

Dated: June 1, 2018

Respectfully submitted,

PEOPLE OF THE STATE OF ILLINOIS,
by LISA MADIGAN,

Attorney General of the State of Illinois,
MATTHEW J. DUNN, Chief
Environmental Enforcement/
Asbestos Litigation Division

By: 

ANDREW ARMSTRONG
Chief, Environmental Bureau/Springfield
Illinois Attorney General's Office
500 South Second Street
Springfield, Illinois 62706
(217) 782-7968
aarmstrong@atg.state.il.us

Of counsel:

STEPHEN J. SYLVESTER
Senior Assistant Attorney General
(312) 814-2087
ssylvester@atg.state.il.us

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R18-20
AMENDMENTS TO 35 ILL. ADM.	)	(Rulemaking-Air)
CODE 225.233, MULTI-POLLUTANT	)	
STANDARDS	)	

POST-HEARING COMMENTS
OF THE ILLINOIS ATTORNEY GENERAL'S OFFICE

Attachment 1

Vistra Energy's (VST) CEO Curtis Morgan on Q1 2018 Results α

Vistra Energy's (VST) CEO Curtis Morgan on Q1 2018 Results - Earnings Call Transcript

May 5, 2018 2:04 AM ET | 1 like
by: SA Transcripts

Q1: 04-26-18 Earnings Summary

Press Release SEC *8-K* *Slides* α *News*

EPS of $-0.71 misses by $-0.93 | Revenue of $765M (- 43.8% Y/Y) misses by $-505M

Vistra Energy Corp. (NYSE:VST) Q1 2018 Earnings Conference Call May 4, 2018 8:00 AM ET

Executives

Molly Sorg - Vice President, Investor Relations

Curtis Morgan - President and Chief Executive Officer

William Holden - Executive Vice President and Chief Financial Officer

Sara Graziano - Senior Vice President of Corporate Development

Jim Burke - Executive Vice President and Chief Operating Officer

Analysts

Shahriar Pourreza - Guggenheim Partners

Julien Dumoulin-Smith - Bank of America Merrill Lynch

Greg Gordon - Evercore ISI

Praful Mehta - Citigroup

Angie Storozynski - Macquarie

Operator

Welcome to the Vistra Energy First Quarter 2018 Results Conference Call. All lines have been placed on mute to prevent any background noise. After the speakers' remarks, there will be a question-and-answer session. [Operator Instructions]

I would now like to turn the call over to Molly Sorg, Vice President, Investor Relations. Please go ahead.

Molly Sorg

Thank you, Michelle, and good morning, everyone. Welcome to Vistra Energy's investor conference call discussing first quarter 2018 results, which is being broadcast live via webcast from the Investor Relations section of our website at www.vistraenergy.com. Also available on our website are a copy of today's investor call presentation, our 10-Q and the related earnings release.

Joining me for today's call are Curt Morgan, President and Chief Executive Officer; Bill Holden, Executive Vice President and Chief Financial Officer; Jim Burke, Executive Vice President and Chief Operating Officer; and Sara Graziano, Senior Vice President of Corporate Development. We also have a few additional senior executives in the room to address questions in the second part of today's call, as necessary.

Before we begin our presentation, I encourage all listeners to review the Safe Harbor Statements included on **Slides** 1 and 2 in the investor presentation on our website, which explain the risks of forward-looking statements and the use of non-GAAP financial measures. Today's discussion will contain forward-looking statements, which are based on assumptions we believe to be reasonable only as of today's date. Such forward-looking statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those projected or implied.

Further, our earnings release, slide presentation and discussions on this call will include certain non-GAAP financial measures. For such measures, reconciliations to the most directly comparable GAAP measures are in the earnings release and in the appendix to the investor presentation.

I will now turn the call over to Curt Morgan to kick off our discussion.

Curtis Morgan

Thank you, Molly, and good morning to everyone on the call. As always, we appreciate your interest in our company. I want to apologize upfront for relatively lengthy call, but we have a lot to talk about today. You may want to grab a snickers for.

Turning now to Slide 6, we have a lot of exciting news to cover today as our merger with Dynegy closed just under a month ago on April 9. Following the merger, we are now more than a $20 billion enterprise value integrated power company competing in the key U.S. markets with expected annual adjusted EBITDA of $3 billion or more on an annual basis and projected conversion rate of adjusted EBITDA to free cash flow of more than 60%.

Importantly, we have also made meaningful progress in our merger transition and integration, and we're excited to announce today a nearly 60% increase in our merger value lever targets, which I will discuss in detail momentarily. As you may recall, our reference of value lever targets include synergies, our operations performance initiative or what we call **Operator**, free cash flow and tax value enhancements.

This increase in our merger value lever targets, combined with power price improvement, particularly in the ERCOT markets have resulted in significantly higher EBITDA and free cash flow estimates for the combined company, as compared to our October 2017 forecast, and we'll get into that in detail on this call.

Speaking of ERCOT market, as many of you know, we were able to close the merger without a requirement to the best of any assets in ERCOT, which positions us well for the anticipated peak summer demand with tight reserve margins, at least, for the next few years.

We have retained length even under the most severe, and it is important to note this, even under the most severe weather conditions, like the 2011 event, as a precaution to make sure we meet our customers' demands under any scenario. So the very important thing about this, we're carrying very good length into the summer and that's important to know.

Interestingly, forward curves in ERCOT are steeply backward dated beyond 2019, likely due to uncertainty regarding the potential development of longer-term generation resources. Ironically, in our view, the current forward curves do not support new investment, especially in the energy-only ERCOT market. Remember, these are 30-year to 40-year assets and the market is not supportive for even one year to forward hedge either by the liquidity or the pricing to support new development.

We like our net long position in ERCOT and believe this will be able to generate approximately $3 billion or more of adjusted EBITDA on an annual basis in nearly any wholesale market environment. The factors that contribute to the stability are that we – approximately 45% of our gross margin is derived from relatively stable capacity payments in retail operations.

We own a young, predominantly gas-filled, low heat rate generation fleet that as a result is regularly in the money generating meaningful energy revenues. And our commercial operations team has proven experience in the industry and has consistently been able to construct a realized price curve for our fleet that is significantly higher than settled around-the-clock prices.

With this business mix and operational expertise, supported by our strong balance sheet that is poised to achieve our 2.5 times net debt to adjusted EBITDA target by year-end 2019, we are confident in our ability to deliver relatively stable earnings with the opportunity to capitalize on upside, while converting approximately 60% of our adjusted EBITDA from ongoing operations to free cash flow. This free cash flow conversion ratio is significantly higher than that of other commodity exposed capital-intensive energy industries. And as a result, we believe, over time, this will lead to a full valuation for Vistra.

However, I must note, we’re not there yet. We understand this is about execution and delivering on our commitments and putting the historical performance of this sector in the rearview mirror with a very different strategy one that centers on low leverage, integrated and low-cost operations, disciplined growth and return of capital to shareholders.

We believe we have been true to our word thus far, including a substantial restructuring of our support organization fully completed three weeks after emerging from bankruptcy, completion of an operations performance initiative and returning $1 billion to our investors at the end of 2016. We have several updates related to the combined company to share this morning, including increasing our merger value lever targets, providing a glimpse in the earnings power of Vistra and initiate 2018 and 2019 guidance. Now these updates will be the focus of today’s call. We’re going to start the discussion with Bill Holden, who will cover Vistra’s standalone first quarter 2018 results.

We finished the quarter delivering $263 million in adjusted EBITDA from our ongoing operations, exceeding our expectations for the quarter and even stronger results when you take into account the $21 million reduction in adjusted EBITDA for accounting purposes, resulting from our partial buyback of the Odessa Power Plant earnout in February.

Though the impact of the partial buyback was negative in the first quarter, we expect the full-year 2018 impact of that transaction net of the premium paid to be a positive $3 million, with a projected three-year net benefit of $23 million in the aggregate, nearly all of which we have already locked in.

Excluding this first quarter negative impact, Vistra's adjusted EBITDA from its ongoing operations would have been $284 million, in line with first quarter 2017 results and ahead of our expectations embedded in our standalone full-year guidance.

Bill is now going to walk us through the first quarter results in more detail. And then I will cover our synergy and operational performance initiative of OPI update, as well as earnings expectation for the combined entity. We will conclude today's call with a brief preview of our June 12 Analyst Day. Bill?

William Holden

Thanks, Curt. As we depict on Slide 8 and as Curt just mentioned, Vistra's standalone first quarter adjusted EBITDA from ongoing operations was $263 million. Excluding the negative $21 million impact from our partial buyback of Vistra earnout in February, first quarter 2018 adjusted EBITDA would have been $284 million, in line with first quarter 2017 results, and as Curt mentioned, above our expectations relative to our standalone full-year earnings guidance.

For the quarter, the retail segments adjusted EBITDA was $194 million, which was $17 million higher than first quarter 2017, primarily due to favorable weather and lower SG&A expenses quarter-over-quarter. Retail also grew residential customer count by approximately 4,000 in the first quarter of 2018.

Adjusted EBITDA for the wholesale segment was $70 million for the first quarter, which was $35 million lower as compared to the first quarter of 2017. $21 million of the decrease was related to the negative impact of our partial buyback of the Odessa earnout in February. So as Curt just mentioned, we expect the full-year benefit net of the premium paid in this transaction of $3 million and in the aggregate a three-year net benefit of $23 million. O&M expenses also increased quarter-over-quarter.

In total, first quarter results exceeded our expectations on a standalone basis, setting up the combined company well to execute on this new 2018 guidance, which I'll describe later on the call.

Curt, so let's get to the merger update. Curt?

Curtis Morgan

Great. Thanks, Bill. I'll be moving us to Slide 10 now. As you can see today, we're announcing an improved outlook for our merger value lever targets compared to what we initially announced upon merger signing in October of last year.

After six months of diligence and detailed transition and integration planning, we're increasing our adjusted EBITDA value lever target to $500 million versus the $350 million announced in October, a robust 40% increase. Sara Graziano and Jim Burke will go into more detail about these merger synergy and operational improvement opportunities later on the call.

On the synergy front, we expect to capture the bulk of the value by year-end 2018, and we believe we have a clear line of sight to achieving this result. As you have heard me say before, this is my fifth time leading an OP effort with McKinsey.

With assist from Bob Flexon and the Dynegy team prior to the merger closing, we're progressing ahead of schedule with the Dynegy fleet and we're nearing completion on the OP effort on the Luminant fleet, which we began shortly after a merger and through bankruptcy in the fall of 2016.

As Jim will further discuss, we expect to realize a material amount from OP in 2018, reaching a significant run rate on OP by the year-end 2018 and capture a 100% of these amounts waived of OP by year-end 2019. We believe there could be more OP value to come. However, we'll take the balance of 2018 to prove this out.

We're also increasing our recurring after-tax adjusted free cash flow target by $170 million to $235 million, of which nearly 70% is expected to be achieved by year-end 2018 and a 100% is expected to be achieved by year-end 2019.

The increased target reflect interest and savings from debt repricings and other transactions already completed between October 2017 and today, as well as incremental interest savings projected once we achieve our long-term leverage target of 2.5 times net debt to adjusted EBITDA.

So we're very confident, these cash flow savings will be achieved. We believe there are even further recurring cash flow enhancements through continued optimization of our balance sheet and we expect we'll be in a position to discuss those later this year.

Last, we're pleased to announce today that the tax reform has materially improved our projected cash, tax and TRA payment outlook. As we now expect, we will not have to pay any federal cash taxes or TRA payments in 2019 through 2022. This improved forecast is primarily a result of the reduced federal income tax rate from 35% to 21% together with our ability to utilize a higher portion of Dynegy's net operating losses in the first five years following the merger.

In addition, we project we'll receive $223 million in alternative minimum tax credit refunds over the next five years, which further increases our projected adjusted free cash flow. In fact, we estimate that these factors combined will improve our five-year federal cash tax and TRA payment outlook by more than $1.7 billion versus our October 2017 estimates.

We believe it is most important to value Vistra off of a free cash flow yield metric of approximately 10% or less. When you consider our stable earnings power and substantial conversion of EBITDA to free cash flow when compared to other commodity exposed capital-intensive industries.

When we apply this 10% free cash flow yield, where discount rate were applicable to the increased merger value lever targets and the impact of tax reform, we calculated projected equity value creation of approximately $7.5 billion, or approximately $14 per share, significantly higher than the $4 billion of equity value creation we projected at the time of the merger announcement.

This improved earnings and cash flow outlook, combined with the recent improvement in forward curves in most markets, but particularly in ERCOT, result in what we project will be significant earnings power for the combined company.

As demonstrated in the pro forma 2018 illustrative guidance on Slide 10, assuming the merger would have closed on January 1 of this year rather than April 9. We forecast the combined company's adjusted EBITDA from ongoing operations would have been $3.15 billion to $3.35 billion versus the approximately $2.875 billion to $3.125 billion consolidated forecast at the time of the merger announcement.

In addition, assuming a January 1 merger close, we estimate adjusted free cash flow from ongoing operations would have been approximately $1.675 billion to $1.875 billion in 2018, again, a mark improvement from approximately $1.415 billion to $1.665 billion in consolidated adjusted free cash flow projected last October.

Similarly, as demonstrated in the 2019 illustrative guidance on Slide 10, assuming the full run rate of synergies and operational improvement benefits are realized in 2019, we estimate Vistra's 2019 adjusted EBITDA from ongoing operations would be $3.275 billion to $3.575 billion, and our adjusted free cash flow from our ongoing operations would be $2.15 billion to $2.45 billion, which would represent an estimated conversion of adjusted EBITDA to free cash flow of more than 60% from ongoing operations.

Over the long-term, we expect Vistra will be able to deliver $3 billion or more of adjusted EBITDA from ongoing operations annually even in the challenging wholesale market environments, with an approximately 60% conversion of adjusted EBITDA to free cash flow from ongoing operations, including during the periods, where capacity prices declined such as the decline in PJM capacity prices from 2019 to 2020.

We believe we'll be able to bridge those declines to the merger value enhancements, commercial optimization of our assets, cost management and balance sheet optimization. At the end of the day, this means that we expect we'll have significant capital available for allocation. I know that's of interest to many of you.

As we described on the right-hand side of the Slide 10, our primary capital allocation priorities will be to first to maximize our adjusted free cash flow by ensuring we achieve or exceed our value lever targets as quickly as possible, while also reducing our debt balances to achieve our long-term target of 2.5 times net debt to adjusted EBITDA by year-end 2019.

Given our improved adjusted EBITDA and adjusted free cash flow expectations for 2018 and 2019, which Bill will discuss momentarily, we estimate we will have approximately $1 billion in aggregate of capital available for allocation in 2018 and 2019, while still achieving our leverage target. We have been working with our Board in anticipation of the merger close to evaluate various capital allocation alternatives. Our projected significant cash flow above debt reduction requirements should report us the opportunity to potentially accelerate certain capital allocation alternatives.

As we have mentioned in prior earnings call – calls, our capital allocation priority is in addition to retire debt or to purchase out stock if we believe it is trading in a significant discount to our view of value, evaluate a recurring dividend with a meaningful yield and with the ability to grow it and pursue growth of our business with a focus on retail renewables and batteries. To be very clear, as we have previously mentioned, we will be disciplined in the pursuit of growth, seeking opportunities that we project will earn at least 500 to 600 basis points more than our cost of capital.

As I will mention again later, capital allocation will be an important agenda item for our June 12 Analyst Day. We continue to believe that an incremental investments in traditional generation are unlikely at this stage, absent compelling value creation. In fact, rationalization of our generation portfolio is more probable, which could provide incremental capital for allocation. We have been open about the components of our portfolio where we will explore rationalization. They include New York, California and the MISO market.

We expect to complete our OP initiative on assets in these areas an explore potential opportunities to enhance value prior to making final discussions on rationalization. We believe these efforts could take the balance of 2018 to conclude.

Now I'm going to turn to Slide 11. Following the merger with Dynegy, Vistra now expects, it will generate approximately 45% of its gross margin from stable revenue sources of retail and capacity payments. In addition, we are projecting at approximately 60% of our adjusted EBITDA will come from the attractive ERCOT market, while more than half of our generation is projected to be come from natural gas asset, which reduces our overall exposure to natural gas pricing.

It is also important to note that we expect a significant contribution to adjusted EBITDA and free cash flow from energy margin in nearly any market environment given our relatively new and efficient generation fleet that is often in the money, especially in the summer and winter peak seasons.

This improved diversification of our operations and earnings together with the significant value levers we expect to realize as a result of merger support our belief that Vistra will be able to generate approximately $3 billion or more of adjusted EBITDA with an approximately 60% conversion of adjusted EBITDA to free cash flow from operations in any market environment.

Now I'm going to turn to Slide 12. As I mentioned at the beginning of the presentation, Vistra is increasing its merger related adjusted EBITDA value lever targets from $350 million to $500 million, $50 million of this increase relates to merger synergies we have identified to our pre-merger integration work which Sara will discuss here in a second.

The remaining $100 million of the increase relates to our operation performance improvement initiative that is underway at both Vistra and Dynegy fleet. We now believe we'll be able to deliver $225 million of the recurring adjusted EBITDA benefits from this program with the opportunity for potential upside to that estimate in the future. Jim is going to provide more detail regarding the OP process later on during the call.

It is important for me to note that true to how we have handled communication of OP value opportunities previously, we have a very high confidence level in our ability to achieve the $225 million in EBITDA value levers, we are announcing today. When we prove those incremental value in the future, we will communicate it at that time.

In sum, we expect we will realize approximately $165 million of adjusted EBITDA value levers in 2018 with 72% of the value levers achieved by year-end, we expect we will have achieved the full run rate of adjusted EBITDA value levers by year-end 2019 with $420 million of benefit realized during the year.

Our entire management team us incentivized to ensure that we do in fact achieve all the targeted merger value levers by year-end 2019. As the Board recently approved a significant grant of long-term options that have a four and five-year clip there. The options are 100% contingent on our collective achievement of hitting the targeted value levers in retention of key people necessary to achieve those targets.

I'm also pleased to announce on this call today that the Vistra Board and I have a recent agreement on a four year extensive of my employment contract from May 2018 until May 2023 I think, isn't it, 2022 to 2023. In my, sorry, in my 35 – I don't even know I'm on contract, in my 35 year career I have never been more excited about an opportunity than the one before me here at Vistra and I am completely committed for getting the value for the Dynegy merger and achieving the full valuation of Vistra.

I'm now going to turn to Slide 13. In addition to the adjusted EBITDA value lever targets, we also have an improved outlook for incremental adjusted free cash flow synergies and tax synergies related to the merger.

As you can see, we now expect we will be able to achieve $235 million of run rate additional after tax free cash flow benefits by year-end 2019, a $100 million of which have already been identified or achieved, $20 million of the project benefits relate to expected capital expenditure synergy we have identified and $8 million reflect interest savings we have already achieved from the repayment of the legacy Dynegy notes due in 2019, as well as repricing and other transactions that have occurred between the announcement of the merger in today's date, thereby reducing our interest expense.

The incremental $135 million of projected after-tax free cash flow benefits reflect interest savings we expect we will see once we reach our net leverage of 2.5 times net debt to adjusted EBITDA. We believe there remains further opportunity for upside, which is not reflected in this presentation, if we are also able to take advantage of favorable market conditions to further reduce our borrowing costs.

In total, we expect we will have achieved, at least, $235 million of additional after-tax free cash flow benefits by year-end 2019. We have also materially improved our federal cash tax and TRA payment forecast for the combined company as a result of tax reform.

The combination of lower federal tax rate from 35% to 21%, coupled with our expected ability to utilize more than Dynegy's net operating losses in the first five years following the merger have resulted in an expectation that we will only pay approximately $24 million in federal taxes or TRA payments through 2022. That – but – and it's important to note that the $24 million that we forecast to pay – to be paid to TRA rightholders in 2018 that stems from 2017 tax year.

We calculate the NPV of the use of Dynegy's net operating losses, as well as the anticipated receipt of alternative minimum tax refunds to be $750 million to $850 million versus our original estimate of $500 million to $600 million. While it might be counterintuitive that the net – or the net present value of the NOLs has gone up even though the federal tax rate has gone down, our expectation for the ability to utilize significantly more of the Dynegy NOLs in the first five years following the merger closing more than offset the impact from the lower tax rate.

As I've said before, and as I hope today's update demonstrates, I continue to believe this merger will bring significant value to Vistra shareholders. We understand our credibility is at stake regarding hitting our value creation targets described above – or described earlier. We have a line item detail for every action required to achieve our targets, sophisticated tracking systems in place and a Steering Committee-based governance process, which I'm a part of that meets frequently to review progress.

This is why we are confident in the value capture and why we are excited for the future of our company. We look forward to executing on the value lever target I just described.

I would like to now turn the call over to Sara Graziano to describe the merger synergies we have identified in a little more detail. Sara?

Sara Graziano

Thank you, Curt. Turning now to Slide 15, as Curt mentioned, during the period, the three merger announcement in closing, the management team of both Vistra and Dynegy undertook a robust integration process.

Through that process, we have identified $275 million of projected adjusted EBITDA synergies related to the merger. $115 million of these synergies were achieved on day one, following the merger close and primarily reflect headcount and executive team reductions, as well as certain other insurance, shareholder and employee expense reductions.

The bulk of the remaining synergies are projected to come from procurement and information technology cost reductions, reflecting the improved purchasing power afforded by Vistra's largest scale, as well as the ability to streamline and simplify applications and infrastructure for the combined company. We also expect to achieve synergies from facilities consolidation and reductions in corporate support, retail, commercial and plant operations overhead.

We are forecasting $115 million of these synergies will be realized in 2018, with 89% of that estimated to be achieved by year-end. We project $260 million of the synergies will be realized in 2019, with the full run rate achieved heading into 2020. We have specifically identified each line items that comprises our $275 million merger synergy target. And as Curt mentioned, we have a sophisticated tracking system in place and a robust governance process that includes periodic reporting. As a result, we have full confidence in our ability to deliver on these targets.

I would now like to turn the call over to Jim to discuss our operations performance improvement process in more detail.

Jim Burke

Thank you, Sara. As you know, our OP process is well underway at both the legacy Dynegy and Luminant fleets. At this stage in the process, we are confident we can achieve $225 million of projected EBITDA enhancements. I would summarize these in the three main areas: the Texas-based limited assets, procurement, and the legacy Dynegy fleet. The Luminant opportunities are in addition to the $50 million value for 2018 that we reported on last fall from our OP efforts. This value has already reflected in our standalone guidance.

First, for Luminant, Martin Lake continues to find cost and revenue opportunities as an early participant in the OP process. Our nuclear site, Comanche Peak, embarked on its efforts late in 2017. They have identified and are implementing actions worth nearly $30 million on a run rate basis. The levers are across the Board, including working with major alliance partners to rationalize scope, prioritizing O&M projects, and reducing site labor and support functions.

Comanche Peak is already one of the lowest nuclear sites in the country. But the team continues to look for ways to compete in a challenging wholesale market, reducing its costs, while maintaining a focus on reliability and nuclear safety. Our combined cycle sites, Forney, Lamar and Odessa have been working through their OP efforts and are implementing ideas worth approximately $10 million.

These ideas include improving heat rate through reducing compressor air inlet temperatures, improving cooling tower efficiency and better monitoring and repair of cycle isolation valves throughout the steam cycle. Another example, planned outage timelines have been optimized through kaizen exercises to shave over 20% of the total time, resulting in lower cost and more gross margin. Importantly, these three teams did their OP efforts together, which materially enhance the value they are achieving.

Moving on to procurement, another big lever for our combined fleet. Sara mentioned procurement synergies have been identified as part of the $275 million. We have identified additional procurement opportunities as part of the OP process in the $225 million target. Combined these procurement opportunities represent a 6% to 8% reduction of the fast loan and spin-based of approximately $1.7 billion, excluding fuel costs, such as coal and natural gas.

We expect to realize these savings through the ongoing evaluation of procurement specifications, strategic sourcing and demand management. For example, the team has identified opportunities in ammonia and bulk chemicals of $10 million to $12 million, averaging 20% reductions. Maintenance, repair and operating supplies with our larger scale is yielding more than 15% through our initial rates.

Now turning to the Dynegy combined cycle fleet, we are leveraging our learnings from our combined cycle fleets here in Texas to see the OP effort across the additional 19 sites. Kendall was the first Dynegy combined cycle to pursue their OP effort and they are executing on more than $5 million of value.

Given our collective efforts to date, we’re going to organize the OP roll out across the rest of the gas fleet in a coordinated manner, focusing by major value drives, such as heat rate, outage reduction, min-max load, offload and deep dives into O&M. We anticipate that the legacy Dynegy combined cycle fleet will realize a run rate value of, at least, $55 million through these efforts.

Finally, the legacy Dynegy coal fleet has 13 sites with about half of these underway with their OP efforts. We have a head start on some of these sites as Dynegy kicked off these efforts prior to the closing of the transaction. Many of the levers are similar to actions implemented on the Luminant Texas coal fleet we reported on earlier. Reductions in min load, improvements in max load, as well as faster ramps up and down all create more flexibility and value.

For example, Zimmer is executing on reducing its min load from 650 megawatts to 450 megawatts, yielding nearly $1 million a year in recurring value. Ramp rates for the majority of the MISO and PJM coal fleet are currently in the 3 to 5 megawatts a minute range and for sites has completed OP, we're executing our ramp rates that are nearly three times faster.

With respect to improved generation, reduction on auxiliary loads can drive value across the spectrum from full load down to minimum loads. As minimum loads value is created by identifying equipment that isn't needed to support a lower level of generation, including cooling water pumps, circulating pumps, air compressors and other house loads to improve the bottom line.

The average reduction both in terms of more effective planned outages, as well as more timely response to unplanned outages is a source of opportunity. [indiscernible] typically a challenge for coal plants and effective preventive maintenance and standard playbooks to recover from them is critical. Many of the MISO and PJM sites experienced unplanned or forced outages in excess of 13%, and being able to reduce this by, at least, 50% is consistent with our experience, as well as reducing the turnaround time from 72 hours to 48 hours or less in times of an unplanned outage.

Heat rate focus through implementation of onsite data and analytics, coupled with real-time advanced monitoring and diagnostics from our POC or Power Optimization Center is a significant source of value. Operators can use this information to adjust operating parameters to resolve issues related to combustion and cycle efficiency losses. Baldwin and Zimmer have identified over 4 million of annual heat rate improvement through their OP efforts.

Overall, we're currently projecting we'll realize $50 million of the OP benefits in 2018 and $160 million in 2019. On a run rate basis, we will have achieved roughly $115 million of our $225 million OP target by the end of 2018 and 100% by the end of 2019. It's important to emphasize, there were literally thousands of action items required to capture the OP value across the fleet.

This requires attention in detail and strong accountability in governance assisted by online tracking and reporting tools that reinforce the ongoing performance mindset. The value capture is important, but sustaining the OP process is critical to long-term success and key to identifying even more opportunities down the road. As a result, while we believe there could be opportunities for further upside to this $225 million target, we will not know a confidence until we get further down the road.

With that, I would like to turn the call over to Bill Holden to discuss a few financial highlights of the combined company.

William Holden

Great. Thanks, Jim. Turning now to Slide 18, where we have provided four sets of financial projections. Two sets of which represent our actual guidance for 2018 and 2019, and two sets of which represent illustrative guidance for the same period and are being presented for illustrative purposes to indicate the earnings power of our company.

I'd like to note that we provided the 2019 guidance along with 2018, because the 2019 guidance reflects the partial year of combined – our results, given the timing and the close of the merger.

As Curt mentioned and I will discuss the illustrative 2018 shows that on a combined company basis, including Dynegy's actual first quarter results, adjusted EBITDA and adjusted free cash flow for full-year 2018 are projected to be higher than we anticipated when we announced the transaction. We thought it would also be beneficial to provide you an early look at 2019 on a combined company basis.

On the right-side of the page, you will see the illustrative cases. The 2018 illustrative case provides a projection of the earnings and cash flow generating power of the combined company, as the merger closed on January 1, including actual first quarter results for both companies.

Assuming the merger had closed at the beginning of the year, we forecast the combined enterprise could earn between $3.15 billion and $3.35 billion in adjusted EBITDA from ongoing operations and between $1.65 billion and $1.875 billion in adjusted free cash flow from ongoing operations.

With the exception of the introduction of the Asset Closure segment, this illustrative presentation is on a comparable basis to the pro forma 2018 adjusted EBITDA and adjusted free cash flow projection we provided when the merger was announced.

As Curt mentioned, assuming the January 1 merger closing, we had previously estimated the combined company could earn between $2.875 billion and $3.125 billion of adjusted EBITDA on a consolidated basis. The improvement of approximately $250 million, when comparing midpoints versus our 2018 illustrative case reflects four primary drivers. First, an increase of $5.85 million related to the increase in merger value lever targets, we now expect to realize within the first 12 months following the merger close.

Second, an adjustment of approximately $85 million to reflect the exclusion of the Asset Closure segment from the 2018 illustrative case we're presenting today and an increase of approximately $155 million reflecting improved power prices, primarily in ERCOT. These positive variances were partially offset by Dynegy's first quarter 2018 results, which were approximately $75 million lower than Dynegy management expectations at the time the merger was announced.

I would also note that we – had we compared our current 2018 forecast for April 9 through December 31 only for the same time period from our October 2017 forecast, our positive variance would have been even higher as the results for those periods does not include Dynegy's first quarter underperformance. Because the merger actually closed on April 9th Vistra's 2018 financial results will only include Vistra's results on a standalone basis for the period prior to April 9th 2018 and results of the combined company for the period from April 9th through December 31, 2018.

As a result, our 2018 guidance which can be found in the first column in the table on Slide 18 reflects earnings and cash flow expectations for 2018 on this basis. Vistra is projecting 2018 adjusted EBITDA from ongoing operations will be $2.7 billion to $2.9 billion with adjusted free cash flow from ongoing operations of $1.4 billion to $1.6 billion. Guidance reflects power price curves as of March 30th, 2018 in all markets. Because our 2018 guidance does not reflect earnings and cash flow expectations for the combined company for a full year, we are also providing 2019 guidance today.

In 2019 we expect adjusted EBITDA from ongoing operations of $3.2 billion to $3.5 billion and adjusted free cash flow from ongoing operations of $2.05 billion to $2.35 billion, which represents a projected adjusted EBITDA to free cash flow conversion ratio of approximately 64% from our ongoing operations, highlighting the significant cash flow generation we expect from our diversified and integrated operations.

The last case we present on Slide 18 is in the far right-hand column and it reflects, as Curt mentioned earlier this morning, the earnings potential of the combined enterprise once we realize the full run rate of projected EBITDA value lever targets. In that instance we would expect Vistra could earn approximately $3.275 billion to $3.575 billion in adjusted EBITDA from ongoing operations and approximately $2.15 billion to $2.45 billion in adjusted free cash flow from ongoing operations.

Turing to Slide 19, we provide a look forward from our 2018 and 2019 guidance, the illustrative cases we show on **Slides** 10 and 18. The 2018 illustrative case reflects 2018 guidance and has increased for actual and forecasted Dynegy results for January 1st to April 8th, the period prior to the merger close and an incremental quarter of realized EBITDA value levers.

The 2019 illustrative case reflects 2019 guidance and has increased by $80 million to reflect the full run rate of adjusted EBITDA value levers, versus the $420 million we expect to realize in 2019. In any case we believe the projected earnings power of the combined enterprise is impressive and it supports our view that Vistra should be able to earn upwards of $3 billion of adjusted EBITDA on an annual basis, while converting approximately 60% of its adjusted EBITDA from ongoing operations to free cash flow.

Turning now to Slide 20, we have updated our capital structure slide pro forma for the merger close. As we can see, pro forma for the merger closing and for the retirement of the $850 million of Dynegy 6.75% senior notes due in 2019 which occurred on May 1st, we had net debt of the combined company of approximately $10.5 billion as of March 31st, 2018.

We project our net debt to adjusted EBITDA will be 2.9 times as of year-end 2018 and approximately 2.2 times at year-end 2019. As a result we project we will have approximately $1 billion of capital available for allocation over the next 18 months, while still achieving our 2.5 times net debt to adjusted EBITDA target by year-end 2019. We plan to provide more specificity regarding our initial capital allocation plan at our upcoming Analyst Day on June 12th.

We also plan to discuss our thoughts of optimizing our capital structure at the Analyst Day. We have approximately $3.7 billion of senior notes that are callable later in 2018 and in 2019, streamlining our capital structure and minimizing our borrowing cost will be an important focus for us in the coming months. To the extend the capital markets remain favorable, we would pursue repricing or refinancing opportunities in the future as has been Vistra’s historical practice.

Our balance sheet remains strong and we’re committed to achieving our long-term leverage target of 2.5 times net debt to adjusted EBITDA by year-end 2019 as we continue to believe maintaining a strong balance sheet is critical to success in this industry.

I’ll now turn the call back over to Curt for a brief wrap up before we get to Q&A.

Curtis Morgan

Thanks Bill. I know we've covered a lot here today, but at the end here it might be useful to quickly highlight again why we're optimistic about the future of our company and the ability to create superior shareholder value for investors.

As I said before, we believe our overall strategy of low leverage, low cost integrated business operations and disciplined capital allocation is the winning formula for companies like ours and will lead to long-term shareholder value. We continue to believe that the Dynegy merger is consistent with these strategic imperatives and represents the single largest opportunity to enhance shareholder value relative to a host of other strategic alternatives we evaluated, we now must execute.

If you just take a look at Slide 22 briefly, the closing of the Dynegy merger provides what we believe will be significant value creation for shareholders, as well as diversification, scale and a platform to expand our integrated operations.

On the value creation side, as I highlighted it earlier, we now project the merger together with the impact of tax reform will create approximately $500 million in adjusted EBITDA value levers, $235 million in additional after-tax free cash flow benefits and more than a $1 billion, $1.7 billion in federal cash tax and TRA savings, plus anticipated alternative minimum tax credit refunds.

The combination of these benefits we believe should create approximately $7.5 billion in equity value, as a combined company we expect we'll be able to drop approximately 60% of our EBITDA from ongoing operations down to adjusted free cash flow. A free cash conversion ratio that is significantly higher than that of other commodity based capital intensive business stream.

As an organization, we project to earn approximately $3 billion or more per year in adjusted EBITDA, that should translate to approximately $9 billion or more in adjusted free cash flow from ongoing operations from 2018 through 2022. We are absolutely committed to achieving our long-term leverage target of 2.5 times net debt to EBITDA, adjusted EBITDA by year-end 2019 and expect we will have significant capital to pursue a diverse set of capital allocation alternatives, including returning capital to our shareholders. In fact, we estimate we'll have approximately $1 billion, as we discussed previously, $1 billion in capital allocate in 2018 to 2019 while still achieving our leverage target.

The ability to achieve these financial metrics is a direct reflection of our earnings, geographic and field diversification, as well as the quality of our assets and operations following the closing of the merger. We are the leading retail platform, we're a market leader in Texas in addition – and the addition of Dynegy's generation fleet provides a platform for us to leverage Dynegy's existing retail presence, while applying best practices from our TXU Energy brand to expand further in these regions.

Further, even before any retail growth, we projected approximately 50% of our adjusted EBITDA over time will come from a combination of retail and capacity payments, as well as from the attractive ERCOT market. Our operations are estimated to be the lowest cost among competitor generators as we project all-in wholesale cost of approximately $9 per megawatt hour and retail cost of approximately $45 per residential customer equivalent, which gives you the sense of the type of scale benefits that we receive.

With the addition of the Dynegy legacy CCGT as we believe we now have the youngest most efficient fleet in the key U.S. markets, more than 60% of which is gas field. We own a very attractive low cost assets that are in the money [ph] most of the time and contribute to our ability to produce consistent earnings and free cash flow in a variety of market environments, while lowering our organizational risk and reducing our exposure to natural gas.

We look forward to going into more detail regarding our new operating profile at our Analyst Day on June 12. So as we conclude today Slide 23 provides a highlight or a high-level preview of our Analyst Day which will be held at our corporate offices here in Irving on June 12 beginning at 8:30 AM central time and concluding approximately 1:30 PM central.

The topics we expect to cover includes capital allocation which I know is probably high on everybody's list in the priorities thereof. Our five-year free cash flow outlook, capital structure optimization opportunities, operational update included retail, commercial operations and generation with an OP update we also plan to provide our view yet it's a preliminary one, as you might guess on the impact and the opportunities for batteries.

I know that's something of interest and we had a lot of chatter about what's long-term impact from batteries, we obviously are very interested in that and we're beginning to invest in it. We hope many of you will be able to join us in Texas and we look forward to that day and for those of you unable to join us in person, the event will be broadcast out via a webcast on our website.

With that operator, we are now ready to open the line for questions. Thank you.

Question-and-Answer Session

Operator

[Operator Instructions] Your first question comes from Shahriar Pourreza from Guggenheim Partners. Your line is open.

Shahriar Pourreza

Hey good morning guys.

Curtis Morgan

Hey Shah.

Shahriar Pourreza

So on the synergies, nice surprise on the incremental $50 million for the corporate combo. As we're thinking about additional opportunities, have you tapped this out, and more importantly, as we're thinking about the operational synergies, obviously past comments even to Dynegy's own internal studies seem to point to multiples higher on the operational side. So again, can you review sort of what you need to play out to up this number to more emulate what the past comments have been? And when do you think you can update us since you already have pretty good start?

Jim Burke

Well, look I think included [ph] what we have done and look I have to say talking about it to one thing, doing it to another, so I really don't – I know there were some numbers sitting around out there, but Shah here is how it works, because these are plant by plant you've got to get in and you got to do the assessments and it takes to go into each plan, and I'll just – I should emphasize you guys, there are literally thousands of line item items that comprise getting to that 225, and there will be another thousand or so to get another incremental on that.

And so what we've done with our OPI effort is try to bring those out and community those to you guys, when – once we get into the plant and do that early-on assessment. What we do is we do an early on assessment, it's very detailed and then we put target out there for the plants to go after and then we prove it up. And so that's why I say any increment to the 225 is likely to come more at the end of this year so that we can get through the plant assessment. And then so that we could feel comfortable, the one thing that we are very focused on is putting numbers out there that we know we can achieve that you can take to the bank and that don't erode our credibility because we get out in front of ourselves.

So I think that's what we're trying to do here and I do think there is probably I think Jim, I think there is another incremental here, and it's just we want to prove it out and then communicate it, I think you probably shouldn't expect anything on that until the end of this year and then we'll communicate what that increment looks like.

As far as synergies go, I think we hit the top end of that. I mean, that was our top end of our range and we hit it, and I don't – I would not expect a lot more rallies looking for cost savings, but I would consider it anything more material. It's the OP area where I see incremental and there is a good chance that we'll have some reasonable amount there, but we've got to prove it up before we communicate it.

Shahriar Pourreza

That's helpful, well understood Jim. And then just not to jump ahead of the Analyst Day, but $1 billion of cash available after delevering in the near-term which you'll obviously likely be materially higher post your delivering targets, you are looking at shutting down some additional assets with Dynegy, you've got a mark in Texas this summer and then you got stable cash flows right from retail. So how and when should we begin to think about a dividend? Is 3% to 4% yield "meaningful". And then as you sort of think about a Board approval of the dividend policy, when you think about growth, are you sort of thinking about looking to emulate regulated peers?

Jim Burke

Yes, so, I don't think – well, let me just step back, on the dividend I think what we are thinking about there and we're inching toward this, but we just bought the company, we are integrating it, we feel pretty confident about it, we got a summer ahead of us, and I don't think that you are going to hear from us that we have a definitive day to begin a dividend at the June 12th. I mean we are still working with our Board, but I doubt, but I do think Shah that when we get through this summer and we work with our Board, we have a Board meeting over this summer. We're going to take a hard look at that and we've been pretty open. And that is something that's squarely on our – in our site. But we're also just trying to be mindful that we've got a lot of wood to chop elsewhere and we want to make sure how we're doing through this summer before we make a final decision on it.

We do still think this 3% to 4% yield range is important. But we also think, it's incredibly important to be able to grow that dividend. I think, you – it's hard to – it's hard for us not to admit that when you look at the cash generation of this business and it's because we have low leverage, so we have low interest expense, and it's because our CapEx to maintain our business is substantially lower than the CapEx at other energy commodity-based capital intensive business have to plow back in their business just to generate the same level of EBITDA like E&P and MLPs, that we are going to have a multitude of opportunities around capital allocation.

And we've been very open about the fact that dividend is one that's squarely on the table. We're just – we're not ready to pull the trigger on that, but I think we'll make some final decisions as the year progresses. I think, you should expect to hear from us much more definitive sense on this in 2018, I believe that we will have that discussion. But we are going to talk about some other things around capital allocation and in particular, we'll talk a little bit about our stock where it's trading and share repurchases. I also – at the June 12th meeting, I think, there'll be more meat on the bone on that one.

Shahriar Pourreza

Terrific. And then just one last question, if I may. As you think about retail deals sort of the Northeast, what's sort of the read-through to your plan as presented today, i.e., any potential delays you see as far as you're delevering targets with a retail deal or the deal that you're sort of looking at shouldn't sway your balance sheet targets more than a couple of months?

Curtis Morgan

Yes. No, I think, it's limited, if any. So I think we can do retail type transactions if we decide to do that. And I should emphasize that, our retail strategy is going to be – it's going to be a dual strategy and it will be looking at M&A. But I will tell you that, we have to feel very confident of what we're getting and we have to feel confident that we are getting a good value proposition, and that's not easy to do looking at the retail companies that are out there.

We have a way to do business and we have certain standards. And we're going to make sure that what we're giving is real at the end of the day. I think, what you probably are going to see the way you will see is a pretty aggressive out of ERCOT organic growth strategy that will put the lever down. And we think that's probably – it's like the more cost-effective approach to growing our business.

When I look at it this way, Shahriar, we've got people out there that have grown businesses to $100 million of EBITDA and 1 million customers over sort of a three-year to seven-year period. And I look at that, I look at the problems that we have in our company why can't we do that and why can't we build the kind of business we like rather than acquiring something, paying a premium and getting something that we're not even certain is a real solid business model.

So we're going to take a hard look at that, Jim. As Scott Hudson is here with us too, who runs our retail business, they're working on with Sara Graziano, working on our retail strategy. We're taking that to our Board in our July Board meeting. And I think, you guys will hear more about that strategy as well, and we're going to talk about that too at our June 12th meeting.

Shahriar Pourreza

Got it. And Curt, congrats on the contract extension. Now you stuck with us for four more years. See you guys.

Curtis Morgan

Well, now that you put it that way. I'm looking forward to you. Thank you, Shahriar.

Shahriar Pourreza

Thank you, guys.

Curtis Morgan

You bet.

Operator

Your next question comes from Julien Dumoulin-Smith from Bank of America. Your line is open.

Julien Dumoulin-Smith

Hey, good morning. Congratulations.

Curtis Morgan

Hey, Julien, how are you?

Julien Dumoulin-Smith

Good. Thank you very much. Happy Friday. I suppose to start it off here with the Asset Closure. So we talk about that in terms of the composition of EBITDA attribution and/or just timeline to actually getting these things closed out, I'm thinking specifically MISO in California?

Curtis Morgan

Yes. So a couple of things on that, and then Bill, you might want to get in some more details. But the one area, I'd say, we're still working on is the Dynegy sort of ARO-related expenditures over the next few years. And so, look, I think we're talking about by the 12, Julien.

We want to provide kind of a 10-year look at our cash expenditures, and we're – and the reason we're not doing that right now is that, we're still working on it. And – but we know we need. If we're going to separate this thing out, we know we need to provide detailed information and we'll also give you an EBITDA outlook as well.

So the EBITDA and – yes – and so, I guess, what you guys know on the Asset Closure segment that I'm going to – on that particular thing, we're going to give you guys more detail. On asset rationalization in terms of what we're going to do with our assets, I think, we've been clear on this.

We've got to figure out what kind of a business we have in MISO. And I know that everybody would like to see the capacity market get passed from the Illinois legislature. This is probably not a commonly known fact, but I grew up in the Illinois and I know a little bit about Illinois politics and that stage right out of Chicago and we have downstate Illinois coal plants and there are a lot of people in the Illinois that don't like coal plants.

I think, it is a really low probability that we get that passed, I love it, we'll work on it, but we can't do a business around a hope. We've got to build a business around reality. And if reality is that we have the same capacity clears that we just saw in MISO, we got to do some things with our business.

I think, the most important thing for our company is the work with the Illinois EPA and legislature to get the multi-pollutant standard changed, and that's good for everybody, because it basically allows the assets to sort of fend for themselves and we have a higher probability of keeping more assets in that market with that adjusted than if we keep them in a bubble state that they're in now.

So our highest priority has been to work through the MPS process and try to get that through. We'll continue to work on the capacity market, but I just don't have a lot of hope for that. What's that mean at the end the day, that we're – and we're going through the OP process too, that's the other prong. But once we get through all that like we did in Texas, we're going to make decisions and we're losing money on assets, we're not going to run.

And so I would expect balance of this year, you guys are going to hear a lot more from us about what we're going to do with our MISO generation. I do think though at the end, when we get all that done, the retail business and what's left of the assets, we could have a little – nice little business in MISO that we can make money on, and that's the real goal on this. And so that's what I think, you'll see us probably a smaller, more focused business in MISO at the end of the day.

In California, we have some opportunities there that I don't know that I can really – yes, I can't really talk about right now, Julien, but I like to. But we have some opportunities around our asset sites there that are pretty intriguing and could be very valuable. And so our view on that is, we got to play that out and then we'll decide what we do with it. Right now, our position in California is not our strategic position, and we're not looking to grow for additional generation at all in California.

So if that's what we're left with, you can expect we're going to start to do something with that position. So I think, that's about as straight as I can be on those assets right now. And unfortunately, we don't have anything to announce on it, but we're working through it. And what we're trying to do is simplify our business and focus on those areas where we make money. And I think it's ERCOT, PJM, EISA New England is really the core. And then around that, we've got a tremendous retail business and we're continuing actually to grow our other retail brands in Texas.

We can do an acquisition of something in Texas and expand a little bit further on the retail side. And then with our asset base, we're looking for retail channels to basically sell our long asset position – generation position in PJM. And we're focused on Illinois, Ohio, where we already have position there. We're looking at Pennsylvania. We think Pennsylvania is a very good state for retail, as you can expect us to be pretty aggressive there. We'll look at Massachusetts, Connecticut, those types of markets on the retail side.

So that if you think about what are we going to do, we're going to look at the retail side of the things to grow that out in addition to the asset rationalization. And then, of course, I'll talk about this renewable as it relates to our retail business, are important to us. And then we have began to, what I call, into the battery world. We think batteries are real.

We think there are some opportunities in ERCOT around batteries, and so we have opportunities may present themselves. And so you'll see us actually probably put a little bit – I won't scare anybody, we're not talking about hundreds of millions of dollars here. But we have some small opportunities that allow us to get in that business and to understand batteries and understand their application in markets like ours.

Julien Dumoulin-Smith

Excellent. A quick follow-ups, if I can. What's the curve date for the adjusted EBITDA that you post today just to understand where the mark-to-market is?

William Holden

Yes, it's March 30.

Julien Dumoulin-Smith

Okay, it's very, very recent. And then separately, what's the retail allocation of synergies just when you look at the numbers that you put out there just if you were to kind of slice up that 500?

Curtis Morgan

It's like $10 million.

Julien Dumoulin-Smith

Okay. [Multiple Speakers]

Curtis Morgan

So I should tell you, Julien, I think I spent like $17 million in total. And so we got over half of that as synergies, but there weren't a lot of meat on that bone. And our – as you know, even prior to this deal, our costs, we were at – we were one of the lowest cost on a residential customer equivalent basis as it was, just TXU Energies. And so when you combine what they had, almost 1 million customers with $17 million of spend, that's why we saw such a precipitous reduction in that particular metric on the $45.

We were – I think we were around $90 previous and we dropped it in half, because we picked up all these assets, because the way that they go to market, right? They do mainly muni ag type stuff and broker-related. And so their overhead structure was less, because they're not doing like we do a lot of door-to-door and direct marketing type stuff.

Julien Dumoulin-Smith

Got it. Excellent. Thank you all very much.

Curtis Morgan

Thank you.

Operator

Your next question comes from Greg Gordon from Evercore. Your line is open.

Greg Gordon

Hey, good morning. Can you guys hear me?

Curtis Morgan

Hey, morning. Good morning, Greg. How are you?

Greg Gordon

Yes, good morning. So – I'm great. So a lot of my questions have been answered. When you talk about your confidence that you can be $3 billion run rate EBITDA company even under stressed market conditions. I mean, I guess, I'm looking at the page 19, you're the $3,275 to 3,575 illustrate of EBITDA forecasts, you've indicated that you think you can nudge that a little bit higher perhaps with further OPI – OP initiatives. But when you run your simulations and get comfortable with that, you're sustainably sort of even in a down cycle of $3 billion EBITDA run rate business.

Can you just give us a sense of how you stress tested that? Are you counting on countercyclicality in the retail versus the wholesale business, or what factors drive you to the conclusion that you think you can convince investors that this is fundamentally a pretty stable through the cycle cash flow business?

Curtis Morgan

Yes. So – look, I will say that, we do have the combined company, Greg, we ran models on this is – has reduced its exposure to gas fairly significantly one with the retail channels, but also because of – in PJMs a significant combined cycle fleet and the small effect there – that we've added into us. And so we have reduced it. But I want to be clear, we still have exposure to both gas and we have exposure to heat rate. And that's how we look at our combined power position to break it between gas and heat rate.

The reason I feel comfortable and we feel comfortable, because there is exposure outside the bands of what we provide. But it's our ability to access liquid, commodity markets, and to be able to hedge and to take that tail risk out. And some – we're doing something now on ERCOT to attempt and I think we're doing a good job of it in terms of how we hedge the summer to try to reduce the risk of that – something could happen in ERCOT that where we would go below the bottom-end of the range.

I don't want to miss – mislead anybody. I mean, this is a presentation where we're talking about our company and what we think we can do, but through execution. But we still have risk in our business. But the way we manage our business and we think about, we don't wait and swing for the fences, we find opportunities relative to our fundamental view in each of the markets, where the forward curves are above that and we take that risk exposure off the table.

And by doing that, in fact, we really like the PJM market, because it actually has more liquidity further out into the market that we can manage that risk to an EBITDA outcome and we talk about that with Steve Muscato, who runs our commercial group will say, okay, Steve, this where we want to be. This is the EBITDA we want to hit. And then Steve comes up with strategies on how we can hedge, and how we can we can basically hit those numbers.

So Greg, it is my confidence in our ability to commercialize our assets and use liquid forward curves to be able to manage the risk that we have inherent in our business. But I also would say it's also, because we have, on the energy side, we have very low heat rate in the money assets, so that's helpful to we have capacity payments as well as retail business. And when I combine all those and we stress, we stress our outcomes, we feel comfortable that we can hit the $3 billion plus and we can convert roughly 60% of that into cash.

Greg Gordon

That's great. When you talk about batteries, not to try to gun jump you on the Analyst Day, but that's my job. You talked about ERCOT, but you've also mentioned California. And I know back in March, I think it was back in March. They had a ramp in the duck curve one or two days that was basically so substantial. It was like three to four years. They hadn't projected a ramp in the duck curve as steep as they saw for another three four years out from when it happened. And so they seem like they are kind of in a bind there to figure out how they're going to deal with the – how much renewables they have there, so is it battery storage opportunity what you're infer – you are implying or inferring you could be looking at at those sites in California, as well as perhaps dabbling in retail focused batteries in ERCOT?

Curtis Morgan

Yes so this is what I could say that we have two of the best sites in PG&E's territory for batteries and so we are certainly considering that. And if you thought, Greg, you hit it around the head. If we thought we were going to have a business in California, it wouldn't be a traditional generation business, that's not gone. We had an opportunity to get into alternative energy sources like a battery and we could do it through potentially contractual arrangements and work with the utilities there that's a business that we could get our head around. And that might even lead potentially to even considering God forbid our retail business. But the bottom line is, the business we have there now is not a sustainable business, but what we could do with those sites could actually create a business in California. So that's it.

And I would also tell you Greg that we should have called our battery section – session on the 12th to Greg Gordon battery session, because you're the one that has pushed us on that issue about what does the long-term – and I'm being serious, what does the long-term outlook of these markets look like with a realistic penetration of batteries and renewables. And it's a serious issue for us and we're studying it and we're going to share with you guys what we know. We won't – well, nobody has the answer, but at least we can share with you guys our thoughts around it.

Greg Gordon

No, that you are too kind, I appreciate that. Have a great morning.

Curtis Morgan

All right, Greg.

Operator

The next question comes from Praful Mehta from Citigroup. Your line is open.

Praful Mehta

Thanks so much. Hi guys.

Curtis Morgan

Electronic Filing: Received, Clerk's Office 6/1/2018P.C. #2751

Hey, Praful. How are you?

Praful Mehta

Good, good thanks for the fulsome update. A couple of quick questions, I know you've gone through a long session already. But quickly on Texas, firstly, in 2019 how long a position do you have right now and how do you see that market evolving 2019? You've talked about backwardation as well. So a little bit on Texas and how you are positioned to any sensitivities to movements up or down on the curve. How would you see that play out?

Curtis Morgan

So I'm going to – you can go ahead and get the numbers, I want to talk about [Multiple Speakers].

William Holden

Yes, I'll just quickly give you a summary of our positions and the sensitivity. We've got those in the appendix by the way, so you can refer to them later, but you'll see on natural gas, this is at March 30, we were about 23% hedged and then on for 2019 and then on heat rate for 2019 in March 30 we were about 42% hedged. But I guess the sensitivities, that – the changes that are also greater. So for natural gas sensitivity, at March 30th, it was sort of $0.50 change in gas, if $235 million of the gas price changes up to $225 million down as the gas price was down. And again, that sensitivity of heat rates are held constant and then the market heat rate sensitivity for a one turn in heat rate is about $160 million up and $150 million down.

Curtis Morgan

Yes, that's good. So to talk maybe slightly more qualitative than that. But just directionally in 2018 and 2019 when we look at just the fundamentals for the market and since we live here we see this, the tremendous amount of growth that's going on in Texas, load growth seems extremely strong. And when you look at what the new resources are likely to come on between 2018 and 2019, there are some, but it's limited. We actually felt that 2018 or that 2019 would trade over 2018.

Now what I'd say is, there's a physiology to all these markets and I think people got caught in 2018 in a little bit and so that played out in kind of behavior and physiology and 2019 hasn't quite gotten to that further yet. But we certainly have seen 2019 come up as we've gotten further into 2018 and I believe it will come up even further as we see the physiology of the market turn from 2018 to 2019 and realize that there really isn't a lot of resource coming on and there's still load growth coming. So we've always felt like 2019 was going to be a little tighter, we'll see, but it's certainly seems that way to us was.

The question for me and we've talked about this a lot is, what happens beyond that, but even 2020 it's hard to see how there's enough resources that are on. There's no big chunky gas combined cycle play, first as I've said earlier when you look at the forward curves they don't justify a plant like that. So we do believe that there's going to be renewables to come in when and solar, but it's just not enough over that period of time. So we still think that 2020 is going to look pretty attractive over time and that should pop up as well. And then some of that backwardation should come out in the market.

Now backwardation I think is a function of uncertainty and it's a function of illiquidity. And as you move close to those markets, we would expect those curves to move up. So it's going to be interesting to see there's no – I don't think there is any more – there's any deep pocketed strategic who are going to make a poor decision to build 2000 megawatts when it's not needed in this market.

I don't see that happening, this is going to have to be merchant players and in an energy only market with backwardated curves and which is already difficult to get – to raise debt against. And then the illiquidity in the market because of the uncertainty that trading – traders have in it, it will be very difficult to go out and do a long-term hedge to support a newbuild. So that bodes well, on my view that bodes well for some sustainable relatively strong ERCOT market over the next few years.

Praful Mehta

Got you, super helpful. And then just quickly on taxes, it sounds like a meaningful improvement on the NOL utilization and the fact that you're really not paying any cash taxes for a number of years. Just wanted to confirm, is there any uncertainty or do you require any tax approval or private letter ruling or anything else for this change or is this already okay in terms of the NOL utilization of Dynegy?

Curtis Morgan

Yes, our assumptions are based on existing law at the date of the merger, so we're pretty confident in the outcome.

Praful Mehta

All right. Well, thanks so much, guys.

Curtis Morgan

Thanks.

Operator

Your next caller comes from Angie Storozynski from Macquarie. Your line is open.

Angie Storozynski

Thank you. So I wanted to actually go back to this sensitivity that you guys are showing to changes in natural gas prices in Texas especially, because power prices in Texas have seemingly decoupled from natural gas, which could be a good thing given what's happening with the Permian gas. And so how do you see it evolving, yes, we have obviously scarcity for being priced in Texas and that might continue for the next year or two. But you're also seeing this incredible growth in the gas, associated gas in Permian that with some estimates suggesting that from next summer Permian gas could be basically trading at zero. And so how should I think about that and your exposure of your earnings to that the gas, regional gas phenomenon?

Curtis Morgan

Yes, so a good question, let me try to attack it in a couple of ways. First of all, we sort of recognized the gas exposure. And I think I've mentioned this previously that we break our power position to a gas equipped position and a heat rate position. And without – I don't want to give up our positioning, but what I will tell you is that we are mindful of where gas is and we are protecting ourselves on gas in both 2018 and 2019 to the downside. And we have effectively done that and I think that was important for us and we left ourselves some position for the upside.

So I can't really, Angie, I just don't think it's right for me to say much more details than that, because Steve Muscato is staring at me and I don't want to give away our position. But we recognized exactly what you said. Now, we actually though, we actually have a net benefit in our fleet in particular the Luminant fleet, but our gas is doing quite well, I mean with the kind of gas prices. And one thing we are going to have Steve go through at the Analyst Day is pricing in ERCOT because I think there maybe some misconception about it. But in general, gas generators that Houston Ship Channel gas, which trades at a premium to Mid-Continent gas, Texas gas, and Waha. They set the price investors congestion from West Texas.

What that means is, because Houston Ship Channel gas is higher, there are plans to source off a Midcon and off of Texas and off of Permian actually have a advantage relative to those that price off a Houston Ship Channel or Henry Hub. So we have a pretty good position, now we're working on the Dynegy plans to get them better positioned on the gas over time, but even they are better positioned than some, but the bottom line is, our assets, Forney, Lamar and Odessa are really good gas positions.

So for us we're in a pretty good position. The thing we're worried about and it's a fair question is the downside on the gas and we have positioned our self to guard against the downside, because we think that in the next year or two, we think it's downside risks. What I would also tell you though is that, the markets are telling us that they believe, it could even build pipelines in Texas so I want to be clear. This is not the same kind of situation that you have in the Marcellus and you have the Utica and other parts of country where there's Nimby about or just anti-pipelines.

You can build pipelines in Texas, so anybody who thinks they could come in and try to build on the backs of low gas, try to build a combined cycle plant that's going to vanish in about two years, because there's going to be gas, there's going to be pipeline to get that gas out and try to get it to LNG facilities and get it to rest of the country and also to try to get it to Mexico. So that differential is going to dissipate over time.

Angie Storozynski

That's all I have. Thank you.

Operator

This will bring us to the end of the Q&A portion, as we have ran out of our time limit. I turn the call back over to the speakers for a closing remarks.

Curtis Morgan

Okay. Thank you very much. And thank you all for taking the time to join us. As I stated at the beginning of the call. We do appreciate your interest in Vistra. And we look forward to continue our conversations. Thank you. Operator?

Operator

Thank you everyone. This will conclude today's conference. You many now disconnect.

Comments (0)

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R18-20
AMENDMENTS TO 35 ILL. ADM.	)	(Rulemaking-Air)
CODE 225.233, MULTI-POLLUTANT	)	
STANDARDS	)	

POST-HEARING COMMENTS
OF THE ILLINOIS ATTORNEY GENERAL'S OFFICE

Attachment 2

Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard (Oct. 2016)

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397
BRUCE RAUNER, GOVERNOR ALEC MESSINA, DIRECTOR

217/782-3397

May 8, 2017

Robert A. Kaplan, Acting Regional Administrator
Office of the Regional Administrator, R-19J
U. S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3507

Re: Redesignation of the Metro-East St. Louis Nonattainment Area for the 2008 8-Hour Ozone National Ambient Air Quality Standard

Dear Mr. Kaplan:

The Illinois Environmental Protection Agency ("Illinois EPA"), on behalf of the State of Illinois, and pursuant to Sections 107(d)(3)(E), 110(a)(2), 175A, and 182 of the Clean Air Act ("CAA") and Section 4 of the Illinois Environmental Protection Act (415 ILCS 5/4), requests that the Metro-East St. Louis ozone nonattainment area ("Metro-East NAA"), composed of Madison, Monroe, and St. Clair Counties in Illinois, be redesignated to attainment for the 2008 ozone National Ambient Air Quality Standard ("NAAQS"). The Illinois EPA also submits its "Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard" ("Maintenance Plan") as a revision to Illinois' State Implementation Plan ("SIP").

On April 30, 2012, USEPA designated the Metro-East St. Louis area as nonattainment for the 2008 ozone NAAQS. The area was classified as marginal nonattainment effective July 20, 2012. (77 FR 30088) On March 6, 2015, in the final 2008 ozone NAAQS SIP requirements rule, USEPA established an attainment deadline for marginal areas of July 20, 2015. (80 FR 12264) USEPA granted a one year extension until July 20, 2016, for the Metro-East St. Louis area to attain the standard. (81 FR 26697) The standard has now been attained. Certified ambient air monitoring data collected by the Illinois EPA in the Metro-East St. Louis area, as well as data collected in Missouri, demonstrate that the entire St. Louis nonattainment area is meeting the 2008 ozone standard, and has been meeting the NAAQS since the 2013-2015 monitoring design period. USEPA published a Clean Data Determination for the Metro-East St. Louis area effective August 26, 2016. (81 FR 41444)

The Maintenance Plan is being provided as technical support for the redesignation request. Included within the Maintenance Plan are revised year 2030 motor vehicle emissions budgets developed using the MOVES2014a model and the Illinois Ozone Emissions Inventory for 2014 ("Emissions Inventory"). The Maintenance Plan, including the motor vehicle emission budgets and the Emissions Inventory, is required as part of the Illinois EPA's redesignation request.

Illinois EPA hereby certifies and confirms that this request meets the requirements for redesignation under Section 107(d)(3)(E), 110(a)(2), 175A, and 182 of the CAA for the Metro-East St. Louis nonattainment area for the 2008 ozone NAAQS The Illinois EPA held a public comment period and a public hearing. The public notice was published in the Illinois Register on August 12, 2016. A public hearing was held on September 14, 2016, in accordance with the requirements set forth in 40 CFR 51.102, at which several comments were made and a question posed. A letter of support was received by the Illinois EPA after the hearing. A compilation of the comments, the question, the Illinois EPA's response, and the letter of support are included in the Illinois EPA's Responsiveness Summary. The Maintenance Plan was finalized and effective October 17, 2016.

This SIP revision meets the criteria for completeness pursuant to 40 CFR Part 51, Appendix V, Criteria for Determining the Completeness of Plan Submissions. This request is being submitted via the USEPA's electronic eSIP submission system. Attached is a list of the documents provided.

If there are any questions, please feel free to contact David Bloomberg at 217-524-4949 or via email at David.Bloomberg@illinois.gov.

Cordially,

Alec Messina
Director

Attachments

Illinois State Implementation Plan

List of Enclosed Documents

1. Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard.

2. Illinois Ozone Emissions Inventory for 2014.

3. Notice of Public Hearing and Comment Period, August 12, 2016.

4. Illinois EPA Responsiveness Summary.

Electronic Filing: Received, Clerk's Office 6/1/2018 P.C. #2751

ATTACHMENT 1

Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard

AQPSTR 16-05

October 2016

Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

Illinois is requesting that the U.S. Environmental Protection Agency ("USEPA") redesignate the Illinois portion of the St. Louis nonattainment area ("Metro-East NAA") from nonattainment of the 2008 8-hour ozone National Ambient Air Quality Standard ("NAAQS") to attainment. In order to redesignate a nonattainment area to attainment, USEPA must determine that violations of the NAAQS are no longer occurring, that the improvement in air quality has been achieved by permanent and enforceable emission reductions, and that the state's maintenance plan is adequate to maintain the NAAQS in the area.

This document provides the necessary information for USEPA to make that determination, and describes Illinois' Maintenance Plan for the Metro-East NAA, as well as providing additional technical information required to support a redesignation request. Motor vehicle emissions estimates developed using USEPA's Motor Vehicle Emissions Simulator ("MOVES") model are also incorporated. The Illinois Environmental Protection Agency ("Illinois EPA") has prepared this plan in consultation with the Missouri Department of Natural Resources ("MDNR") and USEPA. The MDNR is preparing a similar plan for the Missouri portion of the St. Louis nonattainment area.

Ozone air quality has improved in the St. Louis region as a result of implementation of State and Federal control measures since the designation of the St. Louis area as marginal nonattainment in 2012. The entire St. Louis nonattainment area has three years of complete, quality assured ambient air quality monitoring data for 2013-2015 that demonstrates compliance with the 2008 8-hour ozone NAAQS. These air quality improvements are due to permanent and enforceable emissions control measures.

This Maintenance Plan provides for continued attainment of the 2008 8-hour ozone air quality standard for the Metro-East NAA for a period of at least ten years after USEPA has formally redesignated the area to attainment. The Plan also provides assurances that, even if there is a subsequent violation of the air quality standard, measures listed in the Plan will prevent any future occurrences through contingency measures that would be triggered upon such an occurrence. Finally, the Plan includes on-road motor vehicle emissions budgets for use in transportation conformity determinations to assure that any increases in emissions from this sector do not jeopardize continued attainment of the 8-hour ozone standard during the ten-year maintenance period.

1.0 INTRODUCTION

This document describes Illinois' Maintenance Plan for the Metro-East NAA. A maintenance plan is required before the area can be redesignated from nonattainment to attainment of the 8-hour ozone NAAQS promulgated by USEPA in 2008. Illinois EPA has prepared this plan in consultation with the MDNR and USEPA. The MDNR is submitting a redesignation request for the Missouri portion of the nonattainment area.

The entire St. Louis nonattainment area has three years of complete, quality-assured ambient air quality monitoring data for 2013-2015, demonstrating attainment with the 2008 8-hour ozone NAAQS.

This document also provides the technical information needed to support a request to redesignate the St. Louis area to attainment of the 8-hour ozone NAAQS. Section 107 of the Clean Air Act ("CAA") establishes specific requirements to be met in order for a nonattainment area to be considered for redesignation: USEPA must make a determination that the area has attained the NAAQS based on at least three complete years of ambient monitoring data. USEPA must have approved a State Implementation Plan ("SIP") for the area under Section 110 and Part D of the CAA. The state must demonstrate that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements. Finally, the state must submit, and USEPA must approve, a maintenance plan under Section 175(A) of the CAA, including provisions for contingency measures that will be implemented if future violations of the 8-hour ozone NAAQS are measured.

This Maintenance Plan provides for the continued attainment of the 8-hour ozone NAAQS for the Metro-East NAA for a minimum of ten years after USEPA has formally redesignated the area to attainment. The Plan also provides assurances that even if a subsequent violation of the ozone NAAQS occurs, provisions in the Plan will prevent additional future occurrences through contingency measures that would be triggered upon such occurrence.

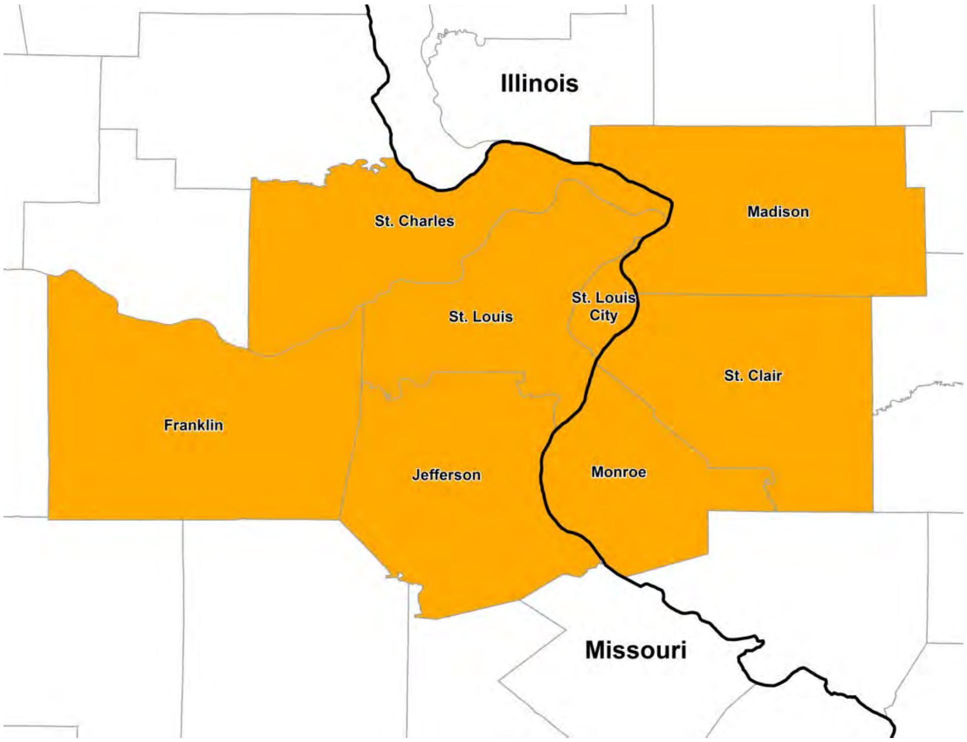
This document addresses the maintenance plan requirements established by the CAA and USEPA, and includes additional information to support continued compliance with the 8-hour ozone NAAQS.

1.1 Regulatory Background

The CAA, as amended in 1990, requires areas that fail to meet the NAAQS for ozone to develop SIPs to expeditiously attain and maintain the NAAQS. Historically, exceedances of the ozone NAAQS have been monitored in Madison and St. Clair counties in Illinois and in the Missouri portion of the NAA.

The Metro-East NAA, which includes Madison, Monroe, and St. Clair counties in Illinois, was originally designated as marginal nonattainment in 2012 pursuant to the 2008 revisions to the ozone NAAQS. Several counties in Missouri were also designated as nonattainment of the 8-hour ozone NAAQS. Figure 1.1 depicts the current St. Louis Missouri-Illinois NAA.

Figure 1.1 8-Hour Ozone Nonattainment Area St. Louis MO-IL



The following is a list of the counties contained in the St. Louis Missouri-Illinois 8-hour ozone nonattainment area:

- Madison County, IL
- St. Clair County, IL
- Monroe County, IL
- St. Louis County, MO
- St. Louis City, MO
- St. Charles County, MO
- Jefferson County, MO
- Franklin County, MO

The emissions reductions needed to attain the 8-hour ozone NAAQS include both State and Federal measures that have reduced ozone precursor emissions both locally and regionally. These measures have allowed the St. Louis Missouri-Illinois NAA to attain the 8-hour ozone standard by the end of the 2015 ozone season.

1.2 Status of Air Quality

Ozone monitoring data for the most recent three-year period, 2013 through 2015, demonstrates that air quality has met the 2008 8-hour ozone NAAQS in the St. Louis Missouri-Illinois NAA.

2.0 REDESIGNATION AND MAINTENANCE PLAN REQUIREMENTS

Sections 107 and 110 of the CAA list a number of requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. One of those requirements is the development of a maintenance plan, which describes a state's plan for maintaining the NAAQS for a ten-year period after redesignation to attainment. USEPA has published guidance for the preparation of maintenance plans and redesignation requests. This guidance is contained in a document entitled "Procedures for Processing Requests to Redesignate Areas to Attainment" (September 4, 1992).

Before a redesignation to attainment can be promulgated, USEPA must:

- Determine that the NAAQS for ozone, as published in 40 CFR 50.4, has been attained. Ozone monitoring data must show that violations of the NAAQS are no longer occurring. This showing must rely on three consecutive years of data. The ambient air monitoring data must be quality assured in accordance with 40 CFR 58.10, recorded in USEPA's Air Quality System ("AQS") data base, and be available to the public.

- Determine that the improvement in air quality between the year violations occurred and the year that attainment was achieved is based on permanent and enforceable emissions reductions.

- Approve the state's maintenance plan. The requirements for the maintenance plan are discussed below.

- Determine that all other requirements applicable to nonattainment areas have been met.

To be approvable, the state is required to have a public comment period and provide the opportunity for a public hearing on the Maintenance Plan prior to adoption. The maintenance plan must contain the following elements:

- A comprehensive emissions inventory of the precursors of ozone completed for the "attainment year";

- A projection of the emissions inventory forward to a year at least ten years after redesignation and a demonstration that the projected level of emissions is sufficient to maintain the ozone NAAQS;

- A commitment that, once redesignated, the state will continue to operate an appropriate monitoring network to verify maintenance of the attainment status;

- A demonstration of legal authority to implement and enforce all control measures contained in the SIP;

- Provisions for future updates of the inventory to enable tracking of emissions levels, including an annual emissions statement from major sources;

- Motor vehicle emissions budgets for transportation conformity for the ten-year maintenance period;

- A commitment to submit a revised maintenance plan eight years after redesignation;

- A commitment to enact and implement additional contingency control measures expeditiously in the event that future violations of the NAAQS occur; and

- A list of potential contingency measures that would be implemented in such an event.

Illinois' Maintenance Plan has been prepared in accordance with the requirements specified in USEPA's guidance document and additional guidance received from USEPA staff. The following sections of this document describe how USEPA's requirements have been met.

3.0 OZONE MONITORING AND MODELING

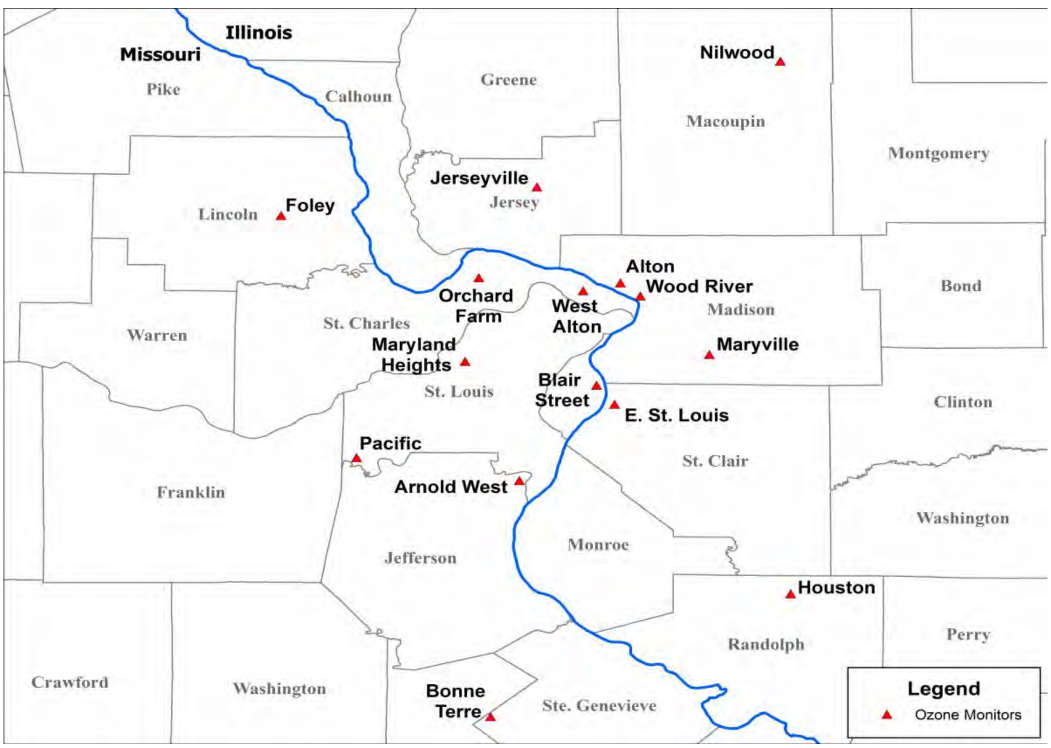
USEPA's published guidance document, "Procedures for Processing Requests to Redesignate Areas to Attainment" (September 4, 1992), details specific requirements regarding the collection and use of ambient air monitoring data needed to support a redesignation request. Before the Metro-East NAA can be redesignated, Illinois must demonstrate that the 8-hour ozone NAAQS, as published in 40 CFR 50.4, has been attained.

The following subsections describe how each of these requirements has been addressed.

3.1 Monitored Design Values

Currently there are 10 ozone monitors located in the nonattainment counties in the St. Louis region; 6 are located in Missouri and 4 are in Illinois. Missouri and Illinois also operate ozone monitors at locations upwind and downwind of the metropolitan area. Figure 3.1 shows the locations of these monitors.

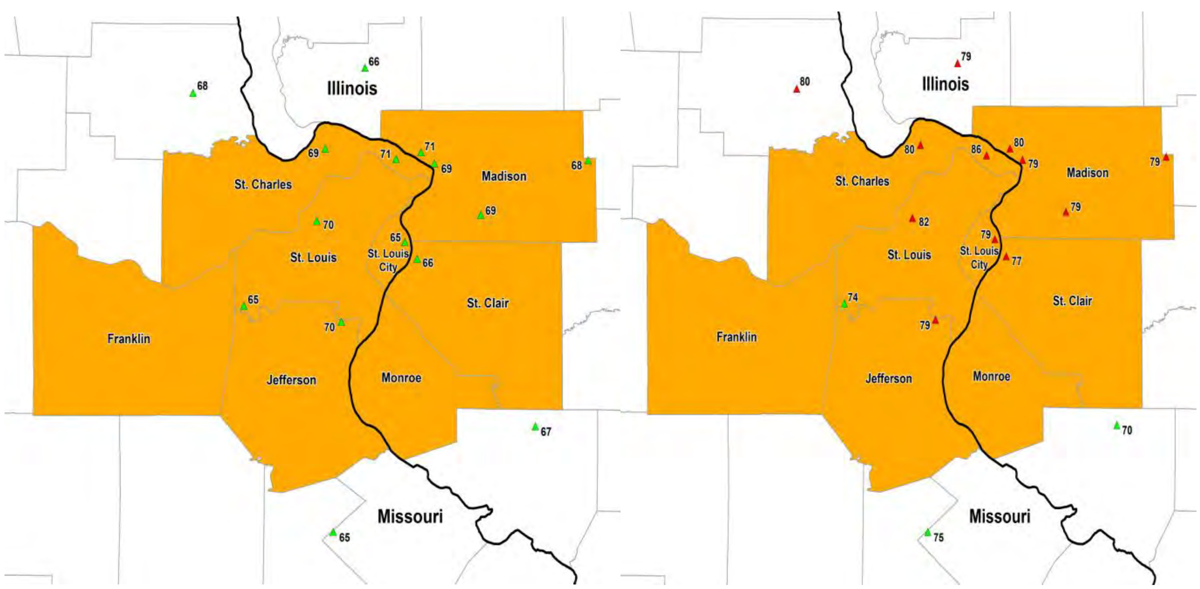
Figure 3.1
Ozone Monitors in the St. Louis Area



To determine whether the NAAQS is being exceeded, the design value must be calculated. The current USEPA method for calculating the ozone design value is to average the fourth highest daily maximum 8-hour value for each year over the three-year period. The calculated 8-hour ozone design values for the monitors in the St. Louis Missouri-Illinois NAA for 2013-2015 are included as Appendix A of this report. Figure 3.2 compares the design values for the 2010-2012 period for monitoring stations in the St. Louis region to the corresponding design values from 2013-2015. Every monitor in the nonattainment area have 2013-2015 design values that are 9-15 ppb lower than their design values for 2010-2012. An upwind monitor outside the nonattainment area at Houston, Illinois had only a 3 ppb decrease in design value over the same period. This indicates that background ozone concentrations are decreasing at a much slower rate than are design values in the nonattainment area. This result illustrates the effectiveness of emission reduction within the NAA. The data demonstrate that ozone air quality has improved dramatically throughout the St. Louis NAA and that the 2008 8-hour ozone NAAQS has been attained for the 2013-2015 period.

Figure 3.2
Comparison of 8-Hour Ozone Design Values (ppb) for the St. Louis Region Between 2010-2012 and 2013-2015

2010-2012 **2013-2015**



3.2 Influences of Meteorology on Ozone Formation

A statistical analysis that constructs ozone concentration trends for high ozone days having similar meteorological characteristics, called a classification and regression tree (“CART”) analysis, was completed by the Lake Michigan Air Directors Consortium (“LADCO”). The purpose of this analysis is to minimize the effect of meteorological variability on the trend in ozone concentrations. The resulting trend in ozone concentrations is due to reductions of anthropogenic emissions.

The CART analysis, presented in more detail in Appendix B, uses 8-hour ozone concentrations from the Alton, Maryville, and Wood River monitors for the period 2000-2015. These three monitors were chosen because typically, high ozone in the Metro-East occurs with south to southwest surface winds. These monitors are north and northeast of the urban center, and Alton is the controlling monitor on the Illinois side.

The results are that days with high ozone as well as high temperatures and southerly winds show a marked decrease in ozone concentrations over the 15-year period. The analysis demonstrates that the decrease in ozone concentrations leading to attainment of the 8-hour standard in the Metro-East NAA is caused by actual reductions in emissions, not by favorable meteorological conditions.

3.3 Quality Assurance

Illinois EPA has quality assured all Illinois ozone monitoring data in Appendix A for 2013-15 in accordance with 40 CFR 58.10 and the Illinois EPA's Quality Assurance Plan, which describes Illinois EPA's standard operating procedures for operating the ambient monitoring network and validating the data. The MDNR has a similar quality assurance plan. Illinois EPA has recorded the monitoring data in the USEPA's AQS database, as has Missouri. USEPA's AQS database is available to the public.

3.4 Continued Monitoring

Illinois commits to continue monitoring ozone levels according to a USEPA approved monitoring plan, as required to ensure maintenance of the ozone NAAQS. Should changes in the location of an ozone monitor become necessary, Illinois EPA will work with USEPA to ensure the adequacy of the monitoring network. Illinois EPA will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Illinois EPA will continue to enter all data into AQS on a timely basis in accordance with federal guidelines.

3.5 Impact of Permanent and Enforceable Measures on Future Air Quality

USEPA has recently done national-scale ozone photochemical modeling that used a 2017 projected inventory to assess air quality improvement resulting from controls in the updated Cross-State Air Pollution Rule ("CSAPR"). The 2017 modeling results are relevant to maintenance of the 2008 ozone NAAQS because of the proximity of the future year to the current year. USEPA has performed photochemical modeling in support of their proposal to update the CSAPR to address the 2008 ozone NAAQS. Full documentation of their effort is available at http://www.epa.gov/airmarkets/proposed-cross-state-air-pollution-update-rule. In brief summary, the modeling started with the development of a 2011 base case for emissions, meteorology, boundary conditions, and so forth. The base case was evaluated for its ability to replicate monitored values, and found to be performing acceptably. Emissions were then projected to 2017 using the Integrated Planning Model ("IPM") version 5.14 and other growth-and-control tools to account for changes in emissions in all sectors between 2011 and 2017. Finally, a 2017 control case applied an ozone-season cost threshold of $500/ton of NOx to all fossil-fuel-fired Electric Generating Units ("EGUs") with a capacity greater than 25 MW in each of 23 states, including Illinois and all bordering states. More recent updates have been made to this modeling, but those updates incorporated reductions from the now-stayed Clean Power Plan ("CPP"). Since none of the CPP controls will be in place in 2017, those modeling results would be inappropriate for this discussion.

The highest 2017 projected average design value for any nonattainment monitor is 70.1 ppb, well under the 2008 ozone standard of 75.0 ppb. Compared to the 2009-2013 "design value" reported in USEPA's "Air Quality Modeling TSD for the 2008 Ozone NAAQS Cross-State Air Pollution Rule Proposal" (November 2015), the 2017 modeling results show large decreases in ozone concentrations throughout the nonattainment area. These results are strong evidence both that maintenance will be protected and that ozone concentrations will continue to decrease across the entire nonattainment area.

It should be noted that Illinois EPA still disagrees with the state budget for EGU emissions proposed by USEPA in the CSAPR update proposal as well as many of the methods to arrive at that budget, as outlined in comments to USEPA. Even while the agencies work together to create a reasonable future year EGU inventory, it is clear that the magnitude and directionality of the change in future year ozone as demonstrated in the USEPA modeling is realistic.

Table 3.1
USEPA Base Year and Future Year Design Values

Monitor ID	State	County	Monitored Average Design Value	2017 Projected Average Design Value
171190008	Illinois	Madison	77.0	65.6
171191009	Illinois	Madison	78.3	67.5
171193007	Illinois	Madison	76.7	65.4
171199991	Illinois	Madison	76.0	64.4
171630010	Illinois	St. Clair	74.7	65.1
290990019	Missouri	Jefferson	76.3	67.1
291831002	Missouri	St. Charles	82.3	70.1
291831004	Missouri	St. Charles	77.7	68.0
291890005	Missouri	St. Louis	72.0	62.0
291890014	Missouri	St. Louis	79.0	67.9
295100085	Missouri	St. Louis City	75.7	66.7

4.0 EMISSIONS INVENTORY

A redesignation request must contain a demonstration that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emissions reductions. As described previously in Section 3.0, a three-year monitoring period is used to evaluate whether attainment has been achieved. An attainment year inventory can be developed for any of the three years in which an attaining design value is computed. In this Section, the "attainment year" refers to the mid-point year (2014) of the three-year period (2013-2015) used to demonstrate attainment. The request should also include a projection of the emissions inventory to a year at least 10 years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the ozone NAAQS, and a commitment to provide future updates of the inventory to enable tracking of emissions levels during the 10-year maintenance period.

4.1 Attainment Year Inventory - 2014

Illinois EPA has prepared a comprehensive emissions inventory for the Metro-East ozone NAA, including point, area, and on-road and off-road mobile sources for precursors of ozone (NOx and VOM) for the attainment year, 2014. The method of calculating emissions primarily follows the methodology described in Illinois EPA's *Illinois Ozone Emission Inventory for 2014* (see attached document).

Point source information was compiled from 2014 annual emission reports submitted to the Illinois EPA by emission sources. Area source emissions were calculated primarily using an emission factor multiplied by an activity rate (e.g., population, employment, amount of fuel burned, etc.). The 2014 inventory included additional categories not calculated in the 2011 inventory. These categories include oil and gas production, oil exploration, and agricultural field burning. While emissions from these categories may be significant state-wide, they have very minor emissions for the Metro-East ozone NAA.

On-road mobile source emissions were calculated using USEPA's MOVES2014a emissions model with vehicle miles traveled ("VMT") data provided by the Illinois Department of Transportation ("IDOT"). Off-road mobile source emissions were also calculated using USEPA's MOVES2014a emissions model. Aircraft emissions were calculated using the Emissions and Dispersion Modeling System ("EDMS") model. While EDMS may not be the most recent model to calculate aircraft emissions, information from USEPA indicated that is how they would calculate aircraft emissions. Emissions from locomotives were grown from the 2011 inventory, and yard locomotives were included as a new category. Commercial marine vessel emissions were provided by LADCO via a contract with Enercon to calculate emissions for the Great Lakes and major Midwest rivers. Biogenic emissions are not included in these summaries.

The following tables summarize the 2014 emissions estimates for the entire Metro-East nonattainment area.

Table 4.1
2014 Metro-East Ozone Nonattainment Area NOx Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	21.39	0.83	13.05	9.29	44.56
Monroe	0.48	0.15	1.62	8.01	10.26
St. Clair	1.42	0.55	12.27	7.32	21.56
Total	23.29	1.53	26.94	24.62	76.38
Missouri					
Franklin	21.13	0.46	8.00	5.24	34.83
Jefferson	17.96	0.42	12.87	3.04	34.29
St. Charles	21.05	0.89	19.68	7.40	49.02
St. Louis City	4.78	0.93	10.92	5.23	21.86
St. Louis	16.79	3.76	118.61	17.53	156.69
Total	81.71	6.47	170.08	38.44	296.69

Table 4.2
2014 Metro-East Ozone Nonattainment Area VOM Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	7.52	9.41	4.85	3.86	25.64
Monroe	0.10	1.72	0.63	1.03	3.48
St. Clair	1.76	7.93	4.63	2.58	16.90
Total	9.38	19.06	10.11	7.47	46.02
Missouri					
Franklin	2.08	5.80	2.57	2.91	13.36
Jefferson	1.91	5.44	4.65	2.72	14.72
St. Charles	4.12	11.50	7.75	5.25	28.62
St. Louis City	2.88	11.19	4.23	2.92	21.22
St. Louis	2.87	35.88	73.21	19.61	131.57
Total	13.86	69.81	92.41	33.42	209.50

4.2 Air Quality Improvements and Emissions Controls

The Metro-East area was designated as nonattainment of the 2008 8-hour ozone NAAQS in 2012, based on ozone air quality monitoring data collected between 2009 and 2011. Since that time, permanent and enforceable reductions of ozone precursor emissions have contributed to improvements in ozone air quality and to the attainment of the 8-hour ozone NAAQS. Some of these emissions reductions were due to the application of tighter federal emissions standards on motor vehicles and fuels, and some due to the requirements of regional transport rules such as the Clean Air Interstate Rule ("CAIR"). Section 5.0 of this report describes these reductions in more detail, along with an explanation of their regulatory status. In this subsection, the emission levels from 2014 are compared to emission levels estimated in 2011.

USEPA's 8-hour Ozone Implementation Rule required that states with ozone nonattainment areas prepare and submit a base year anthropogenic inventory of sources of ozone precursor emissions, and strongly suggested that the Annual Emissions Reporting Rule ("AERR") inventory that is required every three years would meet this requirement. This base year inventory included emissions from point, area, on-road mobile, and off-road mobile emissions. Illinois EPA prepared this inventory, dated June 2014, based on 2011 emissions. Tables 4.3 and 4.4 summarize 2011 emissions by major source category and by pollutant for the Metro-East NAA.

Table 4.3
2011 Metro-East Ozone Nonattainment Area NOx Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	24.23	0.64	16.56	6.82	48.25
Monroe	0.59	0.13	2.03	4.82	7.57
St. Clair	1.36	0.46	15.55	5.53	22.90
Total	26.18	1.23	34.14	17.17	78.72
Missouri					
Franklin	27.75	0.49	7.83	5.72	41.79
Jefferson	16.66	0.62	12.45	3.33	33.06
St. Charles	25.04	0.68	21.04	8.34	55.10
St. Louis City	4.49	1.16	16.55	6.31	28.51
St. Louis	16.74	2.65	66.34	23.85	109.58
Total	90.69	5.60	124.20	47.55	268.04

Table 4.4
2011 Metro-East Ozone Nonattainment Area VOM Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	9.00	8.75	5.50	4.65	27.90
Monroe	0.09	1.57	0.72	0.77	3.16
St. Clair	1.71	7.80	5.22	3.07	17.80
Total	10.80	18.12	11.44	8.49	48.86
Missouri					
Franklin	2.52	3.36	2.40	3.31	11.59
Jefferson	1.63	7.48	4.24	3.12	16.47
St. Charles	3.34	11.21	6.73	6.23	27.51
St. Louis City	3.59	12.04	4.46	3.38	23.47
St. Louis	3.50	38.68	20.17	22.99	85.34
Total	14.58	72.77	38.00	39.03	164.38

Comparing the Illinois portion of the 2011 inventory to that for 2014 indicates that total NOx emissions for Illinois decreased by about 2.34 tons/day while VOM emissions decreased by about 2.84 tons/day during the same time period. These reductions in ozone precursor emissions, and corresponding reductions in the Missouri portion of the NAA, plus reductions in upwind areas in Illinois and other nearby states, resulted in a substantial improvement in ozone air quality in the St. Louis area, ultimately resulting in attainment of the 2008 8-hour ozone NAAQS.

4.3 Emissions Projections

A maintenance plan must contain a demonstration that the level of emissions projected for the ten-year period following redesignation are sufficient to maintain the ozone NAAQS. Accordingly, Illinois EPA has projected NOx and VOM emissions for the Illinois portion of the St. Louis nonattainment area for 2030. Illinois EPA has also projected 2020 emissions to represent a midpoint during the maintenance period. Emissions for these two projection years are compared to emission levels in 2014 to determine whether the Maintenance Plan is adequate to maintain the NAAQS during this period.

Point and area source categories, along with off-road categories not calculated by the MOVES model, were calculated using Version 6.2 of the "Notice of Data Availability of the Environmental Protection Agency's Updated Ozone Transport Modeling Data for the 2008 Ozone National Ambient Air Quality Standard (NAAQS)" – also known as the NODA. This data set projects 2011 emissions to 2017 and 2025. To account for a base year of 2014 and projected years of 2020 and 2030, additional manipulation had to be performed in order to obtain appropriate growth factors.

Linear interpolation between the years of 2011 and 2027 was used to obtain the 2014 emission rates. Linear interpolation was also used for the years of 2017 and 2025 to obtain 2020 emission rates. The Excel TREND function was used to extrapolate data from the individual years of 2018 to 2025 in order to obtain 2030 emissions.

Emissions presented in NODA are expressed in tons/year. Growth factors for the applicable year (2020 or 2030) were calculated by taking the ratio of the future year to the base year, 2014. Illinois EPA had already calculated daily emissions for the 2014 inventory, so calculating emissions for the future years was a straight multiplication of the applicable growth factor to obtain the future year emissions.

Illinois EPA's 2014 inventory included some point sources that began operation after the 2011 NODA base year. These emissions were grown using growth factors already calculated using NODA for the same SCC. Illinois EPA notes that the projections in NODA calculated by the IPM model do not agree with what Illinois EPA believes will actually happen with fuel switching and shutdowns. Therefore, appropriate modifications to address the incorrect NODA projections were made in that portion of the inventory.

On-road and off-road emissions for 2020 and 2030 were calculated using the MOVES2014a model. The inputs assume the continued phase-in of the Tier 2 motor vehicle standards, the phase-in of the Tier 3 standards beginning in 2017, and continued operation of Illinois EPA's vehicle inspection and maintenance program. Total vehicle miles of travel (VMT) for 2020 and 2030 were assumed to increase at a rate of 1.012 percent per year from 2014.

The following tables identify the NOx and VOM emissions estimates for the year 2020 and 2030 for the entire Metro-East nonattainment area.

Table 4.5
2020 Metro-East Ozone Nonattainment Area NOx Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	14.80	0.82	6.39	6.81	28.82
Monroe	0.61	0.15	0.82	6.22	7.80
St. Clair	1.40	0.54	6.01	5.42	13.37
Total	16.81	1.51	13.22	18.45	49.99
Missouri					
Franklin	30.92	3.11	5.99	4.03	44.05
Jefferson	23.58	1.18	4.99	2.19	31.94
St. Charles	8.82	2.41	7.89	5.28	24.40
St. Louis City	4.09	3.79	3.95	4.13	15.96
St. Louis	21.19	6.37	23.60	12.65	42.57
Total	88.60	16.87	46.42	28.27	180.16

Table 4.6
2020 Metro-East Ozone Nonattainment Area VOM Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	7.20	9.07	3.05	2.89	22.21
Monroe	0.09	1.68	0.42	0.72	2.91
St. Clair	1.74	7.65	2.92	2.04	14.35
Total	9.03	18.40	6.38	5.65	39.47
Missouri					
Franklin	2.50	5.87	7.89	2.06	18.32
Jefferson	1.75	5.38	2.41	2.17	11.71
St. Charles	4.17	11.39	3.90	4.21	23.67
St. Louis City	2.84	11.16	1.97	2.44	18.41
St. Louis	3.06	35.03	10.47	17.84	66.40
Total	14.32	68.86	26.64	28.71	138.53

Table 4.7
2030 Metro-East Ozone Nonattainment Area NOx Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	14.57	0.82	3.24	4.30	22.93
Monroe	0.93	0.15	0.42	3.56	5.06
St. Clair	1.43	0.54	3.05	3.45	8.47
Total	16.93	1.51	6.70	11.31	36.46
Missouri					
Franklin	30.92	2.20	3.22	1.97	38.31
Jefferson	27.72	0.88	2.73	2.32	33.65
St. Charles	8.87	1.81	4.34	5.88	20.90
St. Louis City	3.82	2.70	2.18	2.80	11.50
St. Louis	21.75	5.44	13.10	16.93	57.22
Total	93.08	13.03	25.57	29.90	161.58

Table 4.8
2030 Metro-East Ozone Nonattainment Area VOM Emissions (tons/day)

County	Point	Area	On-road	Off-road	Total
Illinois					
Madison	6.75	8.90	1.79	2.64	20.08
Monroe	0.09	1.66	0.25	0.51	2.51
St. Clair	1.69	7.49	1.72	1.94	12.84
Total	8.53	18.05	3.75	5.09	35.43
Missouri					
Franklin	2.52	3.36	2.40	3.31	11.59
Jefferson	1.63	7.48	4.24	3.12	16.47
St. Charles	3.34	11.21	6.73	6.23	27.51
St. Louis City	3.59	12.04	4.46	3.38	23.47
St. Louis	3.50	38.68	20.17	22.99	85.34
Total	14.58	72.77	38.00	39.03	164.38

4.4 Demonstration of Maintenance

Table 4.9 demonstrates that the level of emissions projected for the ten-year period following redesignation is sufficient to maintain the ozone NAAQS. As shown in the table, both NOx and VOM emissions within the nonattainment area are expected to decrease significantly between 2014 and 2030. Projected NOx and VOM emissions for the mid-point year 2020 are also less than the emissions levels in 2014. Based on these emissions trends it is expected that air quality will continue to meet the 2008 8-hour ozone NAAQS throughout the maintenance period.

In addition to the overall emission reductions projected to occur within the nonattainment area, significant reductions of statewide NOx emissions resulting from implementation of Illinois' multi-pollutant standards affecting electric utilities will also help to ensure continued attainment of the 8-hour ozone NAAQS.

Table 4.9
Comparison of 2014, 2020, and 2030 Emission Estimates for the Illinois Portion of the Metro-East Nonattainment Area (tons/day)

	2014	2020	2030	Difference (2014-2020)	Difference (2014-2030)
NOx	76.38	49.99	36.46	-26.39	-39.92
VOM	46.02	39.47	35.43	-6.55	-10.59

4.5 Provisions for Future Updates

As required by Section 175A(b) of the CAA, Illinois commits to submit to USEPA, eight years after redesignation, a revised version of this Maintenance Plan. The revision will contain Illinois' plan for maintaining the 8-hour ozone NAAQS for ten years beyond the first 10-year period after redesignation.

5.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in the Metro-East nonattainment area, including CAA requirements, and other state and federal measures. The control measures required in past ozone SIP revisions have been fully implemented, and other, more recent control programs will continue to provide emissions reductions in future years. Illinois EPA commits to keep these measures in effect after redesignation, or to provide equivalent emissions levels using alternate measures. Illinois' SIP contains acceptable provisions to provide for preconstruction review of new emissions sources. After redesignation to attainment, Prevention of Significant Deterioration ("PSD") requirements will apply to the construction of new major sources and to significant modifications of existing sources. Illinois has accepted delegation from USEPA of this program. Illinois further commits to continue to require that all future transportation plans in the St. Louis area conform with the SIP.

5.1 Attainment Demonstration Control Measures

This redesignation request for the Metro-East NAA identified control measures that have been promulgated at either the state or federal level that are sufficient to allow the Metro-East NAA to meet the 2008 8-hour ozone NAAQS The primary emissions reduction measures for demonstrating attainment of the ozone standard are as follows:

- VOM Reductions in Categories including:
    - RACT for Consumer and Commercial Products Group II
        - Industrial cleaning solvents
        - Flat wood paneling coatings
        - Flexible packaging printing lines
        - Lithographic printing lines
        - Letterpress printing lines
    - RACT for Consumer and Commercial Products Group III
        - Paper, film, and foil coatings
        - Large appliance coatings
        - Metal furniture coatings
    - RACT for Consumer and Commercial Products Group IV
        - Miscellaneous metal and plastic parts coatings
        - Automobile and light-duty truck assembly coatings
        - Miscellaneous industrial adhesives
        - Fiberglass boat manufacturing

- Clean Air Interstate Rule (CAIR)/Cross State Air Pollution Rule (CSAPR)

- Illinois' Multi Pollutant Standards ("MPS") and Combined Pollutant Standards ("CPS")

- Mercury and Air Toxics Standard ("MATS")

- New Source Performance Standards ("NSPS") including:

    - Reciprocating Internal Combustion Engine Standards 40 CFR 60 Subparts IIII and JJJJ

    - Industrial/Commercial/Institutional Steam Generating Units 40 CFR 60 Subpart Db.

  - Crude Oil and Natural Gas Production, Transmission and Distribution 40 CFR 60 Subpart OOOO

- NESHAPs/Maximum Achievable Control Technology ("MACT") Standards including:

  - Reciprocating Internal Combustion Engine Standards 40 CFR 63 Subpart ZZZZ

  - Industrial/Commercial/Institutional Boilers and Process Heaters 40 CFR 63 Subpart DDDDD and JJJJJJ

- Standards and Limitations for Organic Material Emissions for Area Sources (Consumer and Commercial Products and Architectural and Industrial Maintenance Coatings rule)

- State Regulations for Stationary Reciprocating Internal Combustion Engines and Turbines

- State Regulations for NOx RACT

- Ongoing reductions from the Enhanced Vehicle Inspection & Maintenance Program

- Ongoing reductions from Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements

- Ongoing reductions from On-Highway Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements

- Federal Control Programs Incorporated into NONROAD Model (e.g., Nonroad Diesel Rule), plus Evaporative Large Spark Ignition and Recreational Vehicle Standards

- Ongoing reductions from Tier 4 Nonroad Diesel Engine Standards and Diesel Fuel Sulfur Content Restrictions

- Ongoing reductions from Category 3 Marine Diesel Engine Standards

- Ongoing reductions from Marine Compression-Ignition Engine Standards and Locomotive Engine Standards

- Consent Decrees – Dynegy Midwest Generation, ConocoPhillips, CITGO, Exxon-Mobil, Marathon Ashland, Archer Daniels Midland

It should be noted that other regulatory requirements also affect Metro-East VOM emission sources. These include MACTs, NSPS, and NESHAPs. These programs satisfy the RACT requirements for specific source categories because these rules are more stringent than RACT. It is concluded from this review that Illinois' existing VOM RACT rules fulfill USEPA's RACT requirements for VOM sources in the NAA.

5.2 Controls to Remain in Effect

Illinois will maintain all of the control measures listed in this Section to ensure maintenance of the 8-hour ozone NAAQS. Any revisions to the control measures included as part of the Maintenance Plan will be submitted as a SIP revision to USEPA for approval, and will be accompanied by a showing that such changes will not interfere with maintenance of the NAAQS.

Illinois EPA has the necessary resources to enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emissions of ozone precursors in the Metro-East NAA.

5.3 Provisions for Permitting New or Modified Emissions Sources

Illinois has longstanding and fully implemented programs for the review of new major sources and significant modifications of existing sources. The PSD program, which includes requirements for Best Available Control Technology ("BACT") on major new sources or significant modifications of existing sources, will be applicable in the Metro-East area once the area has been redesignated to attainment. Illinois has been delegated full authority to implement the PSD program by USEPA.

5.4 Transportation Conformity

The purpose of this section is to describe and establish the Metro-East NAA motor vehicle emissions budgets associated with the 8-hour ozone Maintenance Plan SIP. Average summer weekday motor vehicle emissions budgets are being proposed for the attainment year, 2014, and the final year of the Maintenance Plan, 2030, for the precursor pollutants NOx and VOM. Although the Maintenance Plan includes motor vehicle emissions estimates for the milestone year of 2020, this year is not being proposed as part of the motor vehicle emissions budgets.

The 2014 and 2030 budgets were developed consistent with the motor vehicle activity assumptions and emissions control strategies incorporated into the 8-hour ozone attainment demonstration analysis. The budgets reflect an emissions level determined using data provided by Illinois EPA and consultation with the East-West Gateway Council of Governments and are consistent with the emission levels used in the attainment demonstration.

A motor vehicle emissions budget is that portion of the total allowable emissions allocated to highway and transit vehicle use that are defined in the SIP for a certain year. The rules governing transportation conformity require certain transportation activities to be consistent with motor vehicle emissions budgets contained in control strategy implementation plans (40 CFR § 93.118). Section 93.101 of the rule defines a "control strategy [State] implementation plan revision" as a "plan which contains specific strategies for controlling the emissions and reducing ambient levels of pollutants in order to satisfy CAA requirements of reasonable further progress and attainment." In order to demonstrate conformity to the motor vehicle emissions budget, emissions from the implementation of a transportation plan or a transportation improvement program must be less than or equal to the budget level (40 CFR § 93.118(a)).

The effects of motor vehicle control measures are incorporated into the emissions factors produced by the USEPA's MOVES model. These control measures include motor vehicle emissions standards, the operation of a vehicle inspection and maintenance ("I/M") program, and the required use of reformulated gasoline and low sulfur gasoline and diesel fuel.

The Maintenance Plan emissions analysis summarized in Table 4.9 estimates that NOx and VOM emissions will be 39.92 tons/day and 10.59 tons/day, respectively, less in 2030 than the 2014 attainment year emissions levels. The transportation conformity regulations (40 CFR § 93.118(a)) allow the addition of a portion of this "safety margin" to the motor vehicle emissions estimates. As year 2030 emissions levels are projected to be substantially less than the attainment year 2014 emissions, a fraction of the safety margin is being proposed to be added to the 2030 estimated motor vehicle emissions to establish the motor vehicle emissions budget. Of the NOx safety margin, 25% is being used and 50% of the VOM safety margin is being used, which would equate to an increase of 9.98 tons/day of NOx and 5.30 tons/day of VOM. Since only a fraction of the safety margin is being used, maintenance requirements are still easily met.

The motor vehicle emissions budgets, which reflect the VMT, control program assumptions and safety margin are listed in Table 5.1.

Table 5.1
Proposed Metro-East 8-hour Ozone Maintenance Plan Motor Vehicle Emissions Budgets (tons/day)

	Estimated Emissions		**Applied Safety Margin**		**Motor Vehicle Emissions Budgets**	
Year	**NOx**	**VOM**	**NOx**	**VOM**	**NOx**	**VOM**
2014	26.94	10.11	-----	-----	-----	-----
2030	6.70	3.75	9.98	5.30	16.68	9.05

Complete details on the derivation of the motor vehicle emissions budgets, including discussion of the MOVES model inputs and assumptions are included in Appendix B of this report.

6.0 CONTINGENCY MEASURES

6.1 Contingency Measures

Section 175(A) of the CAA specifies the requirements for maintenance plans, including provisions for contingency measures triggers that will cause actions in response if violations of the 8-hour ozone NAAQS are measured after redesignation to attainment. A list of potential contingency measures that would be implemented in such an event should also be included in the Maintenance Plan.

Contingency measures are intended to provide further emissions reductions in the event that violations of the 8-hour ozone NAAQS occur after redesignation to attainment. While these measures do not need to be fully adopted by the State prior to the occurrence of NAAQS violations, the contingency plan should ensure that the contingency measures are adopted expeditiously if they are triggered. The Maintenance Plan must identify the triggers that determine when contingency measures will be adopted, and the measures that the State will consider.

Illinois EPA's contingency plan for the Metro-East NAA is described in Table 6.1. Consistent with this plan, Illinois agrees to adopt and implement, as expeditiously as practicable, the necessary corrective actions in the event that violations of the 8-hour ozone NAAQS occur within the Metro-East maintenance area after redesignation to attainment. As described in Section 5.0 of this report, Illinois has adopted and is continuing to implement a range of control measures that will greatly reduce precursor emissions, both locally and statewide. The contingency plan anticipates that these emissions reductions will be sufficient to mitigate exceedances or violations of the NAAQS that may occur in the coming years without further regulatory action.

The contingency plan provides for different levels of corrective responses should ambient 8-hour ozone levels exceed the NAAQS in any year, if emissions in the NAA increase significantly above current attainment levels, or if the NAAQS is violated. A Level I response would occur in the event that: 1) the fourth highest 8-hour ozone concentration at any monitoring site in the St. Louis NAA (including sites in Missouri and Illinois) exceeds 75 ppb in any year, or 2) the VOM or NOx emissions increase more than 5% above the levels contained in the attainment year (2014) emissions inventory. It should be noted that USEPA does not require a state to implement contingency measures when occasional exceedances are recorded. The Illinois EPA's voluntary commitment to initiate a Level I response is intended to prevent future violations of the NAAQS from ever occurring.

Table 6.1 Contingency Plan for the Metro-East NAA

Contingency Measure Trigger	Action to be Taken	List of Potential Contingency Measures
Level I Trigger • Fourth highest monitored 8-hour average ozone concentration exceeding 75 ppb in any year at any monitoring station in the St. Louis MO-IL maintenance area. • The Metro-East maintenance area's NOx or VOM emissions inventories increase more than 5% above the levels included in the 2014 emissions inventories.	Illinois will evaluate air quality, or determine if adverse emissions trends are likely to continue. If so, Illinois will determine what and where controls may be required, as well as level of emissions reductions needed, to avoid a violation of the NAAQS. The study shall be completed within 9 months of the certification of the ozone data showing an exceedance. If necessary, control measures shall be adopted within 18 months of determination and implemented as expeditiously as practicable, taking into consideration the ease of implementation and the technical and economic feasibility of the selected measures.	**Point Source Measures** • Continued phasing in of: Mercury and Air Toxics Standards (MATS), Reciprocating Internal Combustion Engines (RICE) NESHAP, and Industrial/Commercial/ Institutional Boilers and Process Heaters NESHAP; Cross-State Air Pollution Rule Update, after promulgation by USEPA; • NESHAP - Risk and Technology Review including: Mineral Wool Production 40 CFR 63 Subpart DDD; Ferroalloys Production 40 CFR 63 Subpart XXX; Petroleum Refineries 40 CFR 63 Subparts CC and UUU; • NSPS - Petroleum Refineries 40 CFR 60 Subpart Ja • Broader geographic applicability of existing measures, if determined to be an issue • Oil and Gas Sector Emission Guidelines, once finalized by USEPA; • Conversion of coal-fired EGU's to natural gas and from baseload units to intermittent units; • Implementation of OTC model rules for above ground storage tanks; • Clean Power Plan, once stay is lifted. **Mobile Source Measures** • 2017 Light-Duty Vehicle GHG and Corporate Average Fuel Economy (CAFÉ) Standards • Mobile Source Air Toxics Rule; • Tier 3 Vehicle Emissions and Fuel Standards; • Heavy-Duty Vehicle Greenhouse Gas Rules; • Regulations on the Sale of Aftermarket Catalytic Converters. **Area Source Measures** • Standards and Limitations for Organic Material Emissions for Area Sources (Consumer and Commercial Products and Architectural and Industrial Maintenance Coatings rule) Current California Commercial and Consumer Products – Aerosol Adhesive Coatings, Dual Purpose Air Freshener/Disinfectant, etc.
Level II Trigger • A violation of the NAAQS at any monitoring station in the St. Louis MO-IL maintenance area.	Illinois will conduct a thorough analysis to determine appropriate measures to address the cause of the violation. Analysis shall be completed within 6 months of the certification of the ozone data showing a violation. If necessary, the appropriate selected measures shall be implemented within 18 months of a violation.	

Illinois commits to compiling VOM and NOx emissions inventories for the Metro-East area every three years for the duration of the Maintenance Plan to facilitate the emissions trends analysis included in the contingency plan under Level I. The Illinois EPA will coordinate with the Missouri DNR to evaluate the causes of high ozone levels or the emissions trends and to determine if control measures are needed to assure continued attainment of 8-hour ozone NAAQS. Under Level I, measures that could be implemented in a short time would be selected, if any are deemed necessary, so as to be in place quickly after the Illinois EPA is aware that corrective measures have been triggered. Control measures selected under Level I will be adopted in most cases within 18 months after a determination is made, and implemented, generally, within 24 months of adoption.

A Level II response would be implemented in the event that a violation of the 8-hour ozone NAAQS were to be measured at a monitoring site within the St. Louis maintenance area (including sites in Missouri and Illinois). In order to select appropriate corrective measures, the Illinois EPA will work with the Missouri DNR to conduct a comprehensive study to determine the causes of the violation and the control measures necessary to mitigate the problem. The analysis will examine the following factors:

- the number, location, and severity of the ambient ozone exceedances;
- the weather patterns contributing to the ozone levels;
- potential contributing emissions sources;
- the geographic applicability of possible contingency measures;
- emissions trends, including timeliness of implementation of scheduled control measures;
- current and recently identified control technologies; and
- air quality contributions from outside the maintenance area.

Contingency measures will be selected from those listed in Table 6.1 or Illinois will implement other measures deemed appropriate and effective at the time the selection is made. This list of contingency measures is comprehensive, and it is expected that implementation of only a few of these measures would be necessary. The selection of measures will be based upon cost-effectiveness, emissions reduction potential, economic and social considerations, ease and timing of implementation, and other appropriate factors. Implementation of necessary controls in response to a Level II trigger will take place as expeditiously as possible, but in no event later than 18 months after the Illinois EPA makes a determination, based on quality-assured ambient data, that a violation of the NAAQS has occurred.

Adoption of additional control measures is subject to necessary administrative and legal processes. The Illinois EPA will solicit input from all interested and affected parties in the area prior to selecting appropriate control measures. No contingency measure will be implemented without providing the opportunity for full public participation. This process will include publication of notices, an opportunity for public hearing, and other measures required by Illinois law.

6.2 Commitment to Revise Plan

As noted in Section 4.5 above, the Illinois EPA commits to review its Maintenance Plan eight years after redesignation, as required by Section 175(A) of the CAA. The Maintenance Plan revision is intended to ensure continued attainment of the 8-hour ozone NAAQS for an additional ten-year period.

6.3 Public Participation

In accordance with Section 110(a)(2) of the CAA, the Illinois EPA is required to have a public comment period and provide for the opportunity of a public hearing prior to adoption of this Maintenance Plan and submittal to U.S. EPA. Public participation in the SIP process was provided for as follows:

- Notice of availability of the Metro-East 8-Hour Ozone Maintenance Plan document, the public comment period, and, if requested, the time and date of any public hearing was published in the Illinois Register.

- A 30-day public comment period was available to the public for the submittal of comments to the Illinois EPA on the Metro-East Maintenance Plan. A summary of the comments received and the Illinois EPA's responses thereto will be included, if necessary, as part of this submittal to USEPA.

- The public hearing to receive comments on the Metro-East Maintenance Plan is scheduled in the Illinois Department of Transportation building in Collinsville, Illinois.

6.4 Legal Authority to Implement and Enforce

The Maintenance Plan must contain a demonstration that the State of Illinois has the necessary legal authority to implement and enforce the measures relied upon to attain and maintain the NAAQS. Illinois has the legal authority to implement and enforce the requirements of this SIP submittal pursuant to the Illinois Environmental Protection Act.

7.0 CONCLUSIONS

The Metro-East NAA has attained the 8-hour ozone NAAQS established in 2008 and is in compliance with the applicable provisions of the CAA required of marginal ozone nonattainment areas. Illinois has performed an analysis showing that the air quality improvements in the Metro-East NAA are due to permanent and enforceable control measures. Supporting documentation is contained herein.

The Illinois EPA has prepared a Maintenance Plan that meets the applicable requirements of the Clean Air Act. This Maintenance Plan provides for the continued attainment of the 2008 8-hour ozone NAAQS for a period of ten years after USEPA has formally redesignated the area to attainment. This Maintenance Plan provides adequate contingency measures for potential, additional emissions reductions in the event that future violations of the 2008 8-hour ozone NAAQS are observed in the area.

The Illinois EPA has prepared a comprehensive emissions inventory of the precursors of ozone completed for the “attainment” year 2014, and has prepared projections of the emissions inventory to a year at least 10 years following redesignation. These projections indicate that emissions levels in the Metro-East NAA will continue to remain much lower than emissions from the attainment year 2014 levels, thereby maintaining the ozone NAAQS in future years. Illinois commits to continue to operate an appropriate air quality monitoring network to verify the maintenance of the attainment status once the area has been redesignated. Illinois EPA has the legal authority to implement and enforce all control measures.

Finally, the Metro-East Maintenance Plan includes on-road motor vehicle emissions budgets for use in transportation conformity determinations to ensure that any increases in emissions from this sector do not jeopardize continued attainment of the 8-hour ozone standard during the ten-year maintenance period. This Maintenance Plan has been prepared in accordance with the requirements specified in USEPA’s guidance document, and additional guidance received from USEPA staff.

APPENDIX A

Summary of Ambient Air Monitoring Data (2013-2015)

Table A.1
2013-2015 8-Hour Ozone Design Values for Monitors in the Metro-East NAA

State of Missouri

County	AQS Code	Site Name	Design Value	4th High 2013	4th High 2014	4th High 2015
St. Charles	291831004	Orchard Farm	69	71	72	66
St. Charles	291831002	West Alton	71	72	70	71
St. Louis City	295100085	Blair St	65	66	66	63
St. Louis	291890014	Maryland Hts	70	70	72	69
St. Louis	291890005	Pacific	65	67	65	65
Jefferson	290990019	Arnold/Arnold W	70	69	72	69

State of Illinois

County	AQS Code	Site Name	Design Value	4th High 2013	4th High 2014	4th High 2015
Madison	171190008	Alton	71	72	72	69
Madison	171193007	Wood River	69	69	70	69
Madison	171191009	Maryville	69	75	70	64
St. Clair	171630010	E. St. Louis	66	66	67	66

APPENDIX B

Classification and Regression Tree (CART) Analysis for Metro-East, IL, Nonattainment Area

A classification and regression tree ("CART") analysis was conducted by LADCO using 8-hour ozone monitoring data for the region northeast of the St. Louis urban core. The analysis area is comprised of three northern monitors: Alton (ID number 17-119-0008), Maryville (17-119-1009), and Wood River (17-119-3007). The analysis years measured from 2000-2015. The goal of the analysis was to determine the meteorological conditions associated with high ozone episodes in the Metro-East air-shed and to construct trends for the days identified as sharing similar meteorological characteristics.

The CART analyses for the Metro-East area ozone study processed multiple meteorological variables for each day to determine which are the most effective at predicting ozone. Meteorological data collected for this analysis were taken from Lambert Field (St. Louis) NWS station and processed by LADCO. Upper air observations were taken from the Lincoln, Illinois, NWS site and were downloaded from the National Climatic Data's Center ("NCDC") Integrated Global Radiosonde Archive. Meteorological variables for this analysis included maximum and average daily temperatures, dew points, relative humidity, and air pressure at the surface and different levels of the atmosphere, wind directions and wind speeds, change in temperatures and air pressure from the previous day, average wind speeds and temperatures over a two- or three-day period, day of the week, cloud cover, daily precipitation, and other parameters.

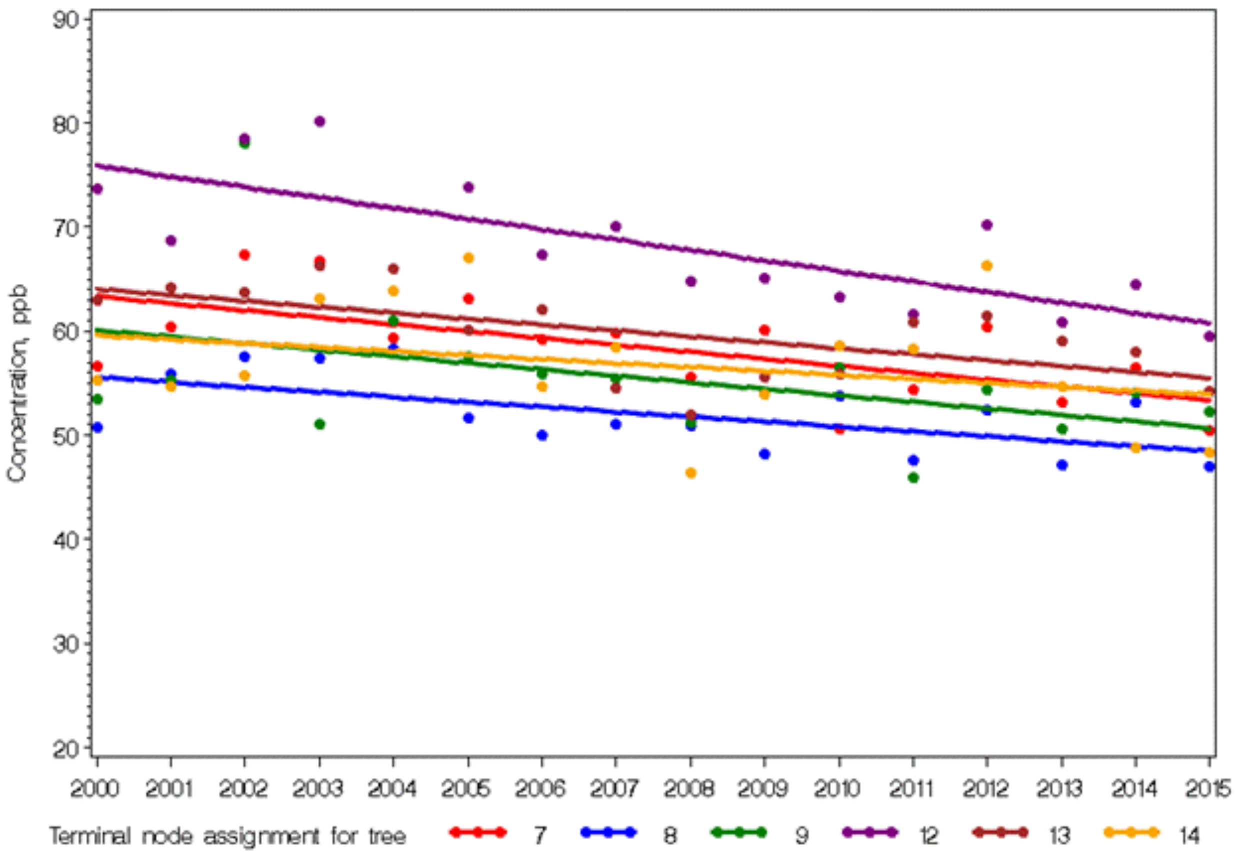
Regression trees, where each branch describes the meteorological conditions associated with different ozone concentrations, were developed to classify each summer day (May - September). Although the exact selection of predictive variables changes from site to site, the universally common predictors are temperature, wind direction, and relative humidity. These are included in the dataset as daily averages and maximums as well as averages at specific times throughout the day (morning 7-10 am, afternoon 1-4 pm, etc.). Similar days were assigned to nodes, which are equivalent to branches of the regression tree. By grouping days with similar meteorology, the influence of meteorological variability on the underlying trend in ozone concentrations is partially removed; the remaining trend is presumed to be due to trends in precursor emissions or other non-meteorological influences. Ozone trends in these nodes were then plotted.

The CART analysis determined that six sets of meteorological conditions had the strongest correlation with high ozone episodes (values over 50 ppb for ozone) for the Metro-East sites. Of those six, Node 12 has by far the highest average ozone concentration (> 8 ppb higher) of any node (68.75 ppb). Node 12 represents a mean afternoon temperature above 87 degrees F, 24-hour transport distance of 480 miles or less, and a lower midday relative humidity (46% or less).

Figure B.1, presented below, shows that for the six nodes identified by the CART analysis, ozone values are trending lower for the most recent 15 years. All six nodes are associated with ozone values that are trending lower. Node 12, the node with the highest average concentration, is also the node with the steepest declining slope. While maximum temperatures plays a strong role in the formation of ozone, the CART analysis reveals that other meteorological parameters are also significant in the conditions that are favorable for ozone formation.

By using a CART analysis to analyze 8-hour ozone data in the Metro-East area, the influence of variations in meteorology can be mitigated such that comparisons of high ozone days with similar meteorological conditions can be made to determine if ozone values have decreased over time due to anthropogenic emission reductions. In general, ozone trends in the Metro-East area have declined. Furthermore, under meteorological conditions when monitored 8-hour ozone has historically been at its highest, ozone concentrations are lower under similar meteorological conditions. This analysis demonstrates that lower ozone values are not caused by favorable meteorological conditions and that progress in reducing ozone precursor emissions is the primary reason for lower 8-hour ozone concentrations in the Metro-East metropolitan area.

Figure B.1
Concentration Trends in CART Nodes – Metro-East, IL (Only Nodes with O_3 50ppb)



APPENDIX C

Metro-East 8-Hour Ozone Maintenance Plan
Transportation Conformity
Motor Vehicle Emissions Budget Documentation

This section describes the development of the motor vehicle emissions budgets associated with this Maintenance Plan. Average summer weekday motor vehicle emissions budgets are being proposed for the year 2030 for ozone precursor pollutants NOx and VOM. The budgets were developed using the MOVES2014a model, which incorporates local inputs such as annual vehicle miles of travel ("VMT"), vehicle fleet characteristics, meteorological conditions, and vehicle and fuel emission control programs.

Background

Section 176(c)(4) of the Clean Air Act Amendments of 1990 requires that transportation plans, programs, and projects which are funded or approved under Title 23 of the United States Code must conform with State or Federal air implementation plans. A motor vehicle emissions budget is that portion of the total allowable emissions allocated to highway and transit vehicle use that are defined in the SIP for a certain year. Section 93.101 of the rule defines a "control strategy [State] implementation plan revision" as a "plan which contains specific strategies for controlling the emissions and reducing ambient levels of pollutants in order to satisfy Clean Air Act ('CAA') requirements of reasonable further progress and attainment." In order to demonstrate conformity to the motor vehicle emissions budget, emissions from the implementation of a transportation plan or a transportation improvement program must be less than or equal to the budget level (40 CFR § 93.118(a)).

Transportation conformity is determined based on these proposed on-road motor vehicle emissions budgets after the USEPA determines that the budgets meet the adequacy criteria of the transportation conformity rule under §93.118(e). The motor vehicle emissions budgets in this submittal are adequate as each of the six criteria under §93.118(e) is satisfied. These six criteria include:

1. The submitted control strategy implementation plan revision or Maintenance Plan was endorsed by the Governor (or his or her designee) and was subject to a State public hearing.

2. Before the control strategy implementation plan or Maintenance Plan was submitted to USEPA, consultation among federal, State, and local agencies occurred; full implementation plan documentation was provided to USEPA; and USEPA's stated concerns, if any, were addressed;

3. The motor vehicle emissions budget(s) is clearly identified and precisely quantified;

4. The motor vehicle emissions budget(s), when considered together with all other emissions sources, is consistent with all applicable requirements for reasonable further progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission);

5. The motor vehicle emissions budget(s) is consistent with and clearly related to the emissions inventory and the control measures in the submitted control strategy implementation plan revision or Maintenance Plan; and

6. Revisions to previously submitted control strategy implementation plans explain and document any changes to previously submitted budgets and control measures, impacts on point and area source emissions; any changes to established safety margins; and reasons for the changes (including the basis for any changes related to emissions factors or estimates of vehicle miles traveled).

This SIP and the associated motor vehicle emissions budgets have been developed by the Illinois EPA, the designated air quality agency for the State of Illinois. The public hearing to accept public comment on the Maintenance Plan was held in Collinsville, Illinois. Notification of this hearing was published in the Illinois Register. Comments on the proposed Maintenance Plan and associated motor vehicle emissions budgets were accepted for 30 days after the public hearing. A Responsiveness Summary to address the written comments received is included in the final submission, as necessary.

In compliance with criterion #2 above, the Illinois EPA discussed the Maintenance Plan at the East-West Gateway Council of Governments' Air Quality Advisory Committee meeting on June 28, and the motor vehicle emissions budget information was distributed to the East-West Gateway Council of Governments' Inter-Agency Consulting Group via e-mail for discussion. The Consultation Group includes representatives from the Federal Highway Administration, the USEPA, the Missouri Department of Transportation, the MDNR, the IDOT, and the Illinois EPA. The draft Maintenance Plan was also forwarded to USEPA's Region V during the comment period.

The motor vehicle emissions budgets proposed and described within comply with adequacy criterion #5. The effects of these controls are incorporated into the emissions factors produced by the MOVES model. In response to adequacy criteria #4 and #6, the narrative of the Metro-East 8-Hour Ozone Maintenance Plan discusses the emissions estimates from other sectors and any changes in regulations. Following, in response to adequacy criteria #3, is a discussion of the inputs and assumptions incorporated into the development of the proposed Maintenance Plan motor vehicle emissions budgets.

Vehicle Miles Traveled: The attainment year 2014 motor vehicle emission estimates contained in the Metro-East 8-Hour Ozone Maintenance Plan incorporate county- and township-level 2014 vehicle miles traveled ("VMT") data from IDOT. The 2014 annual VMT for the three-county Metro-East NAA was 6.1 billion miles. For future year emission estimates, VMT was grown to the target year at a compound growth of 1.012 percent per year. Applying this growth factor to the 2014 VMT level yields future year annual VMT of 6.5 billion for 2020 and 7.4 billion for 2030.

Meteorological Data: USEPA guidance for the use of the MOVES model requires the use of local temperature and absolute humidity data. Appropriate hourly temperature and humidity values were used.

Motor Vehicle Emissions Controls: Beyond the USEPA's federal motor vehicle control program emissions standards, the primary local motor vehicle emissions control programs that were in place in the Metro-East NAA in 2014 and are projected to still be required are a vehicle I/M program ("I/M") and the required use of Reformulated Gasoline ("RFG").

Inspection and Maintenance (I/M): The current Illinois I/M program in effect since February 1, 2012 requires biennial On-Board Diagnostics II ("OBD") testing on all model year ("MY") 1996 and newer ("MY96+") light-duty gasoline vehicles, and 2007 and newer ("MY07+") heavy duty gasoline vehicles with a gross vehicle weight rating ("GVWR") between 8,501 and 14,000 lbs registered in the I/M testable area. Motorcycles and diesel vehicles are not subject to I/M. The program includes a four-year grace period for new vehicles. The post-2012 I/M program was established when the Illinois legislature amended the Illinois Vehicle Inspection law in 2005 and 2011 as follows:

- End dynamometer testing of vehicles
- Require an OBD-based program beginning in February 2007
- Remove the requirement for testing compliant pre-MY96 vehicles
- End the steady-state idle exhaust and evaporative system integrity (gas cap pressure) tests

- Exempt pre-2007 model year heavy duty vehicles with GVWR between 8,501 and 14,000 pounds
- Exempt all heavy duty vehicles with GVWR greater than 14,000
- Add a visual inspection test for vehicles that are equipped with OBD technology, but for which OBD testing is not possible due to the vehicle's design

The Metro-East vehicle testing domain includes the urbanized areas in Madison, Monroe, and St. Clair Counties. An "I/M Coverage" percentage was developed based on the amount of VMT from vehicles subject to the inspection program compared to total area VMT. The I/M Coverage percentage for the Metro-East 8-hour ozone nonattainment area is 84%.

Fuels: The use of federal RFG has been required in the Metro-East St. Louis NAA since 2007 and the St. Louis, Missouri, area since 2001. The entire St. Louis NAA is classified a "southern" area for purposes of motor fuel control programs, so southern grade RFG is required and assumed to be used in the Metro-East area. RFG was assumed to contain 10% ethanol. The MOVES model can account for other fuels, such as E85, natural gas, methanol, etc., but for all practical purposes the gallons of such alternative fuels and hence the number of vehicles using them is very small compared to the number of gasoline and diesel vehicles, therefore, the use of such fuels was not considered.

Gasoline Sulfur: The federal Tier 2 regulations require gasoline sulfur levels to average no greater than 30 parts per million ("ppm") with a maximum of 80 ppm beginning in 2007. There are no Illinois gasoline sulfur requirements. Therefore, the MOVES gasoline sulfur levels were used in the emissions modeling.

Diesel Sulfur: The federal Tier 2 regulations limit the level of sulfur in diesel fuel requiring on-highway diesel fuel to 15 ppm beginning in 2006. Therefore, the MOVES diesel sulfur levels were used in the emissions modeling.

Fuel Volatility: The volatility of summer RFG, measured as Reid vapor pressure ("RVP"), is not specifically regulated. However, a fuel's RVP is one of the primary characteristics controlled in order to meet the RFG performance standards. The MOVES model contains default levels for different seasons of the year based on fuel compliance testing. Therefore, the MOVES RVP levels were used in the emissions modeling.

Vehicle Registration Distribution: A Metro-East area-specific vehicle registration distribution ("RD") profile based upon 2014 information data was developed by Illinois EPA from data provided by the Illinois Secretary of State's Department of Motor Vehicles. The RD is the fraction of vehicles of a given type and age in the fleet of vehicles of that type as a whole. Different vehicle types have different RDs. This profile is assumed to remain valid for 2030.

Source Type Population represents the number of vehicles of each MOVES vehicle type in the fleet as a whole within the area under consideration. Accurate local source-type populations were not available; therefore the MOVES default fractions modified by VMTs by vehicle type were used.

VMT Temporal Fractions are the VMT fractions of annual VMT by month of the year, of weekly VMT by day of the week, and daily VMT by hour of the day. The Illinois EPA uses default values from MOVES. Temporal fractions vary by road type.

Speed distributions are the fractions of VMT on a given road type by given vehicle types in various speed ranges. Thus, on a typical Urban Arterial, a small fraction of the vehicles are traveling at less than 10 mph (±5 mph), more at 20 mph, more at 30 mph, most at 40 mph, less at 50 mph, etc. These fractions differ by hour of the day – in more congested conditions during rush hours, the maximum fraction might be in the 30 mph range. MOVES uses speed distributions when aggregating emissions (or emission rates) for vehicles at different speeds. The Illinois EPA used the MOVES default speed distributions.

Ramp fraction is the fraction of total VMT on limited-access highways such as Interstates that is from on- and off-ramps to or from those highways. Driving on limited-access highways is more or less at uniform speed, but driving on ramps involves considerable acceleration and deceleration; and these speed changes affect emissions. The default MOVES Ramp Fractions are 15% on Rural Interstates, 10% on Urban Interstates, and 2% on Other Freeways and Expressways. Illinois does not have actual or observed Ramp Fraction data; therefore the MOVES default values were used.

Road Type Distribution is the fraction of VMT on different road categories within an area under consideration. The Illinois EPA uses VMT data by the Highway Performance Monitoring System ("HPMS") functional class ("FC") published by IDOT as the basis of its emission calculations. The Road Type Distributions came from default MOVES values.

Safety Margin

USEPA's transportation conformity regulations allow for the use of a safety margin in the development of motor vehicle emissions budgets for Maintenance Plans. A Safety Margin is "the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance."

According to Table 4.9, total projected NOx and VOM emissions for the end of the maintenance plan year 2030 are 39.92 tons/day and 10.59 tons/day, respectively, less than the 2014 attainment year levels. As year 2030 emissions levels are projected to be substantially less than the attainment year 2014 emissions, the Illinois EPA is using 25% of the safety margin for NOx and 50% of the safety margin for VOM to increase the 2030 motor vehicle emissions budget. This results in a motor vehicle emissions budget of 9.98 tons/day of NOx and 5.30 tons/day of VOM higher than originally projected.

Motor Vehicle Emissions Budgets

Using the emissions factors generated by the MOVES model inventory and incorporating the additional emissions from the Maintenance Plan safety margin, Table C.1 presents the proposed Attainment Year 2014 and Maintenance Plan Year 2030 Metro-East 8-hour ozone motor vehicle emissions budgets for use in determining transportation conformity.

Table C.1
Proposed Metro-East 8-hour Ozone Maintenance Plan Motor Vehicle Emissions Budgets (tons/day)

	Estimated Emissions		Applied Safety Margin		Motor Vehicle Emissions Budgets	
Year	**NOx**	**VOM**	**NOx**	**VOM**	**NOx**	**VOM**
2014	26.94	10.11	-----	-----	-----	-----
2030	6.70	3.75	9.98	5.30	16.68	9.05

ATTACHMENT 2

AQPSTR16-02

Illinois Ozone Emission Inventory for 2014

Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

April 2016

Table of Contents

List of Tables

List of Figures

List of Acronyms

AER	Annual Emissions Report
AP-42	Compilation of Air Pollutant Emission Factors
APU	Auxiliary Power Unit
CAA	Clean Air Act Amendments of 1990
CAERS	Computerized Annual Emissions Reporting System
CNG	Compressed Natural Gas
CO	Carbon Monoxide
EDMS	Emissions and Dispersion Modeling System
ERTAC	Eastern Regional Technical Advisory Committee
FAA	Federal Aviation Administration
GIS	Geographic Information System
GVW	Gross Vehicle Weight
HPMS	Highway Performance Monitoring System
ICEMAN	Integrated Comprehensive Environmental Management System
IDOT	Illinois Department of Transportation
ISSIS	Illinois EPA's Illinois' Stationary Source Inventory System
LADCO	Lake Michigan Air Directors Consortium
LPG	Liquefied Petroleum Gas
LTO	Landing and Takeoff Operation
MOVES	Motor Vehicle Emission Simulator
NAA	Nonattainment Area
NAICS	North American Industry Classification System
NODA	Notice of Data Availability for the USEPA's Updated Ozone Transport Modeling Data for the 2008 Ozone NAAQS
NOx	Oxides of Nitrogen
POTW	Publicly-owned Treatment Works
QA	Quality Assurance
QC	Quality Control
ROSS	Registration of Smaller Source Program
RVP	Reid Vapor Pressure
SCC	Source Classification Code
SIC	Standard Industrial Classification (code)
SIP	State Implementation Plan
TPD	Tons per Day
TPY	Tons per Year
TSDF	Hazardous Waste Treatment, Storage and Disposal Facility
USEPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOM	Volatile Organic Material
XML	Extensible Markup Language

Executive Summary

This document provides the results of the Illinois Ozone Emission Inventory for 2014 and a general description of the methods used to calculate the emissions. This inventory uses the up-to-date emission factors and calculation methodologies that were available at the time. The Illinois EPA is required to submit a complete emission inventory to USEPA every three years. A complete inventory includes point, area, and mobile (on-road and off-road) source categories. For an ozone inventory, daily and annual emissions of NOx and VOM are required. Resulting data is separated into the two nonattainment areas (Chicago and Metro-East St. Louis) and the attainment area (the remainder of the State).

The primary source of data for point sources was the source-reported 2014 annual emissions reports (AERs). Area source emissions are typically estimated by multiplying an emission factor by a known indicator of activity (e.g., population) for a source category. On-road mobile source emissions were calculated using the MOVES computer model. Off-road mobile source emissions were also calculated using the MOVES model.

To ensure this inventory is of the highest quality, Illinois EPA implemented quality assurance (QA) procedures and quality control (QC) checks throughout the inventory development process. Illinois specifically followed the procedures outlined in USEPA's guidance documents pertaining to inventory quality assurance and believes the inventory to be complete, accurate, and of high quality.

1 Introduction

Every three years (e.g., 2008, 2011, 2014, etc.) the Illinois EPA is required to conduct a full state-wide emissions inventory of ozone precursor emissions for all source categories (i.e., point, area, mobile). This document reflects the items included in the inventory plus the methodology used to calculate those emissions. Special emphasis is placed on the Chicago and Metro-East St. Louis (Metro-East) areas since they are designated as ozone nonattainment areas (NAAs).

The Chicago NAA includes the counties of Cook, DuPage, Kane, Lake, McHenry, and Will, plus the Townships of Aux Sable and Goose Lake in Grundy County and Oswego Township in Kendall County. The Metro-East NAA includes the counties of Madison, Monroe, and St. Clair.

The primary source of data for point sources was the source-reported 2014 annual emissions reports (AERs). Area source emissions are typically estimated by multiplying an emission factor by a known indicator of activity (e.g., population, employment, etc.) for a source category. Calculation of emissions for area sources primarily used 2014 activity levels and in a few cases projections from previous years were used. Area source calculation methodologies were updated to the most recent calculation methods identified by USEPA.

On-road mobile source emissions were estimated using the MOVES model (Version 2014). Off-road emissions were also estimated using the MOVES model. The MOVES model does not include emission estimates for aircraft, locomotives, or commercial marine vessels. Aircraft emissions were calculated using actual activity data (operations) for each airport. Emissions from locomotives were grown from 2011 emissions using the NODA data. Commercial marine vessel emissions were obtained from a study of 2013 emissions by LADCO.

To ensure this inventory is of the highest quality, Illinois EPA implemented quality assurance (QA) procedures and quality control (QC) checks throughout the inventory process. Illinois EPA specifically followed the procedures outlined in USEPA's guidance.

2 Emission Inventory Summaries

2.1 Background

Four basic steps were involved in the preparation of the emission inventory. The first step was planning. As required by USEPA guidance, Illinois EPA prepared an Inventory Preparation Plan (IPP). This plan outlined the methods by which the Illinois EPA would assemble the 2011 inventory and perform QA/QC checks. The QA/QC plans and procedures are presented in Section 6.0.

The second basic step was data collection. A major element in this step was to determine which source categories should be considered as point sources in the inventory and which should be considered area sources. Fundamentally different data collection procedures are used for these two source types. Actual emissions data reported in the AERs are used to collect point source data, whereas county level information such as population or employment is generally used to estimate area source emissions. The data collected and maintained on point sources is more detailed than area sources.

The third basic step in the inventory compilation effort involved analysis of data collected and the development of emission estimates for each source. Emissions were determined individually for each point source, whereas emissions were generally determined for the overall area source category. Reported emission data, material balances and emission factors were all used to make these estimates. Adjustments were made to the VOM inventory to reflect only reactive VOM.

The fourth step was reporting. Initially, Illinois EPA identified the kinds of data and formats that would be needed for this inventory document to fulfill USEPA inventory requirements. Later, Illinois EPA identified additional reports and features that would be useful for future inventory needs and/or modeling requirements. These have been incorporated into this document.

Demographic data characterizing the various counties in the state are crucial to many of the emission estimation calculation procedures used to develop the inventory for area source categories. Also, in a number of instances, emissions are dependent to some degree on the geographic location of the county. In such instances, Illinois EPA developed factors based on whether counties were either a “Northern” or “Southern” county.

2.2 Methodology

A detailed emission inventory for a pollutant lists each source of that pollutant and the quantity of its emissions. The sources are usually categorized in two ways: (1) point, area, or mobile sources or (2) industrial categories and subcategories.

Emissions from point sources are defined as those whose emissions are usually fairly well characterized and are generally discharged through stacks and which are required to possess an Illinois EPA issued permit or register as a ROSS source. Fugitive emissions are not emitted from a discrete point but are emitted from numerous areas throughout a facility. Area sources are usually spread over wide areas with no distinct discharge points or are comprised of a large number of small point sources that are difficult to describe separately (e.g., the heating furnaces in individual homes in a city) and whose emissions are not so well characterized. Other examples of area sources include architectural surface coating, automobile refueling, dry cleaning, and automobile refinishing. Mobile sources are divided into two major categories – on-road and off-road. On-road mobile sources include cars, trucks, buses, and motorcycles used for transportation of goods and passengers on roads and streets. Off-road mobile sources include other modes of powered transportation such as aircraft, locomotives, ships, and motor vehicles used off-highway. This classification protocol has been utilized throughout this document.

A typical industrial plant may have different source types associated with it. For example, a refinery with numerous industrial processes would itself be a point source; the leaks from valves, pumps, and fittings throughout the miles of piping would be a fugitive source; and the switch engine that moves tank cars on the railroad siding would be an off-road mobile source. Also, a plant may have more than one industrial classification associated with it. The refinery in the previous example is in one industrial category; its tank farm is in another. Quantities of emissions may be measured directly (at the stack); they may be calculated from engineering principles (e.g., mass balance); or they may be estimated (e.g., by assuming reasonable emission rates, times, etc.). Further, emissions can be expressed in terms of annual emissions, seasonal emissions, or daily emissions. In the case of the pollutant ozone, precursor emissions are generally expressed in terms of typical daily emissions representative of the peak ozone season, or tons per day.

Emission estimates presented in this report generally followed the methodologies outlined in USEPA's emission inventory preparation guidance document, Volumes I-IV, and USEPA's "Reporting Guidance for 1996 Periodic Emissions Inventories and National Emission Trends (NET) Inventories." Where different estimation methodologies were used, such methods are identified. The emission estimates were seasonally adjusted to reflect average daily emissions during the summer months, which are generally considered the peak ozone season. For point sources, emissions were taken from source submitted data for the peak ozone season, as reported in their 2014 AERs. Area source emissions were also modified using seasonal adjustment factors for the ozone season. Some sources have greater emissions on weekdays than on weekends. Emissions from all such sources have been adjusted to take weekday/weekend differences into consideration.

The VOM emission estimates provided in this document are for those VOMs determined by USEPA to be photochemically reactive. All identified nonreactive VOMs were excluded from the VOM totals reported here for all sources and source categories. Compounds considered to be nonreactive and therefore not included in the inventory are listed below:

- Methane
- Ethane
- Methylene chloride
- 1,1,1-Trichloroethane (Methyl chloroform)
- Trichlorofluoromethane (CFC-11)
- Dichlorodifluoromethane (CFC-12)
- Chlorodifluoromethane (CFC-22)
- Trifluoromethane (HFC-23)
- Chlorofluoromethance (HCFC-31)
- Difluoromethane (HFC-32)
- Decafluoropentane (HFC-43-10mee)
- Ethylfluoride (HFC-161)
- Trichlorotrifluoroethane (CFC-113)
- Dichlorotetrafluoroethane (CFC-114)
- Chloropentafluoroethane (CFC-115)
- 2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)
- 1,1,2-Trifluoroethane (HCFC-123a)
- 2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)
- Pentafluoroethane (HFC-125)
- 1,1,2,2,-Tetrafluoroethane (HFC-134)
- 1,1,1,2-Tetrafluoroethane (HFC-134a)
- 1,1-Dichloro-1-fluoroethane (HCFC-141b)
- 1-Chloro-1,1,-difluoroethane (HCFC-142b)
- 1,1,1-Trifluoroethane (HFC-143a)
- Fluoroethane (HCFC-151a)
- 1,1-Difluoroethane (HFC-152a)
- Pentafluoropropane (HFC-225ca)
- Pentafluoropropane (HFC-225cb)
- Hexafluoropropane (HFC-236ea)
- Hexafluoropropane (HFC-236fa)
- Pentafluoropropane (HFC-245ca)
- Pentafluoropropane (HFC-245ea)
- Pentafluoropropane (HFC-245eb)
- Pentafluoropropane (HFC-245fa)
- Pentafluorobutane (HFC-365mfc)

- Parachlorobenzotrifluoride (PCBTF)
- Methoxybutane (HFE-7100)
- Nonaflourobutane (HFE-7200)
- Heptafluoropropane ($(CF_3)_2CFCF_2OCH_3$)
- Heptafluoropropane ($(CF_3)CFCF_2OC_2H_5$)
- Heptafluro-3-methoxy propane (HFE-7000)
- 3-Ethoxy-dodecafluoro-2-trifluoromethyl hexane (HFE-7500)
- Heptafluoropropane (HFC-227ea)
- Methyl formate
- Decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300)
- Propylene carbonate
- Dimethyl carbonate
- Perchloroethylene
- Cyclic, branched, or linear completely methylated siloxanes
- Methyl acetate
- Volatile methyl siloxanes
- Acetone

Plus the following four classes of perfluorocarbons (PFCs)

- Cyclic, branched, or linear completely fluorinated alkanes
- Cyclic, branched, or linear completely fluorinated ethers with no unsaturations
- Cyclic, branched, or linear completely fluorinated tertiary amines with no unsaturations
- Sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

2.2.1 Point Sources

Emissions and source-specific data for point sources were developed for the 2014 inventory by Illinois EPA. The primary source of data for point sources was source-reported emissions. These data are reported by the sources annually as part of the inventory process conducted by Illinois EPA and include emissions, process rates, operating schedules, emission control data, and other relevant information obtained from the permit files and plant inspections. The data was converted to an Access® database for processing and retrieval. Emissions were computed on a typical daily ozone season basis for each point source process using the original data.

2.2.2 Area Sources

Area source emissions were typically estimated by multiplying an emission factor by a known indicator of activity for each source category and each county. Area source emissions for 2014 were based on data available for population, employment, and the like. For the 2014 inventory, USEPA made available activity data at the county level for each state for many categories. Unfortunately this data was not always representative of 2014. In other cases, data was provided from national estimates. If data more specific to Illinois was available, it was used by Illinois EPA. Emission estimates for 2014 emissions were developed using 2014 category activity levels, where available, or projections of changes in activity from 2011 to 2014 levels with a preference to data specific to Illinois. Emission controls were accounted for by using either adjusted emission factors or through the use of control factors. Appendix F includes the factors used to develop the emission estimates. Category summary tables reflecting Chicago and Metro-East NAA county emissions are also included.

2.2.3 Mobile Sources

On-road motor vehicle emissions were estimated by use of USEPA's MOVES model. Inputs to run the model were provided by the Division of Mobile Source Programs within the Bureau of Air. The MOVES model is a significant departure from the previous on-road mobile source model so resulting emissions should not be compared to previous inventories. The MOVES model allows data to be pre-aggregated to different levels. Pre-aggregating data at a higher level than hourly reduces the time necessary for a calculation. An hourly run may take hours for a single county. For the ozone inventory, it was not necessary to do any pre-aggregation since the model ran sufficiently quickly in calculating daily emissions. Additional details on the types of data used in MOVES can be found in Section 5.0.

Emissions were also estimated for off-road equipment. The vast majority of off-road mobile sources were calculated using USEPA's MOVES model. The MOVES model does not calculate emissions for railroad locomotives, aircraft, or commercial marine vessels. Locomotive emissions were grown from the 2011 inventory. Commercial marine vessel emissions were obtained from a study funded by LADCO. Aircraft emissions were calculated using the number of landings and take-offs in conjunction with an emission factor using EDMS. Further discussion of off-road equipment emission estimation methodologies and actual estimates are contained in Section 5.2.

2.3 Results

The 2014 Emission Inventory summary of the total ozone precursor emission estimates for the State of Illinois is shown in Tables 2-1 and 2-2. It covers the entire state.

The magnitude of the total NOx and VOM emissions for the state by geographic region are delineated in the bar charts of Figures 2-1 through 2-4. The percentage contributions of the individual regions to the statewide total are shown in Figures 2-5 and 2-6. The pie charts of Figures 2-7 through 2-14 present the total ozone precursor emissions by source category for each geographic region of the state.

Figures 2-15 through 2-18 show the emissions of the source categories for the previous four inventories and the current inventory. It is important to note that while a general trend can be identified, two inventory years may have had different methodologies to calculate emissions. This is particularly the case with on-road and off-road emissions in 2014. The MOVES model used to calculate on-road and off-road emissions was an updated version of the model since the 2011 inventory. Using updated emission factors between inventories most commonly occurs with the area source category. Point sources are the most comparable from year-to-year since the emission factors do not typically change often.

Category summaries by pollutant for the 2014 statewide inventory are given in Appendices A through D. Appendix E presents a county-by-county summary of point, area, on-road, and off-road emissions. Appendix H includes the surrogates used to apportion area source emissions to the nonattainment townships (portions of counties).

Table 2-1: Total Ozone Inventory Typical Summer Day Emissions (tons/day)

	Point	Area	On-Road	Off-Road	Total
Chicago NAA					
NOx	85.89	30.66	255.18	124.89	496.62
VOM	46.36	212.28	116.49	105.28	480.41
Metro-East NAA					
NOx	23.29	1.52	29.16	23.08	77.05
VOM	9.38	19.06	11.60	13.01	53.05
Attainment Area					
NOx	291.74	38.72	207.67	313.79	851.92
VOM	91.13	278.87	90.99	201.41	662.39
Statewide					
NOx	400.94	70.90	492.01	461.76	1,425.61
VOM	146.84	510.20	219.08	319.71	1,195.83

Table 2-2: Total Ozone Inventory Annual Emissions (tons/year)

	Point	Area	On-Road	Off-Road	Total
Chicago NAA					
NOx	18,658.28	32,502.77	91,980.66	36,242.32	179,384.02
VOM	12,591.53	71,750.92	40,409.00	24,251.45	149,002.89
Metro-East NAA					
NOx	7,234.18	1,682.08	10,132.51	5,728.11	24,776.88
VOM	3,094.97	6,467.37	3,726.49	2,397.93	15,686.76
Attainment Area					
NOx	73,860.91	23,827.24	72,660.59	74,994.84	245,343.58
VOM	26,657.44	94,612.63	29,633.89	46,145.79	197,049.75
Statewide					
NOx	99,752.50	58,012.09	174,773.76	116,965.27	449,503.62
VOM	42,344.80	172,830.91	73,769.38	72,795.16	361,740.27

Figure 2-1: Daily NOx Emission Summary (tons/day)

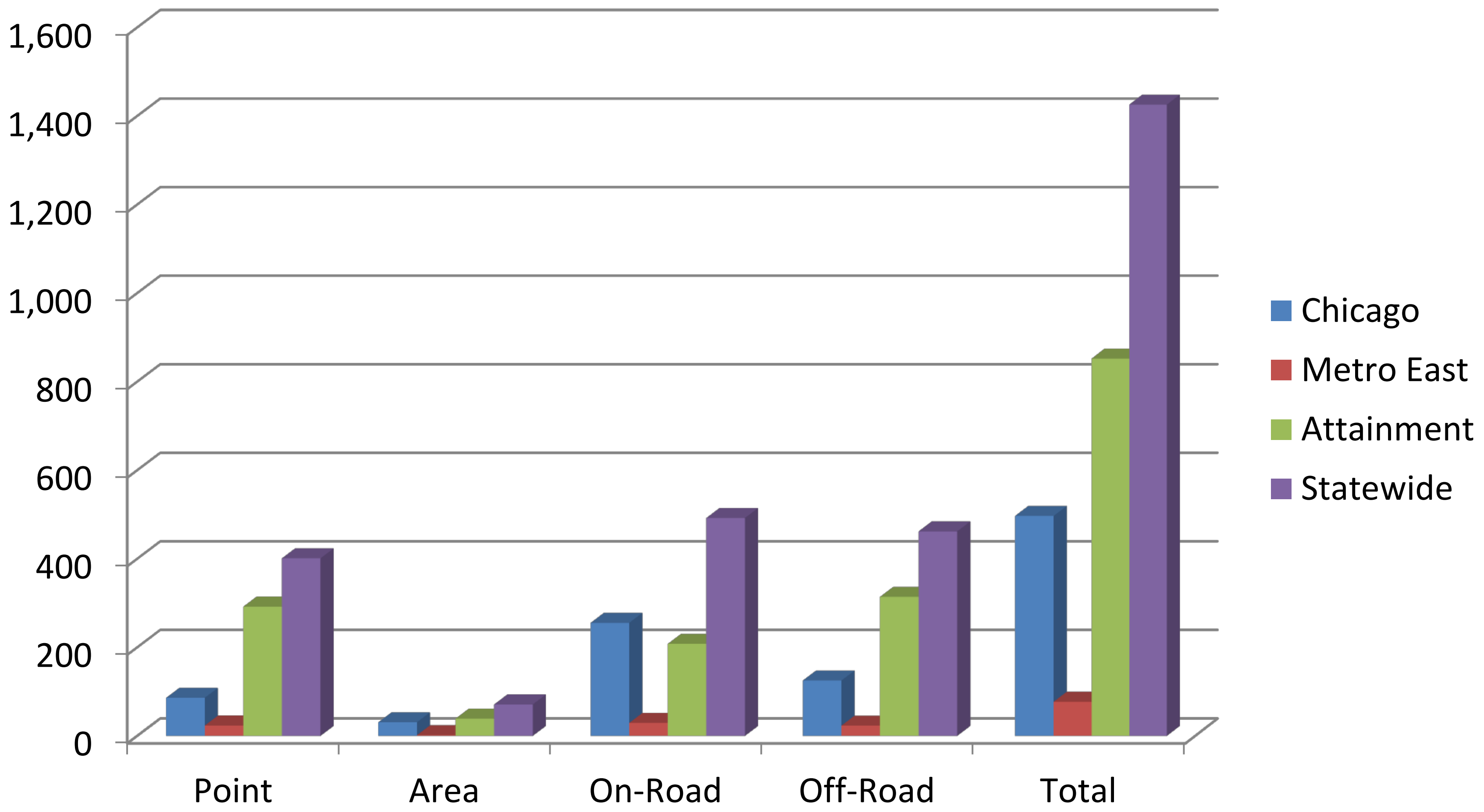


Figure 2-2: Annual NOx Emission Summary (tons/year)

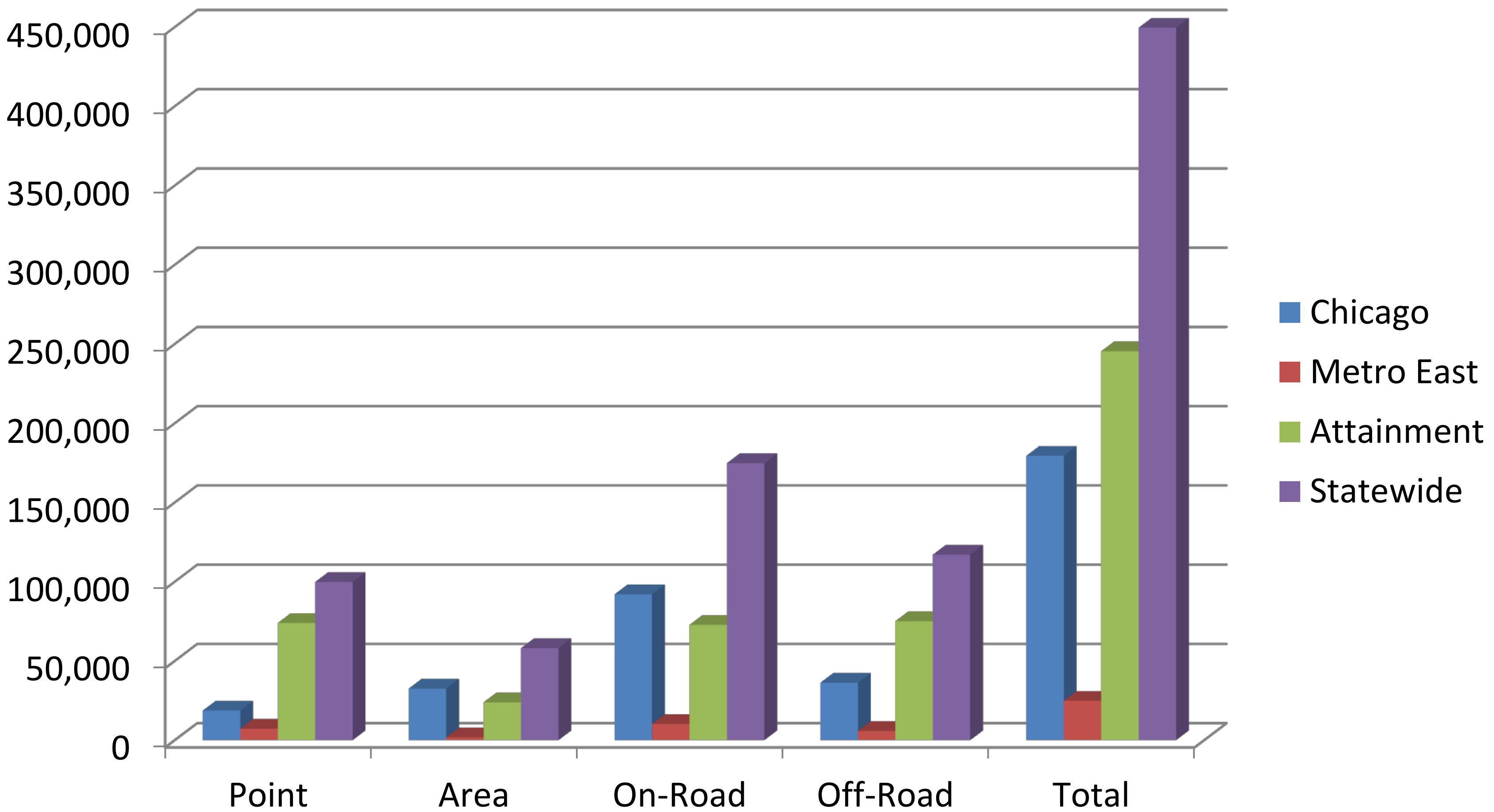


Figure 2-3: Daily VOM Emission Summary (tons/day)

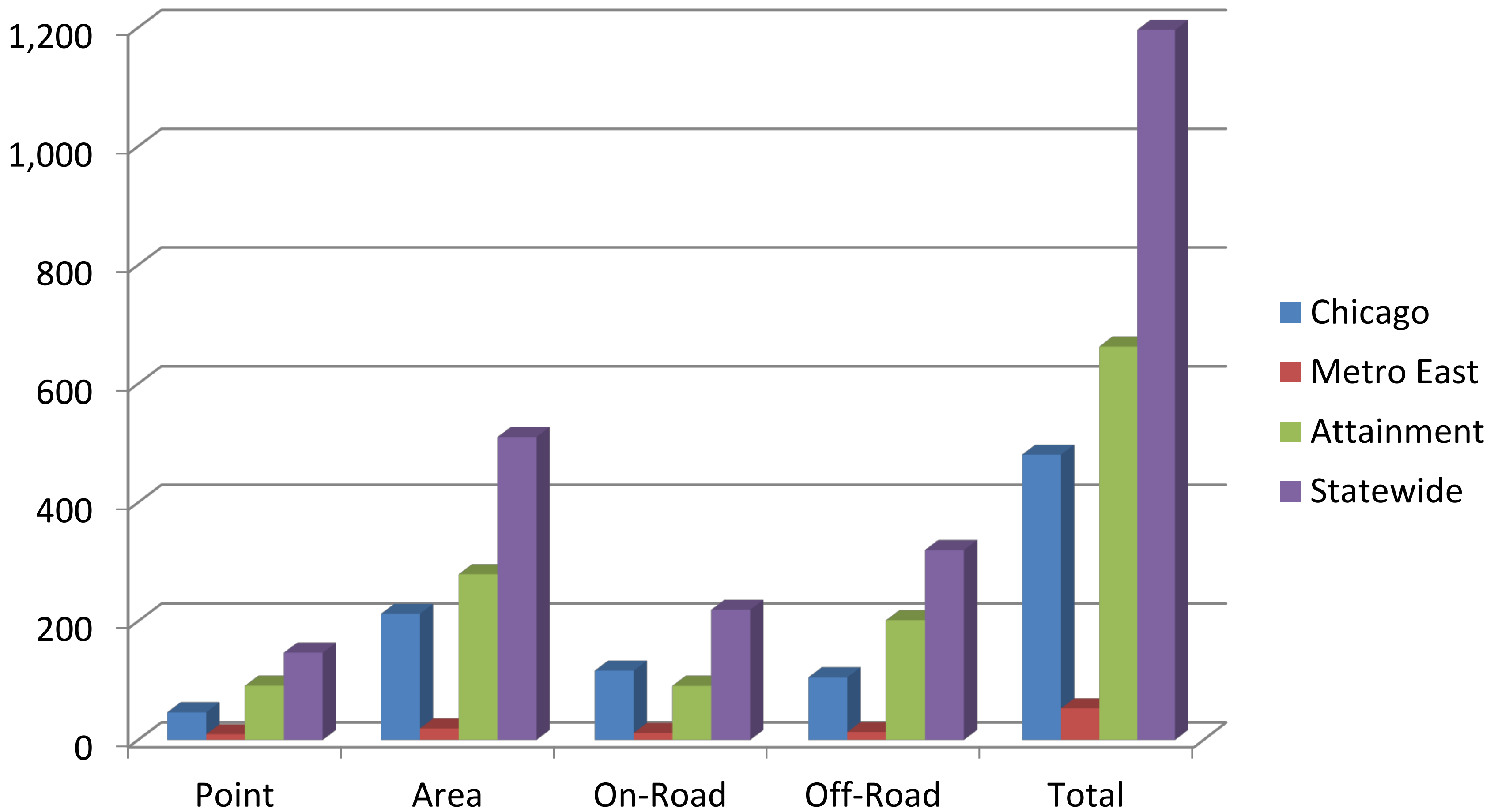


Figure 2-4: Annual VOM Emission Summary (tons/year)

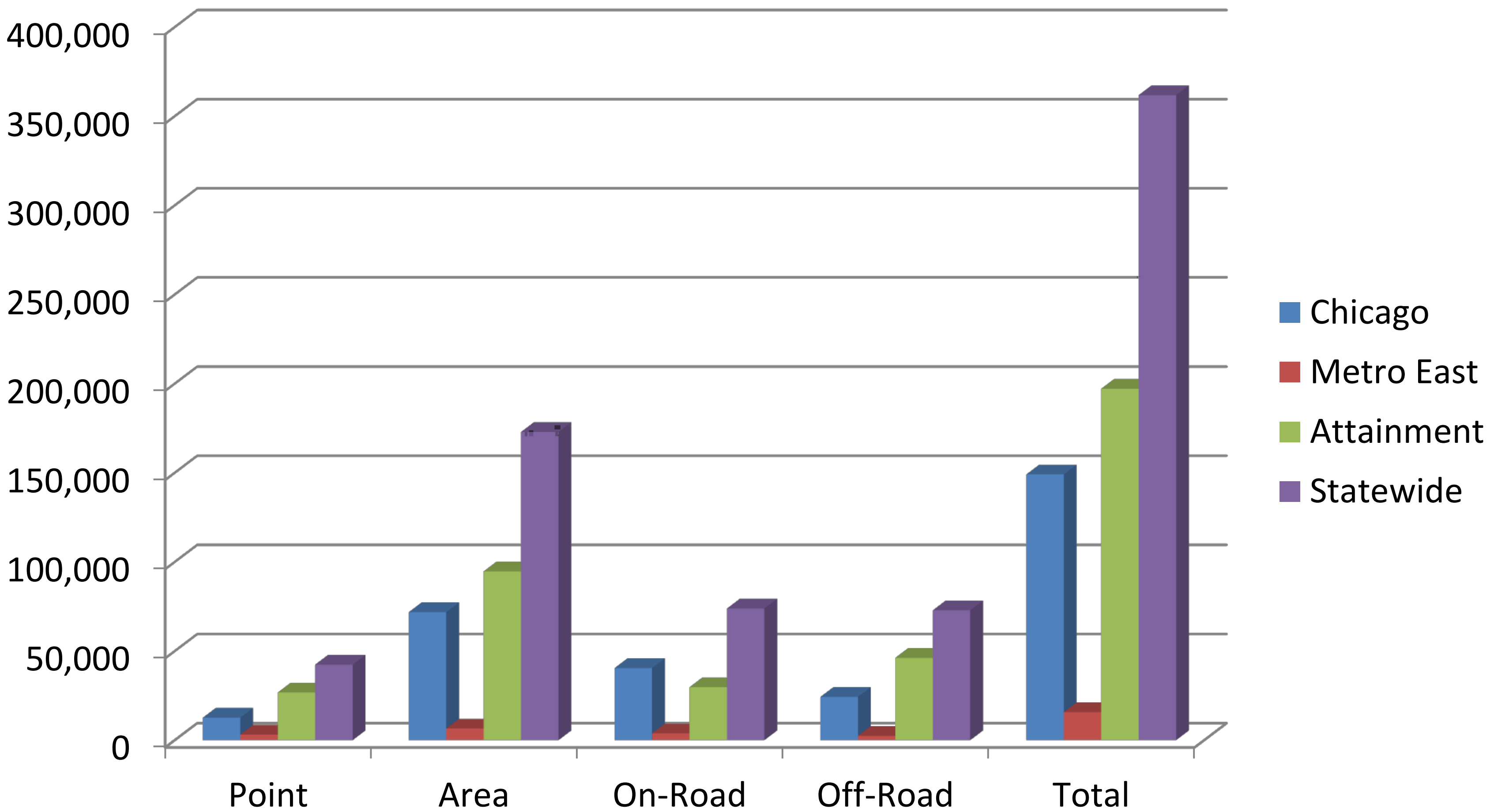
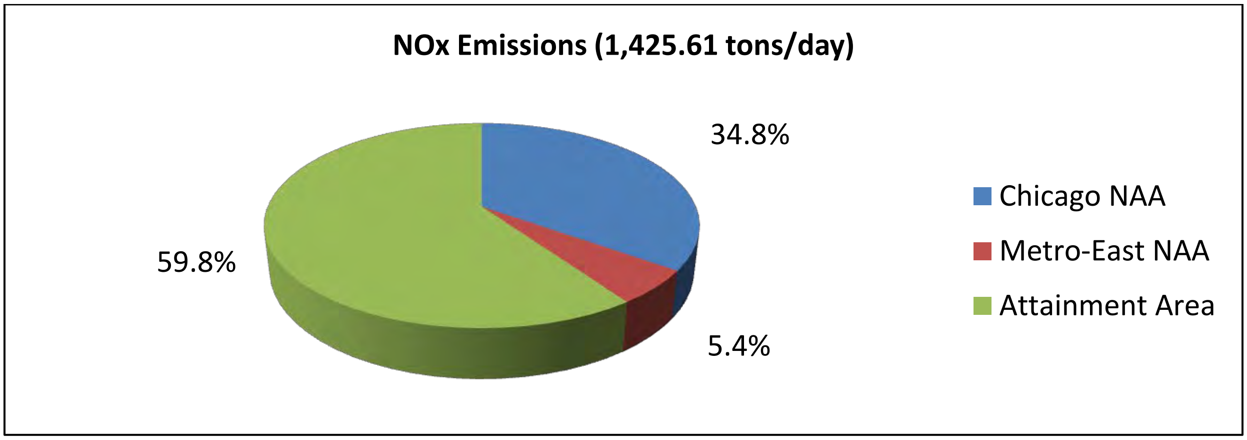


Figure 2-5: Statewide Geographic Contributions of Ozone Precursor Daily Emissions (tons/day)



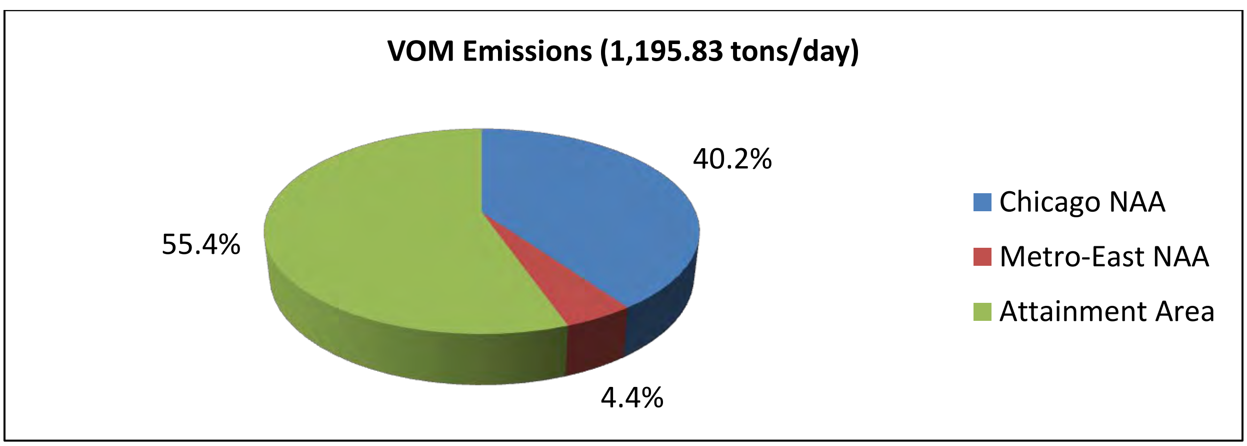
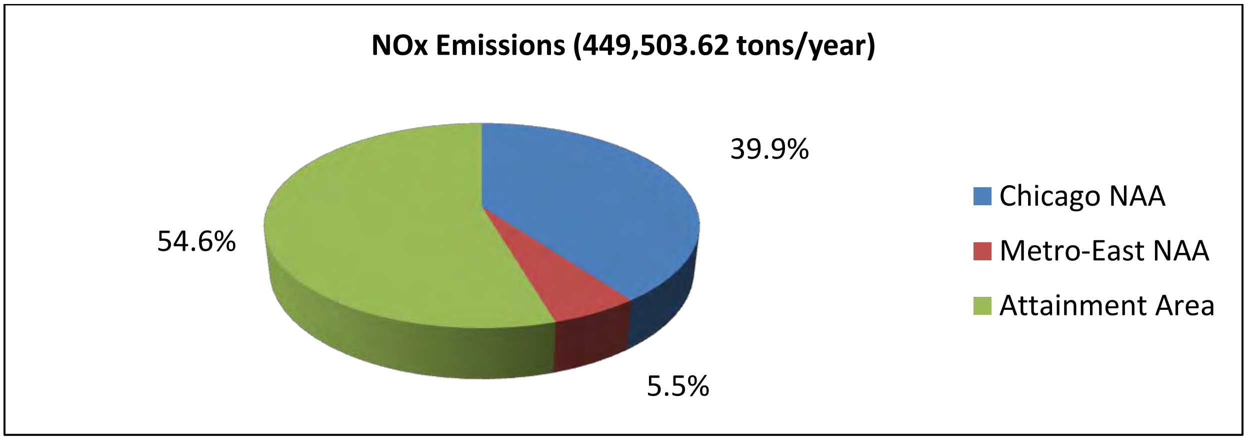


Figure 2-6: Statewide Geographic Contributions of Ozone Precursor Annual Emissions (tons/year)



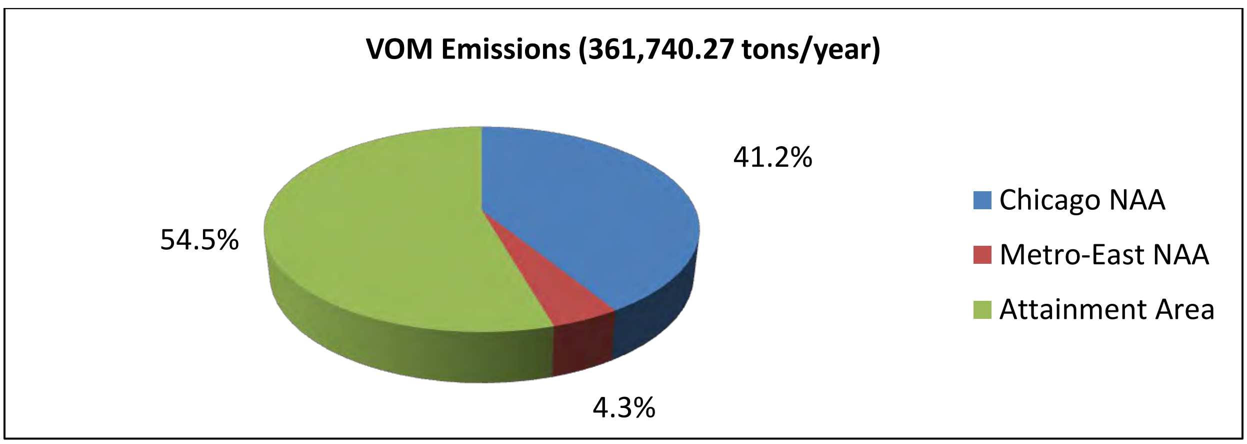
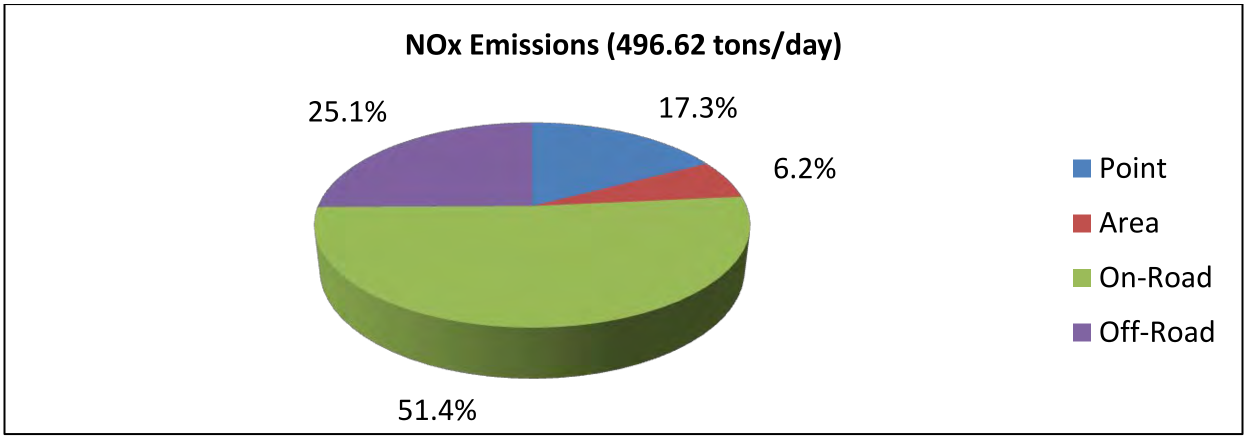


Figure 2-7: Chicago NAA Ozone Precursor Daily Emissions (tons/day)



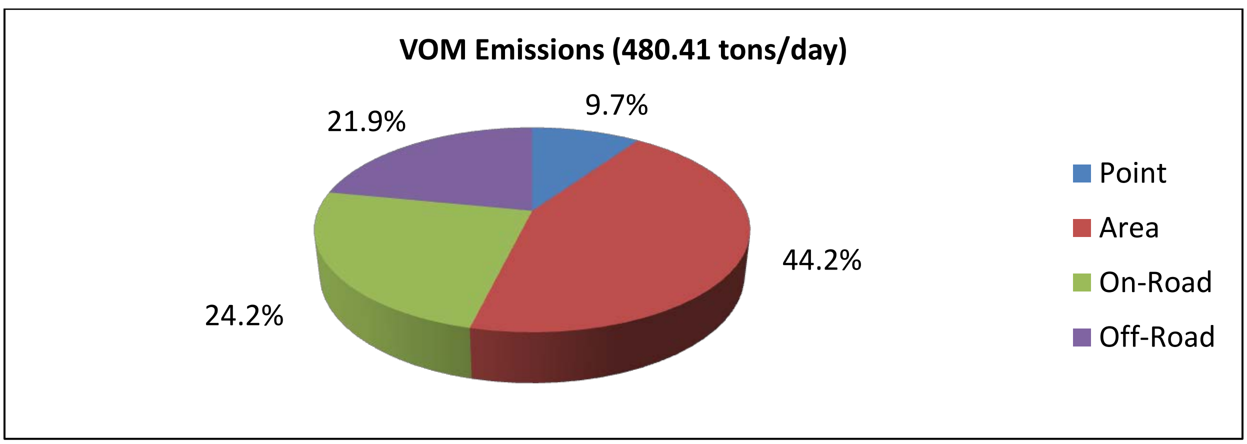
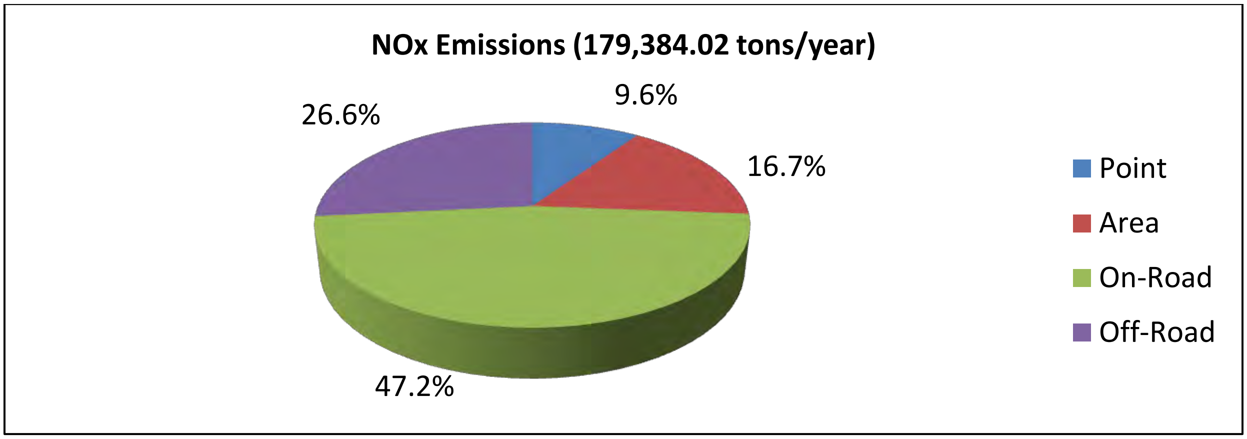


Figure 2-8: Chicago NAA Ozone Precursor Annual Emissions (tons/year)



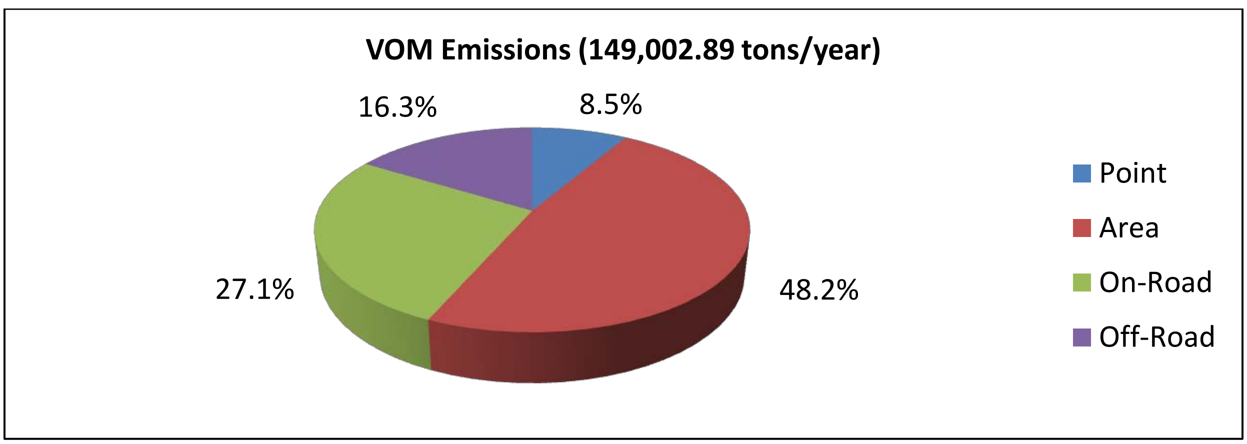
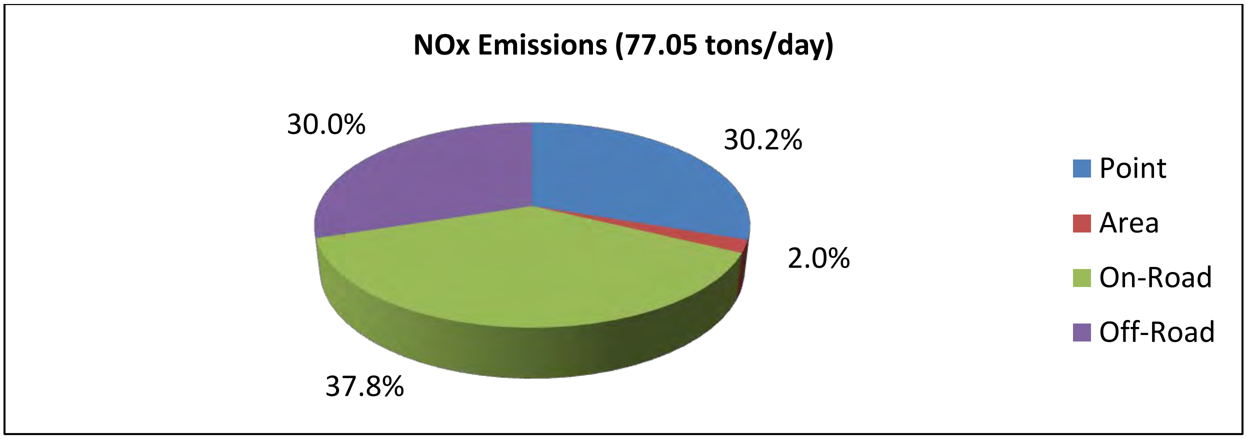


Figure 2-9: Metro-East NAA Ozone Precursor Daily Emissions (tons/day)



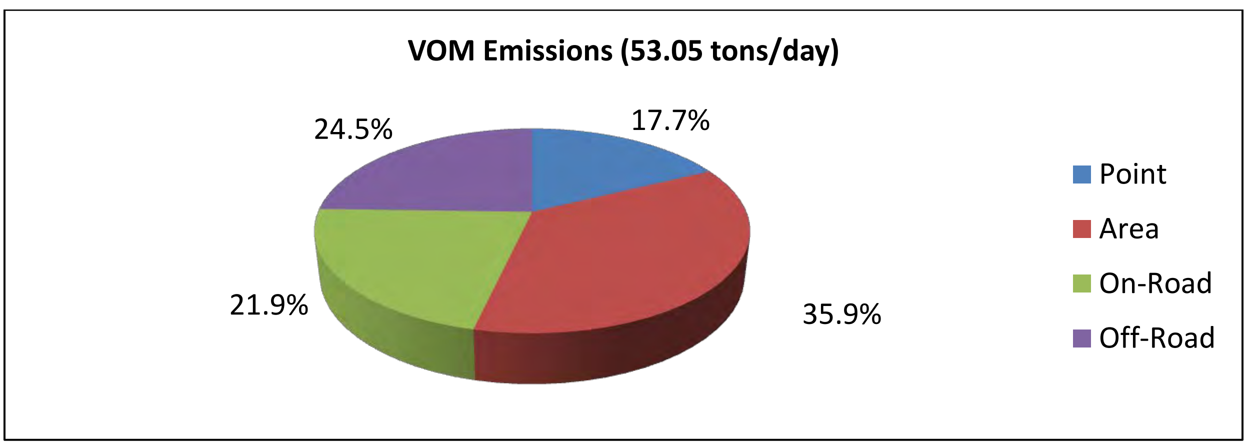
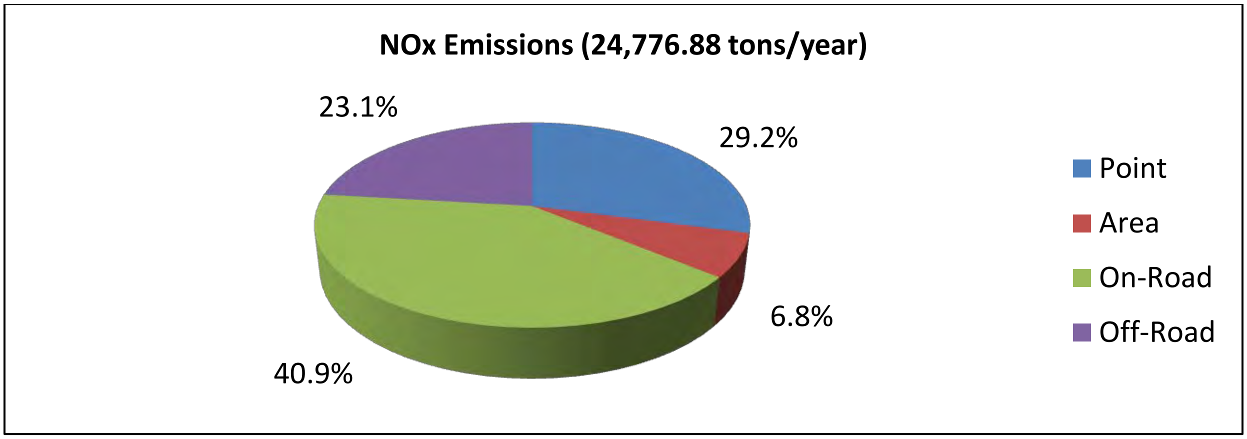


Figure 2-10: Metro-East NAA Ozone Precursor Annual Emissions (tons/year)



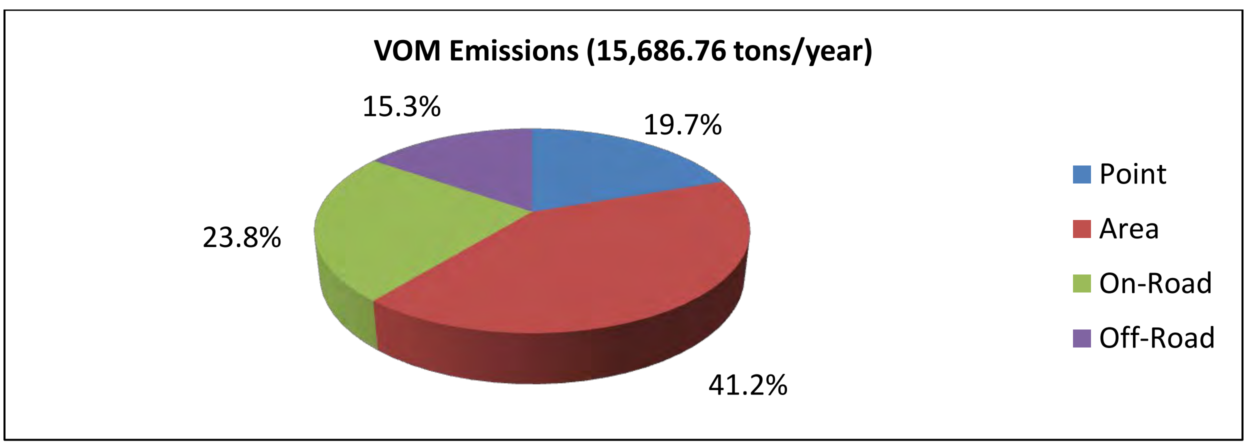
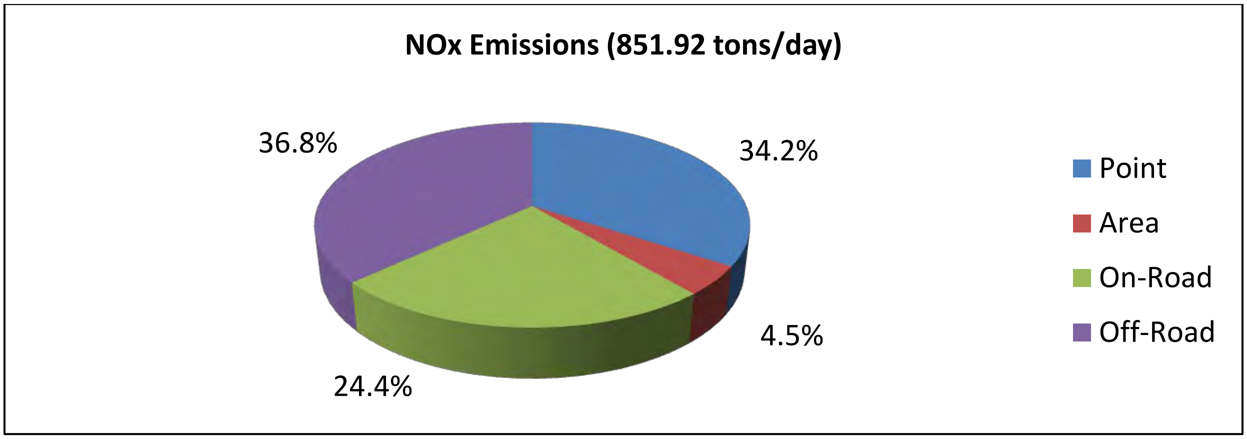


Figure 2-11: Attainment Area Ozone Precursor Daily Emissions (tons/day)



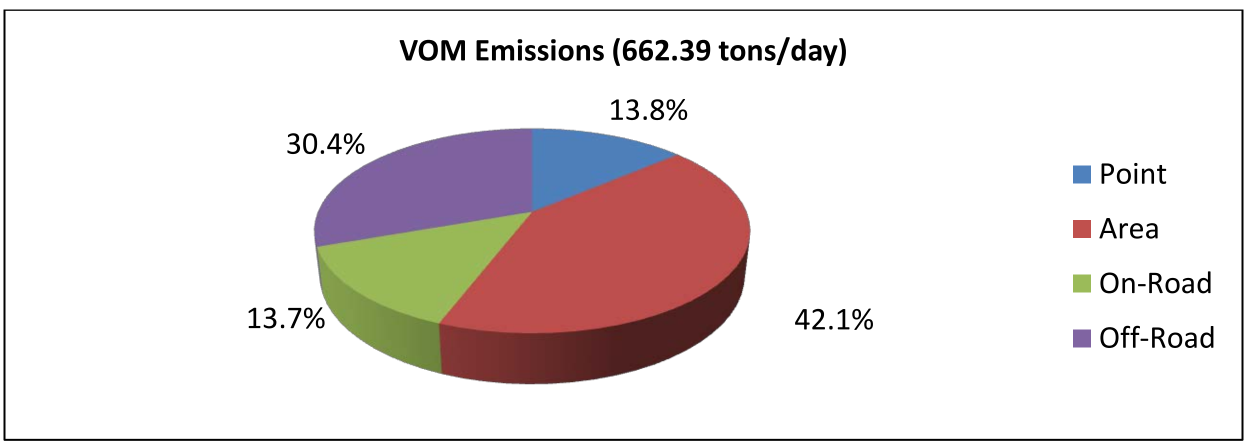
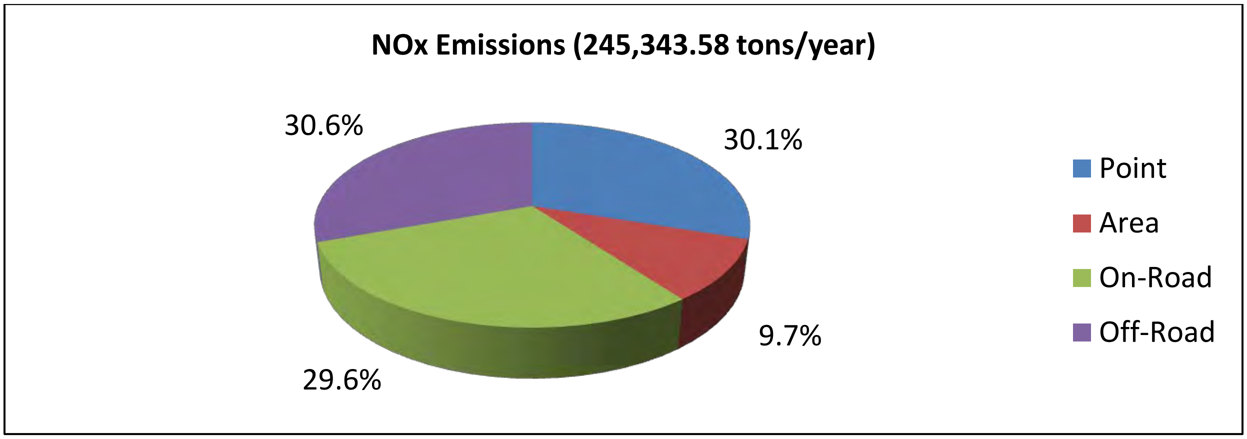


Figure 2-12: Attainment Area Ozone Precursor Annual Emissions (tons/year)



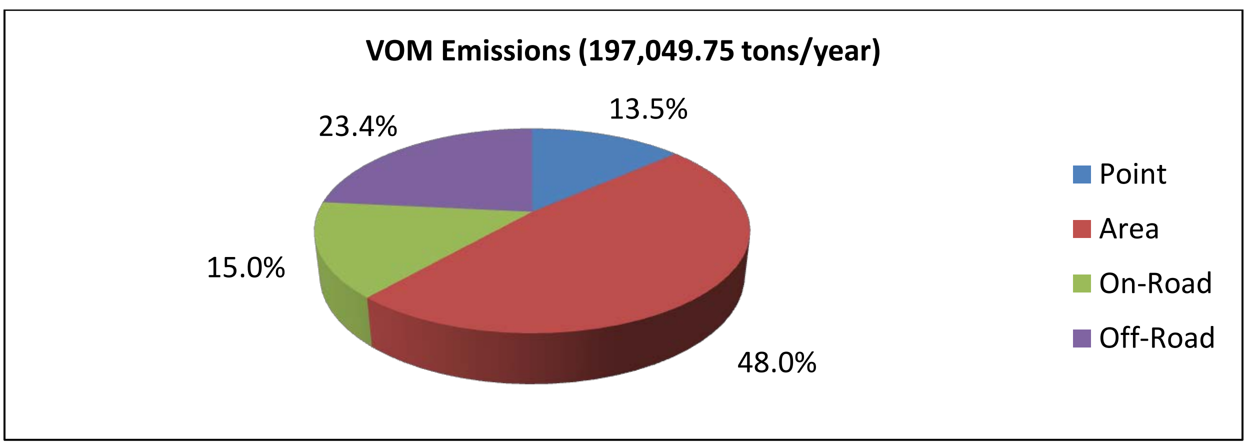
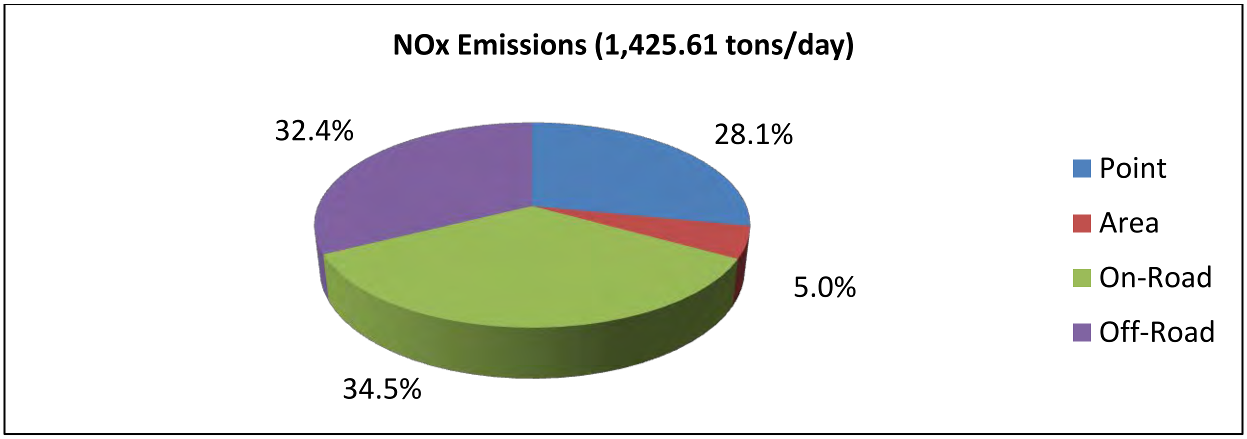


Figure 2-13: Statewide Ozone Precursor Daily Emissions (tons/day)



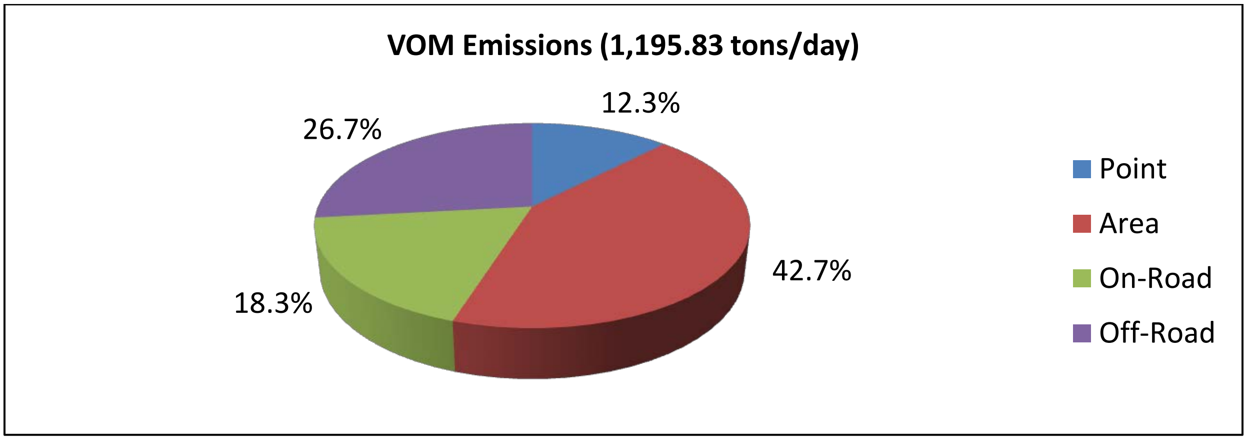
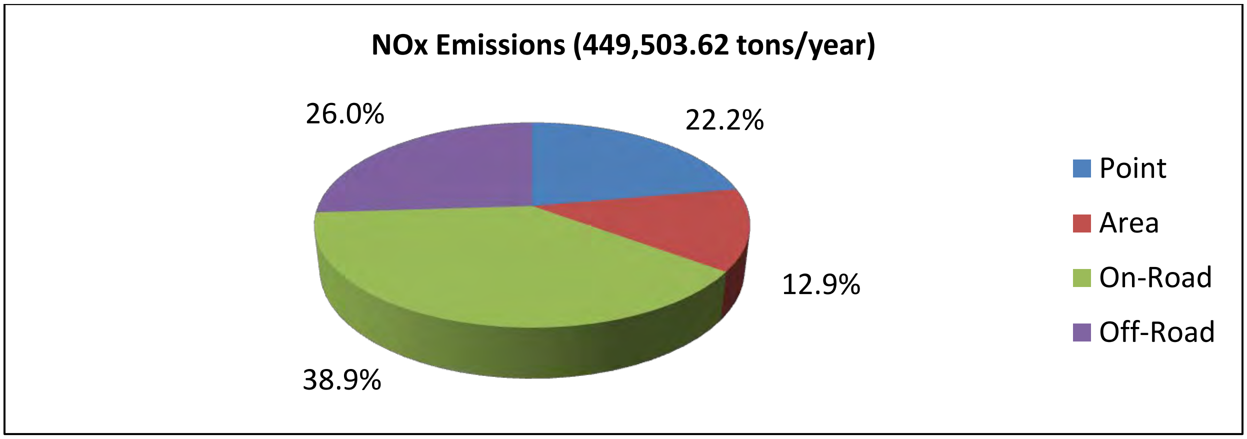


Figure 2-14: Statewide Ozone Precursor Annual Emissions (tons/year)



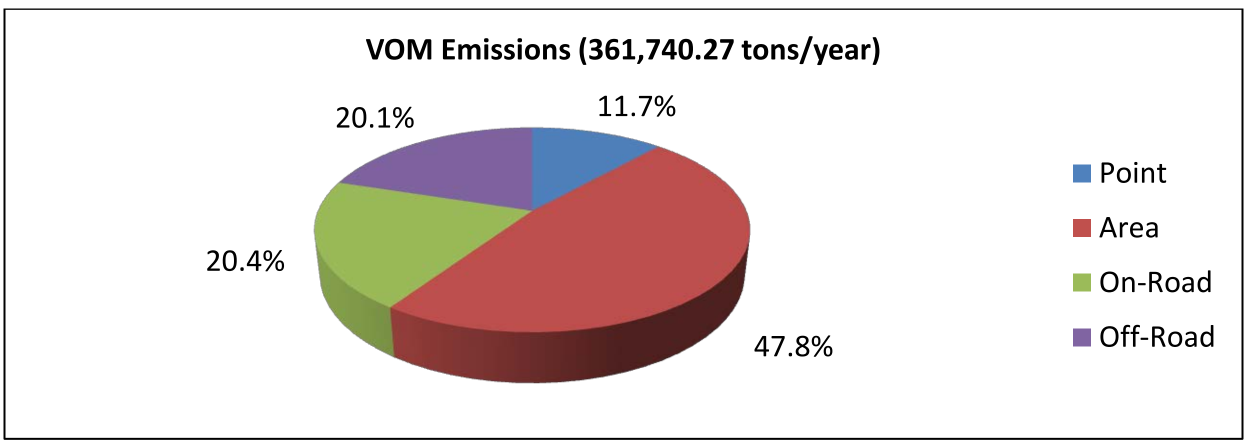


Figure 2-15: Historical Daily NOx Emissions (tons/day)

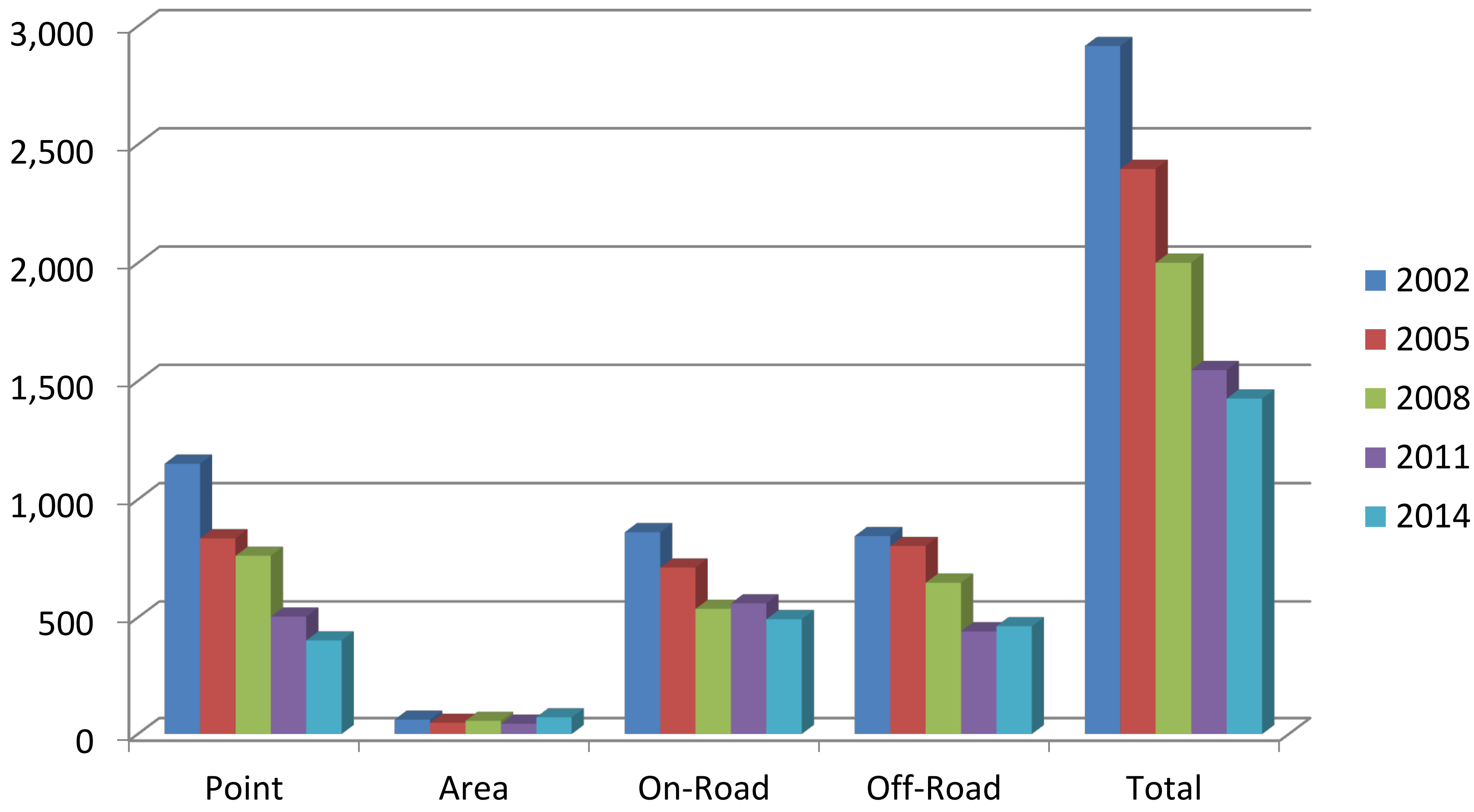


Figure 2-16: Historical Annual NOx Emissions (tons/year)

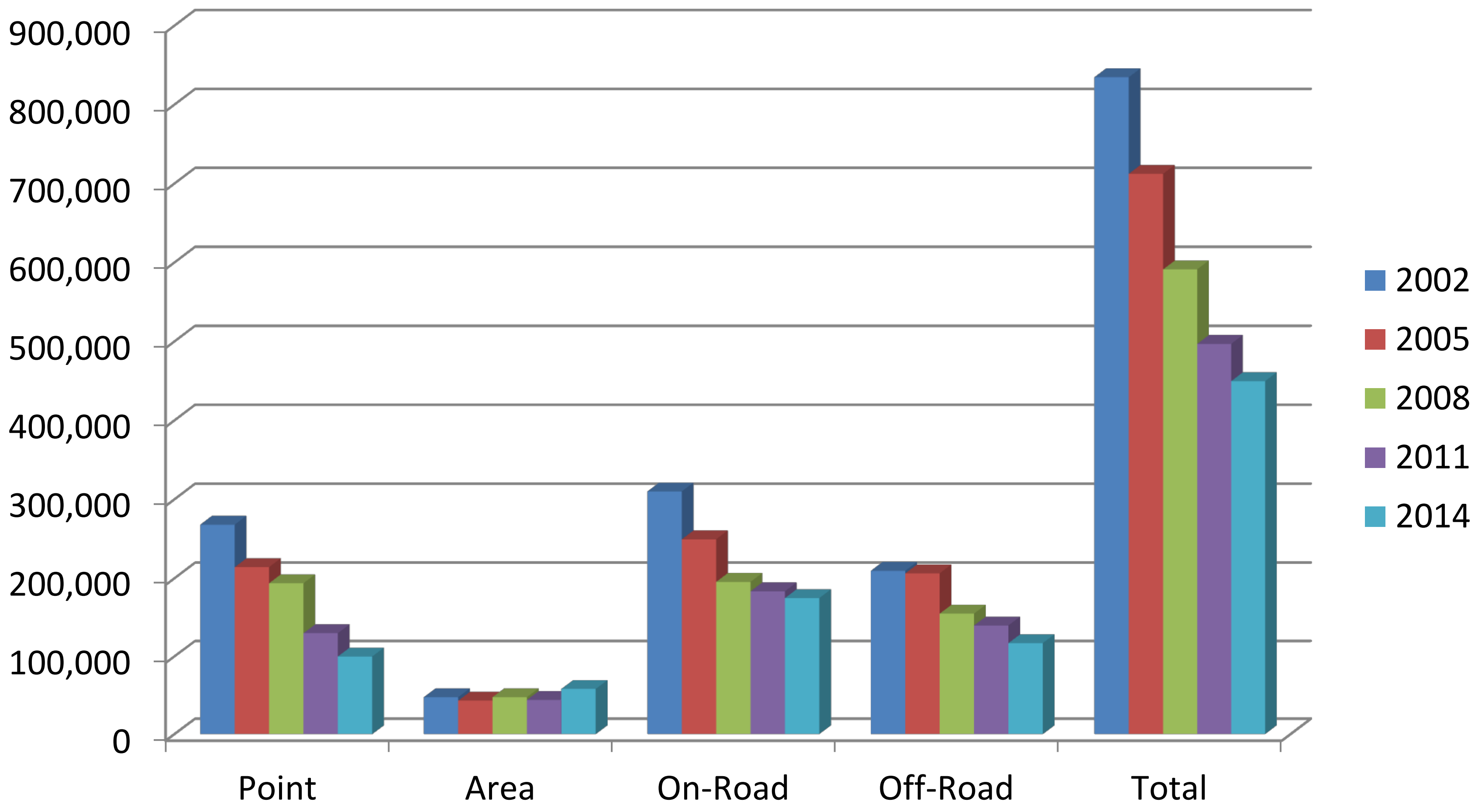


Figure 2-17: Historical Daily VOM Emissions (tons/day)

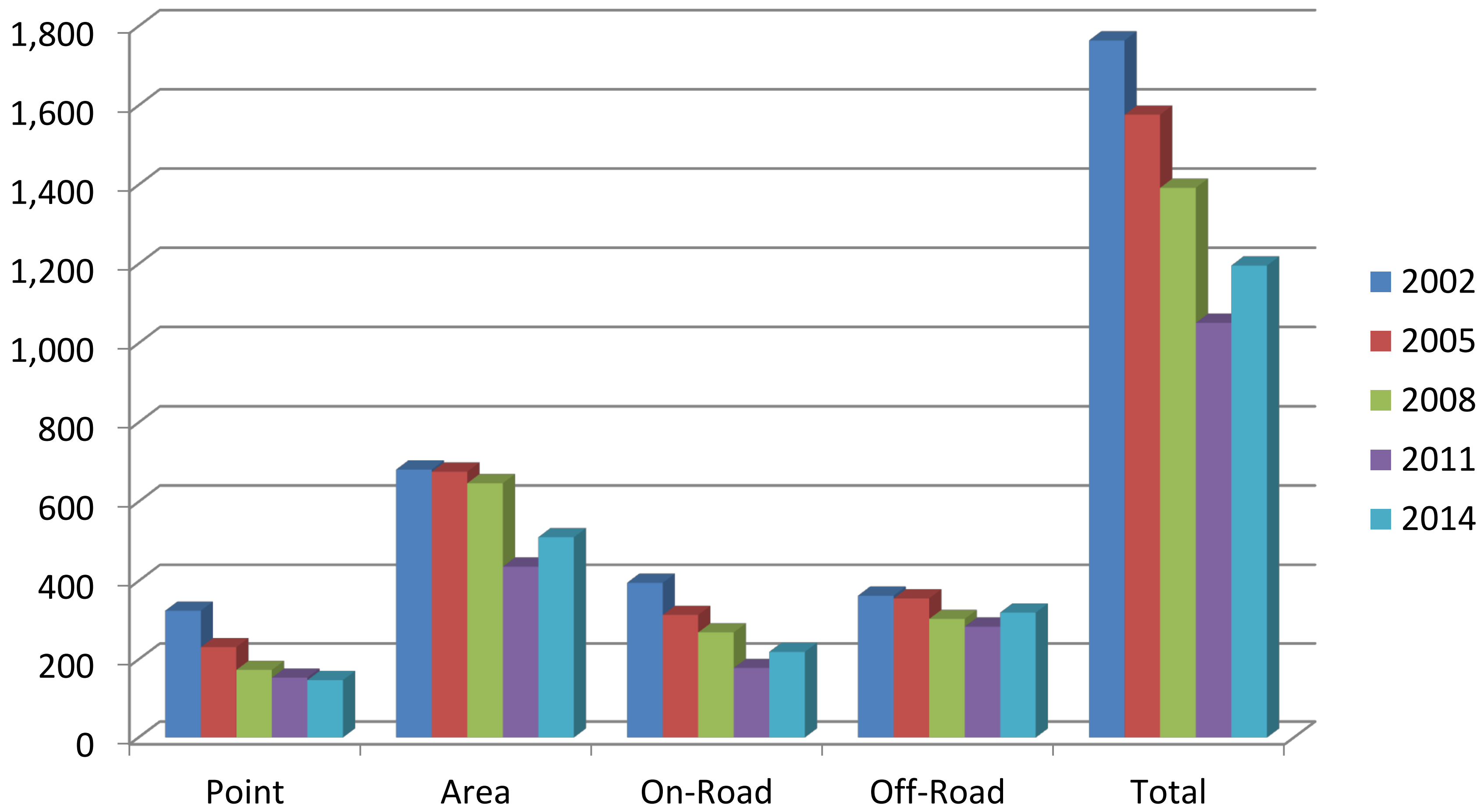
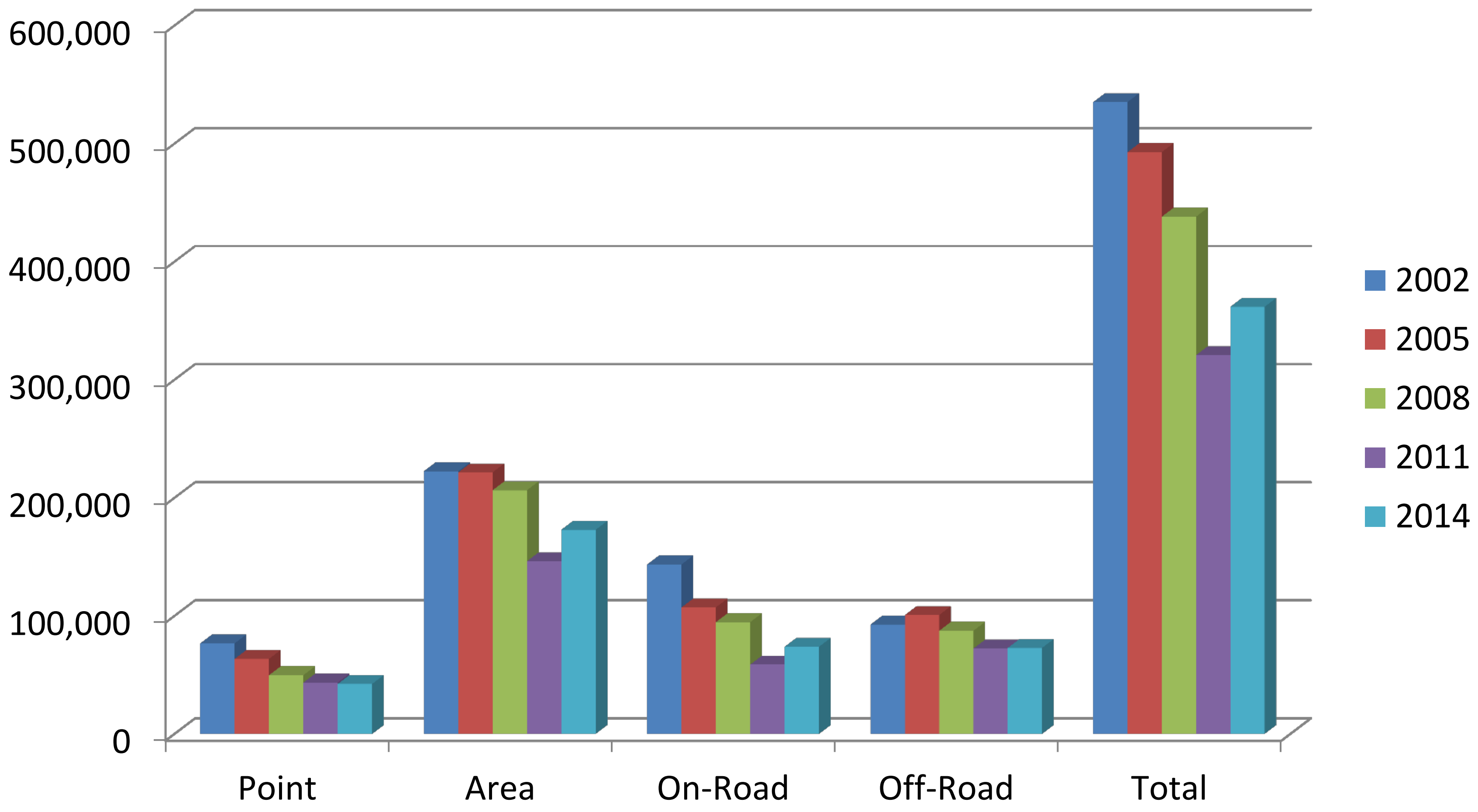


Figure 2-18: Historical Annual VOM Emissions (tons/year)



3 Point Sources

A major distinction typically made in emission inventories is the distinction between point and area sources. The Illinois EPA maintains detailed, unit-by-unit data for permitted sources. This data is obtained from permit applications and AERs. Since the Illinois EPA has very few de minimus emission exemptions from permitting, the 10 ton per year inventory requirement indicated by USEPA inventory guidance is more than adequately met for Illinois sources with permits. It is not uncommon for emissions from a permitted source to be much less than 10 tons/year. Sources that have registered under the ROSS program have their emissions included in the inventory if those emissions existed in the inventory at any given time. New ROSS sources are included in the area source inventory as appropriate.

The sources described above are known as point sources. The area source inventory includes all other stationary sources not included in the point source inventory. In cases where the two categories overlap (e.g., fuel combustion and solvent use), care has been taken to not double-count emissions. Area sources are covered in Section 4. The point source inventory described herein is considered to be the most current and accurate source of emission data available for 2014.

3.1 Source Identification and Data Collection

The sources to be included in the 2014 inventory were identified using the Illinois EPA's ICEMAN database. All operating sources that existed in ICEMAN as of the end of 2014 are included in this inventory.

The 2014 point source inventory was prepared by the Illinois EPA using source reported data from AERs. When a source failed to submit an AER for 2014, other data such as previous Illinois EPA estimates were used.

3.2 Emission Estimation Methodologies

Source-reported actual emissions are used in the 2014 ozone inventory. AERs provided the ozone season hourly emissions and operating schedules that enabled the calculation of ozone season weekday emissions. Where operating schedules were missing or not required to be reported, Illinois EPA estimates were used. These estimates came from previously-submitted AERs or from permit applications. Typical emission estimation methodologies include material balance and emission factors.

Since the inventory included VOM emissions, care was taken to exclude photochemically non-reactive materials. Emission rates from these types of materials are stored separately from VOM in ICEMAN so it was a simple task to exclude their emissions. The list of the compounds that USEPA has identified as being photochemically non-reactive is included in Section 2.2.

3.3 Point Source Emissions

Table 3-1 includes the emissions from all sources classified as point sources.

Table 3-1: Point Source Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	30.43	4,924.61	26.38	6,961.51
DuPage	6.10	684.59	4.39	1,126.18
Grundy Twps	3.84	1,006.91	1.30	455.46
Kane	3.76	503.93	3.20	894.90
Kendall Twps	0.24	91.91	0.21	67.59
Lake	10.82	2,291.70	2.04	443.88
McHenry	1.27	216.58	1.07	252.69
Will	29.45	8,937.18	7.74	2,390.18
Chicago NAA	**85.89**	**18,658.28**	**46.36**	**12,591.53**
Madison	21.39	6,868.15	7.52	2,555.26
Monroe	0.48	5.91	0.10	17.37
St. Clair	1.42	360.12	1.76	522.33
Metro-East NAA	**23.29**	**7,234.18**	**9.38**	**3,094.97**
Attainment Area	**291.74**	**73,860.91**	**91.13**	**26,657.44**
State Total	**400.94**	**99,752.50**	**146.84**	**42,344.80**

4 Area Sources

Area sources are those activities for which aggregated source and emission information is maintained for entire source categories rather than for each individual source. The Illinois EPA is responsible for preparing the area source emission inventory. The area source inventory includes NOx and reactive VOM for the entire state. Emission estimates are presented for the ozone nonattainment areas of Chicago and Metro-East St. Louis, as well as the remaining part of the state, which is in attainment with the 8-hour ozone standard. Where no township-specific information was available for the Chicago NAA counties of Grundy and Kendall, apportioning factors were developed and applied to estimate area source activity.

4.1 Source Identification

Area source categories of NOx and VOM emissions have been identified primarily through previous inventories. These inventories have followed previous guidance and have been found to be complete. As more is learned of emissions and emission sources, USEPA introduces new source categories for area sources. Illinois EPA reviewed this list and incorporated the new categories of agricultural field burning and gas/oil exploration and production.

Care is also taken when identifying potential area source categories. As stated previously, Illinois EPA's point source inventory for 2014 has a very low threshold of emission rates. This means that categories classified as area sources in other states are included solely in the point source inventory for Illinois. The best example of this is coal combustion in industrial and commercial boilers. It is believed that all boilers of this type are permitted and therefore exist in the point source inventory. In cases such as this, Illinois EPA reports zero emissions for the area source category to USEPA. Reporting zero emissions removes all doubt whether the category was overlooked or not. Categories the Illinois EPA assumes are covered completely in the point source inventory include:

- Cremation (animal and human)
- Fuel combustion
    - Commercial/Institutional
        - Coal
        - Wood
    - Industrial
        - Coal
        - LPG
        - Wood
- Fuel marketing
    - Bulk plants
    - Bulk terminals

- Surface coating
    - Aircraft
    - Appliances
    - Marine
    - Metal cans
    - Metal coils
    - Metal furniture
    - Motor vehicles
    - Railroad
    - Wood furniture

4.2 Emission Estimation Methods

4.2.1 Calculation Methodologies

Several methodologies have been used in estimating area source emissions.

- Emission factors
    - Standard (e.g., lb/person, lb/acre)
    - Formula (methods that may require multiple data values)
- Growth factors
- Data from inventories compiled by others
    - Data from USEPA
    - Studies funded by LADCO

In most cases, emissions were calculated by an emission factor. A listing of these emission factors can be found in Appendix F.

In some cases, emissions were calculated by using a growth factor to convert 2011 emissions to 2014 emissions. It should also be noted that for some of the fuel combustion categories, consumption data for some fuels was only available for calendar year 2013. However, the natural gas consumption rate was available for 2014. If the most recent year of data for a fuel was 2013, it was grown to a 2014 value by using the ratio of natural gas consumption for 2014 to that of 2013. Growth factors used in the inventory are identified in Appendix F.

In some cases, an entire data set provided by the USEPA was used in compiling the 2014 area source inventory. For the 2014 the only category using this methodology was gas/oil exploration and production. Since 2014 values were not available, the emissions from 2011 were deemed sufficient to include in the inventory.

4.2.2 Sources of Data

Various sources have been used to determine activity/commodity level data and emission information for area source inventory purposes. Among these are the USEPA's AP-42, USEPA's WebFIRE emission factor database, and data from federal and state agencies including USEPA's Office of Air Quality Planning and Standards, the U.S. Department of Energy, U.S. Bureau of Labor Statistics, Illinois Department of Transportation, Illinois Department of Agriculture, and so on.

4.2.3 Rule Effectiveness and Rule Penetration

For area sources subject to a VOM control equipment regulation, a rule effectiveness (RE) factor has been applied to the control efficiency when determining the emission rates. The RE adjustment reflects the assumption that regulations typically are not 100 percent effective at all sources at all times. For example, if a RE factor of 95 percent has been assumed, a value of 0.95 is multiplied against the control efficiency before subtracting the efficiency from unity.

In cases where a control regulation is applied to an area source category, a rule penetration (RP) adjustment may be required. The RP factor takes into account the fact that, due to exemptions within the rule, all sources within the category may not be regulated. Illinois EPA has used best judgment in the development and application of such factors.

Due to the use of emission factors, rather than the independent calculation of uncontrolled emissions and subsequent control efficiencies, the use of RE and RP factors is limited. In addition, a number of rules regulating area source emissions deal with operational behavior (e.g., keeping the lid closed on a cold-cleaner) rather than the addition of control equipment.

4.2.4 Double Counting of Emissions

A major concern in the development of an area source inventory is the possibility of double-counting emissions. Because some area source methodologies estimate emissions from all sources within a category, emissions already contained in the point source inventory may also be included in the area source estimate. In these instances, the point source emissions must be subtracted from the gross area source estimate to determine the net area source estimate. Commonly affected area source categories are:

- Dry Cleaning
- Fuel Combustion
- Graphic Arts

- Incineration
- Solvent Cleaning

4.2.5 Annual Emissions to Daily Emissions Calculation

Emissions contained in this Section have been expressed in tons/day and tons/year. Activity levels and/or emission factors are frequently based on longer timeframes than a daily timeframe, so adjustment factors have been applied to estimate the typical summer weekday emissions. In order to determine the ozone season activity fraction, a seasonal adjustment factor is applied to the annual emission estimate. This factor compares the summer season percentage of annual activity for the specific category to a uniform seasonal activity level (25 percent). Therefore, if 30 percent of a certain activity occurs during the summer season, the seasonal adjustment factor would by 30 ÷ 25 or 1.2.

In order to estimate emissions on a typical weekday, an activity adjustment factor is applied to the annual emission estimate. This factor is developed in one of two ways. First, the factor can be developed by dividing by the number of days per week an activity occurs and that total divided by 52, the number of weeks in the year. Therefore, the activity adjustment factor for an activity which occurs uniformly, seven days a week is calculated using the following equation: $1 \div 7 \div 52 = 0.00275$.

The second method is used when a percentage of work-week (Monday-Friday) activity has been developed. In this case, a work-week percentage of 33 percent activity converts into an activity adjustment factor by dividing 0.33 by 5 for the number of days the activity occurs divided by 52 which equals 0.00127.

A listing of these seasonal and daily adjustment factors can be found in Appendix G.

4.2.6 Estimating Emissions at the Township Level

In addition to the counties of Cook, DuPage, Kane, Lake, McHenry, and Will, the Chicago NAA also includes Aux Sable and Goose Lake Townships in Grundy County and also Oswego Township in Kendall County. Township-specific area source activity data is not always available. County emissions are apportioned to the township level using other surrogates related to the activity being estimated. These surrogates and their resulting percentages are included in Appendix H.

4.3 Categorical Emission Summary

The following tables identify the emissions of each area source category that was calculated for the 2014 inventory.

Table 4-1: Agricultural Field Burning Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.02	0.00	0.05
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.53	0.00	0.94
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.08	0.00	0.17
McHenry	0.00	0.36	0.00	0.74
Will	0.00	0.19	0.00	0.37
Chicago NAA	**0.00**	**1.18**	**0.00**	**2.27**
Madison	0.00	0.09	0.00	0.19
Monroe	0.00	0.08	0.00	0.13
St. Clair	0.00	0.13	0.00	0.23
Metro-East NAA	**0.00**	**0.30**	**0.00**	**0.55**
Attainment Area	**0.00**	**33.09**	**0.00**	**56.18**
State Total	**0.00**	**34.57**	**0.00**	**59.00**

Table 4-2: Agricultural Pesticide Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.11	26.40
Kane	0.57	136.93
Kendall Twps	0.08	19.14
Lake	0.08	18.42
McHenry	0.62	149.56
Will	0.87	207.93
Chicago NAA	**2.33**	**558.38**
Madison	0.990	237.53
Monroe	0.57	136.10
St. Clair	0.87	208.66
Metro-East NAA	**2.43**	**582.29**
Attainment Area	**88.96**	**21,318.83**
State Total	**93.72**	**22,459.50**

Table 4-3: Aircraft Refueling Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.40	121.02
DuPage	0.19	56.82
Grundy Twps	0.00	0.00
Kane	0.15	44.90
Kendall Twps	0.00	0.00
Lake	0.10	30.40
McHenry	0.15	44.30
Will	0.18	54.44
Chicago NAA	**1.17**	**351.88**
Madison	0.11	31.75
Monroe	0.03	7.67
St. Clair	0.13	39.25
Metro-East NAA	**0.26**	**78.68**
Attainment Area	**2.75**	**824.77**
State Total	**4.18**	**1,255.33**

Table 4-4: Architectural Coating Emissions

County	VOM (tpd)	VOM (tpy)
Cook	21.94	6,138.35
DuPage	3.90	1,091.27
Grundy Twps	0.06	17.35
Kane	2.21	616.95
Kendall Twps	0.22	62.90
Lake	2.95	825.07
McHenry	1.29	359.52
Will	2.87	801.94
Chicago NAA	**35.44**	**9,913.34**
Madison	1.11	311.88
Monroe	0.14	39.45
St. Clair	1.11	310.90
Metro-East NAA	**2.37**	**662.23**
Attainment Area	**16.07**	**4,494.70**
State Total	**53.88**	**15,070.28**

Table 4-5: Asphalt Paving Emissions – Cutback Asphalt

County	VOM (tpd)	VOM (tpy)
Cook	0.00	4.95
DuPage	0.00	1.43
Grundy Twps	0.00	0.04
Kane	0.00	1.13
Kendall Twps	0.00	0.04
Lake	0.00	1.34
McHenry	0.00	0.98
Will	0.00	1.63
Chicago NAA	**0.00**	**11.55**
Madison	0.00	1.11
Monroe	0.00	0.30
St. Clair	0.00	1.00
Metro-East NAA	**0.00**	**2.42**
Attainment Area	**0.00**	**44.51**
State Total	**0.00**	**58.47**

Table 4-65: Asphalt Paving Emissions – Emulsified Asphalt

County	VOM (tpd)	VOM (tpy)
Cook	0.09	13.68
DuPage	0.03	3.95
Grundy Twps	0.00	0.12
Kane	0.02	3.12
Kendall Twps	0.00	0.12
Lake	0.02	3.72
McHenry	0.02	2.69
Will	0.03	4.51
Chicago NAA	**0.20**	**31.91**
Madison	0.02	3.07
Monroe	0.01	0.84
St. Clair	0.02	2.76
Metro-East NAA	**0.04**	**6.68**
Attainment Area	**0.79**	**122.99**
State Total	**1.04**	**161.57**

Table 4-7: Automobile Refinishing Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.78	202.31
DuPage	0.19	49.77
Grundy Twps	0.00	0.48
Kane	0.07	16.93
Kendall Twps	0.00	1.15
Lake	0.11	28.90
McHenry	0.04	11.55
Will	0.11	28.70
Chicago NAA	**1.31**	**339.78**
Madison	0.05	12.61
Monroe	0.01	1.38
St. Clair	0.05	12.86
Metro-East NAA	**0.10**	**26.84**
Attainment Area	**1.36**	**352.72**
State Total	**2.77**	**719.35**

Table 4-8: Commercial Cooking Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.52	189.72
DuPage	0.09	33.73
Grundy Twps	0.00	0.54
Kane	0.05	19.07
Kendall Twps	0.01	1.94
Lake	0.07	25.50
McHenry	0.03	11.11
Will	0.07	24.79
Chicago NAA	**0.84**	**306.40**
Madison	0.03	9.64
Monroe	0.00	1.22
St. Clair	0.03	9.61
Metro-East NAA	**0.06**	**20.47**
Attainment Area	**0.38**	**138.92**
State Total	**1.28**	**465.79**

Table 4-9: Consumer Solvent Use Emissions

County	VOM (tpd)	VOM (tpy)
Cook	60.81	22,113.81
DuPage	10.81	3,931.36
Grundy Twps	0.17	62.49
Kane	6.11	2,222.59
Kendall Twps	0.62	226.59
Lake	8.17	2,972.36
McHenry	3.56	1,295.20
Will	7.94	2,889.04
Chicago NAA	**98.21**	**35,713.45**
Madison	3.09	1,123.55
Monroe	0.39	142.14
St. Clair	3.08	1,120.05
Metro-East NAA	**6.56**	**2,385.74**
Attainment Area	**44.53**	**16,192.46**
State Total	**149.30**	**54,291.64**

Table 4-10: Cremation Emissions - Animal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-11: Cremation Emissions - Human

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-12: Dry Cleaning Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.13	33.07
DuPage	0.02	4.06
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.14
Lake	0.01	2.50
McHenry	0.00	1.19
Will	0.00	0.11
Chicago NAA	**0.16**	**41.06**
Madison	0.01	1.49
Monroe	0.00	0.00
St. Clair	0.00	0.33
Metro-East NAA	**0.01**	**1.82**
Attainment Area	**0.09**	**24.43**
State Total	**0.26**	**67.30**

Table 4-13: Forest Fire Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.20	0.00	0.44
DuPage	0.00	0.09	0.00	0.20
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.07	0.00	0.14
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.08	0.00	0.17
Will	0.00	0.09	0.00	0.19
Chicago NAA	**0.00**	**0.52**	**0.01**	**1.15**
Madison	0.00	0.13	0.00	0.29
Monroe	0.00	0.08	0.00	0.18
St. Clair	0.00	0.11	0.00	0.24
Metro-East NAA	**0.00**	**0.33**	**0.00**	**0.71**
Attainment Area	**0.04**	**7.30**	**0.09**	**16.01**
State Total	**0.05**	**8.15**	**0.10**	**17.87**

Table 4-14: Fuel Combustion Emissions – Commercial/Institutional – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Jersey	0.00	0.00	0.00	0.00
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-15: Fuel Combustion Emissions – Commercial/Institutional – Distillate Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.17	263.24	0.00	4.51
DuPage	0.06	64.60	0.00	1.10
Grundy Twps	0.00	0.45	0.00	0.01
Kane	0.02	20.26	0.00	0.34
Kendall Twps	0.00	1.13	0.00	0.02
Lake	0.02	31.99	0.00	0.56
McHenry	0.01	9.00	0.00	0.15
Will	0.02	20.11	0.00	0.34
Chicago NAA	**0.30**	**410.78**	**0.01**	**7.03**
Madison	0.00	8.36	0.00	0.15
Monroe	0.00	0.82	0.00	0.01
St. Clair	0.01	9.29	0.00	0.16
Metro-East NAA	**0.01**	**18.47**	**0.00**	**0.32**
Attainment Area	**0.08**	**115.87**	**0.00**	**1.98**
State Total	**0.39**	**545.12**	**0.01**	**9.33**

Table 4-16: Fuel Combustion Emissions – Commercial/Institutional – Kerosene

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.60	0.00	0.01
DuPage	0.00	0.14	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.04	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.07	0.00	0.00
McHenry	0.00	0.02	0.00	0.00
Will	0.00	0.04	0.00	0.00
Chicago NAA	**0.00**	**0.93**	**0.00**	**0.02**
Madison	0.00	0.02	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.02	0.00	0.00
Metro-East NAA	**0.00**	**0.04**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.28**	**0.00**	**0.00**
State Total	**0.00**	**1.25**	**0.00**	**0.02**

Table 4-17: Commercial Fuel Combustion Emissions – Commercial/Institutional – LPG

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.10	94.99	0.01	5.21
DuPage	0.02	22.38	0.00	1.23
Grundy Twps	0.00	0.16	0.00	0.01
Kane	0.01	7.02	0.00	0.39
Kendall Twps	0.00	0.39	0.00	0.02
Lake	0.01	11.48	0.00	0.63
McHenry	0.00	3.12	0.00	0.17
Will	0.01	6.96	0.00	0.38
Chicago NAA	**0.15**	**146.49**	**0.01**	**8.04**
Madison	0.00	3.27	0.00	0.18
Monroe	0.00	0.28	0.00	0.02
St. Clair	0.00	3.22	0.00	0.18
Metro-East NAA	**0.01**	**6.77**	**0.00**	**0.37**
Attainment Area	**0.05**	**44.13**	**0.00**	**2.43**
State Total	**0.20**	**197.38**	**0.01**	**10.84**

Table 4-18: Fuel Combustion Emissions – Commercial/Institutional – Natural Gas

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	3.32	4,994.33	0.20	277.38
DuPage	1.15	1,293.77	0.06	69.42
Grundy Twps	0.01	9.76	0.00	0.54
Kane	0.29	393.85	0.01	21.96
Kendall Twps	0.02	15.79	0.00	0.87
Lake	0.58	649.15	0.03	36.57
McHenry	0.20	194.96	0.01	10.72
Will	0.32	398.12	0.02	22.00
Chicago NAA	**5.90**	**7,949.74**	**0.33**	**439.46**
Madison	0.18	195.61	0.01	10.76
Monroe	0.02	17.68	0.00	0.97
St. Clair	0.18	184.85	0.01	10.17
Metro-East NAA	**0.38**	**398.14**	**0.02**	**21.90**
Attainment Area	**1.62**	**2,288.44**	**0.09**	**131.51**
State Total	**7.90**	**10,636.32**	**0.45**	**592.87**

Table 4-19: Fuel Combustion Emissions – Commercial/Institutional – Residual Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-20: Fuel Combustion Emissions – Commercial/Institutional – Wood

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-21: Fuel Combustion Emissions – Industrial – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-22: Fuel Combustion Emissions – Industrial – Distillate Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.22	114.24	0.00	1.10
DuPage	0.08	36.32	0.00	0.36
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.05	20.93	0.00	0.21
Kendall Twps	0.00	0.97	0.00	0.01
Lake	0.07	34.90	0.00	0.35
McHenry	0.02	10.03	0.00	0.10
Will	0.01	6.94	0.00	0.04
Chicago NAA	**0.45**	**224.33**	**0.00**	**2.18**
Madison	0.00	4.14	0.00	0.00
Monroe	0.00	0.23	0.00	0.00
St. Clair	0.01	3.32	0.00	0.03
Metro-East NAA	**0.01**	**7.70**	**0.00**	**0.04**
Attainment Area	**0.28**	**132.30**	**0.00**	**1.29**
State Total	**0.74**	**364.33**	**0.01**	**3.50**

Table 4-23: Fuel Combustion Emissions – Industrial – Kerosene

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.01	3.77	0.00	0.04
DuPage	0.00	1.08	0.00	0.01
Grundy Twps	0.00	0.01	0.00	0.00
Kane	0.00	0.62	0.00	0.01
Kendall Twps	0.00	0.03	0.00	0.00
Lake	0.00	1.04	0.00	0.01
McHenry	0.00	0.31	0.00	0.00
Will	0.00	0.39	0.00	0.00
Chicago NAA	**0.02**	**7.23**	**0.00**	**0.07**
Madison	0.00	0.25	0.00	0.00
Monroe	0.00	0.01	0.00	0.00
St. Clair	0.00	0.10	0.00	0.00
Metro-East NAA	**0.00**	**0.35**	**0.00**	**0.00**
Attainment Area	**0.01**	**4.19**	**0.00**	**0.04**
State Total	**0.03**	**11.77**	**0.00**	**0.11**

Table 4-24: Fuel Combustion Emissions – Industrial – LPG

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-25: Fuel Combustion Emissions – Industrial – Natural Gas

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	4.86	3,026.37	0.14	125.43
DuPage	2.42	1,173.14	0.12	57.13
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.87	519.87	0.04	28.14
Kendall Twps	0.08	35.39	0.00	1.95
Lake	2.15	1,118.05	0.11	60.19
McHenry	0.55	293.62	0.03	15.03
Will	0.00	62.91	0.00	0.00
Chicago NAA	**10.92**	**6,229.35**	**0.46**	**287.87**
Madison	0.00	0.00	0.00	0.00
Monroe	0.01	6.06	0.00	0.33
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.01**	**6.06**	**0.00**	**0.33**
Attainment Area	**4.76**	**2,869.25**	**0.23**	**133.29**
State Total	**15.69**	**9,104.66**	**0.69**	**421.49**

Table 4-26: Fuel Combustion Emissions – Industrial – Residual Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.04	16.42	0.00	0.10
DuPage	0.01	4.69	0.00	0.03
Grundy Twps	0.00	0.03	0.00	0.00
Kane	0.01	2.71	0.00	0.02
Kendall Twps	0.00	0.13	0.00	0.00
Lake	0.01	4.52	0.00	0.03
McHenry	0.00	1.34	0.00	0.01
Will	0.00	1.68	0.00	0.01
Chicago NAA	**0.07**	**31.51**	**0.00**	**0.19**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.03	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.03**	**0.00**	**0.00**
Attainment Area	**0.04**	**18.21**	**0.00**	**0.11**
State Total	**0.11**	**49.76**	**0.00**	**0.30**

Table 4-27: Fuel Combustion Emissions – Industrial – Wood

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-28: Fuel Combustion Emissions – Residential – Coal

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	37.82	0.00	41.56
DuPage	0.00	1.20	0.00	1.32
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**39.01**	**0.00**	**42.87**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	1.80	0.0	1.97
Metro-East NAA	**0.00**	**1.80**	**0.00**	**1.97**
Attainment Area	**0.00**	**47.63**	**0.00**	**52.34**
State Total	**0.00**	**88.44**	**0.00**	**97.18**

Table 4-29: Fuel Combustion Emissions – Residential – Distillate Oil

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.01	9.51	0.00	0.37
DuPage	0.00	0.89	0.00	0.03
Grundy Twps	0.00	0.05	0.00	0.00
Kane	0.00	0.44	0.00	0.02
Kendall Twps	0.00	0.09	0.00	0.00
Lake	0.00	0.50	0.00	0.02
McHenry	0.00	0.31	0.00	0.01
Will	0.00	0.41	0.00	0.02
Chicago NAA	**0.01**	**12.20**	**0.00**	**0.47**
Madison	0.00	1.12	0.00	0.04
Monroe	0.00	0.04	0.00	0.00
St. Clair	0.00	0.69	0.00	0.03
Metro-East NAA	**0.00**	**1.85**	**0.00**	**0.07**
Attainment Area	**0.01**	**16.57**	**0.00**	**0.64**
State Total	**0.02**	**30.62**	**0.00**	**1.19**

Table 4-30: Fuel Combustion Emissions – Residential – Kerosene

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	1.21	0.00	0.05
DuPage	0.00	0.11	0.00	0.00
Grundy Twps	0.00	0.01	0.00	0.00
Kane	0.00	0.06	0.00	0.00
Kendall Twps	0.00	0.01	0.00	0.00
Lake	0.00	0.06	0.00	0.00
McHenry	0.00	0.04	0.00	0.00
Will	0.00	0.05	0.00	0.00
Chicago NAA	**0.00**	**1.55**	**0.00**	**0.06**
Madison	0.00	0.14	0.00	0.01
Monroe	0.00	0.01	0.00	0.00
St. Clair	0.00	0.09	0.00	0.00
Metro-East NAA	**0.00**	**0.23**	**0.00**	**0.01**
Attainment Area	**0.00**	**2.10**	**0.00**	**0.08**
State Total	**0.00**	**3.88**	**0.00**	**0.15**

Table 4-31: Fuel Combustion Emissions – Residential – LPG

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.10	169.37	0.00	6.57
DuPage	0.01	22.07	0.00	0.86
Grundy Twps	0.00	3.11	0.00	0.12
Kane	0.01	23.76	0.00	0.92
Kendall Twps	0.00	5.59	0.00	0.22
Lake	0.01	17.76	0.00	0.69
McHenry	0.02	29.27	0.00	1.14
Will	0.02	36.50	0.00	1.42
Chicago NAA	**0.19**	**307.43**	**0.01**	**11.93**
Madison	0.04	71.16	0.00	2.76
Monroe	0.02	30.96	0.00	1.20
St. Clair	0.03	51.99	0.00	2.02
Metro-East NAA	**0.09**	**154.12**	**0.00**	**5.98**
Attainment Area	**1.02**	**1,689.22**	**0.04**	**65.55**
State Total	**1.30**	**2,150.77**	**0.05**	**83.46**

Table 4-32: Fuel Combustion Emissions – Residential – Natural Gas

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	6.00	9,899.66	0.35	579.24
DuPage	1.04	1,722.17	0.06	100.77
Grundy Twps	0.01	24.53	0.00	1.44
Kane	0.54	896.21	0.03	52.44
Kendall Twps	0.05	82.68	0.00	4.84
Lake	0.75	1,239.71	0.04	72.54
McHenry	0.34	560.99	0.02	32.82
Will	0.72	1,185.01	0.04	69.34
Chicago NAA	**9.46**	**15,610.96**	**0.55**	**913.41**
Madison	0.26	436.70	0.02	25.55
Monroe	0.02	36.23	0.00	2.12
St. Clair	0.24	403.74	0.01	23.62
Metro-East NAA	**0.53**	**876.68**	**0.03**	**51.29**
Attainment Area	**3.69**	**6,097.98**	**0.22**	**356.80**
State Total	**13.68**	**22,585.62**	**0.80**	**1,321.50**

Table 4-33: Fuel Combustion Emissions – Residential – Wood Firelog

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	45.65	0.00	235.03
DuPage	0.00	18.45	0.00	95.00
Grundy Twps	0.00	0.29	0.00	1.51
Kane	0.00	8.93	0.00	45.99
Kendall Twps	0.00	0.88	0.00	4.54
Lake	0.00	12.65	0.00	65.12
McHenry	0.00	5.72	0.00	29.46
Will	0.00	11.79	0.00	60.72
Chicago NAA	**0.00**	**104.38**	**0.00**	**537.38**
Madison	0.00	1.63	0.00	8.40
Monroe	0.00	0.19	0.00	0.96
St. Clair	0.00	1.58	0.00	8.12
Metro-East NAA	**0.00**	**3.40**	**0.00**	**17.49**
Attainment Area	**0.00**	**41.35**	**0.00**	**212.87**
State Total	**0.00**	**149.12**	**0.00**	**767.74**

Table 4-34: Fuel Combustion Emissions – Residential – Wood Fireplaces

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	60.98	0.00	644.43
DuPage	0.00	23.17	0.00	238.07
Grundy Twps	0.00	0.27	0.00	2.32
Kane	0.00	8.62	0.00	71.75
Kendall Twps	0.00	0.89	0.00	7.48
Lake	0.00	12.67	0.00	105.49
McHenry	0.00	5.77	0.00	48.03
Will	0.00	11.26	0.00	93.82
Chicago NAA	**0.00**	**123.63**	**0.00**	**1,211.39**
Madison	0.00	8.09	0.00	98.84
Monroe	0.00	1.03	0.00	12.58
St. Clair	0.00	8.45	0.00	103.29
Metro-East NAA	**0.00**	**17.57**	**0.00**	**214.72**
Attainment Area	**0.00**	**132.50**	**0.00**	**1,689.66**
State Total	**0.00**	**273.70**	**0.00**	**3,115.76**

Table 4-35: Fuel Combustion Emissions – Residential – Wood Furnaces

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.38	0.00	2.44
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.38**	**0.00**	**2.44**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	1.43	0.00	9.32
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**1.43**	**0.00**	**9.32**
Attainment Area	**0.00**	**126.53**	**0.00**	**822.41**
State Total	**0.00**	**128.34**	**0.00**	**834.18**

Table 4-36: Fuel Combustion Emissions – Residential – Wood Hydronic Heaters

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.31	0.00	11.73
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.31**	**0.00**	**11.73**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	1.21	0.00	45.27
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**1.21**	**0.00**	**45.27**
Attainment Area	**0.00**	**111.19**	**0.00**	**4,163.54**
State Total	**0.00**	**112.71**	**0.00**	**4,220.54**

Table 4-37: Fuel Combustion Emissions – Residential – Wood Outdoor

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	6.31	0.00	45.85
Grundy Twps	0.00	0.10	0.00	0.72
Kane	0.00	3.04	0.00	22.10
Kendall Twps	0.00	0.74	0.00	5.39
Lake	0.00	4.65	0.00	33.81
McHenry	0.00	2.14	0.00	15.52
Will	0.00	3.94	0.00	28.61
Chicago NAA	**0.00**	**20.91**	**0.00**	**152.02**
Madison	0.00	1.28	0.00	9.27
Monroe	0.00	0.17	0.00	1.25
St. Clair	0.00	1.43	0.00	10.39
Metro-East NAA	**0.00**	**2.88**	**0.00**	**20.92**
Attainment Area	**0.00**	**16.64**	**0.00**	**120.97**
State Total	**0.00**	**40.43**	**0.00**	**293.90**

Table 4-38: Fuel Combustion Emissions – Residential – Wood Stoves

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	22.62	0.00	165.35
DuPage	0.00	4.52	0.00	38.85
Grundy Twps	0.00	0.12	0.00	1.31
Kane	0.00	3.66	0.00	41.91
Kendall Twps	0.00	0.36	0.00	4.27
Lake	0.00	5.37	0.00	61.63
McHenry	0.00	2.45	0.00	28.08
Will	0.00	4.80	0.00	54.74
Chicago NAA	**0.00**	**43.91**	**0.00**	**396.14**
Madison	0.00	6.80	0.00	71.01
Monroe	0.00	0.83	0.00	8.96
St. Clair	0.00	6.93	0.00	74.09
Metro-East NAA	**0.00**	**14.55**	**0.00**	**154.06**
Attainment Area	**0.00**	**158.21**	**0.00**	**1,869.41**
State Total	**0.00**	**216.66**	**0.00**	**2,419.62**

Table 4-39: Fuel Marketing Emissions – Bulk Plants

County	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
McHenry	0.00	0.00
Will	0.00	0.00
Chicago NAA	**0.00**	**0.00**
Madison	0.00	0.00
Monroe	0.00	0.00
St. Clair	0.00	0.00
Metro-East NAA	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**
State Total	**0.00**	**0.00**

Table 4-40: Fuel Marketing Emissions – Bulk Terminals

County	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
McHenry	0.00	0.00
Will	0.00	0.00
Chicago NAA	**0.00**	**0.00**
Madison	0.00	0.00
Monroe	0.00	0.00
St. Clair	0.00	0.00
Metro-East NAA	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**
State Total	**0.00**	**0.00**

Table 4-41: Fuel Marketing Emissions – Stage I

County	VOM (tpd)	VOM (tpy)
Cook	1.48	504.59
DuPage	0.40	137.38
Grundy Twps	0.01	3.41
Kane	0.18	62.33
Kendall Twps	0.02	5.61
Lake	0.28	94.07
McHenry	0.11	38.20
Will	0.29	97.61
Chicago NAA	**2.77**	**943.20**
Madison	0.15	50.81
Monroe	0.02	6.37
St. Clair	0.14	47.58
Metro-East NAA	**0.31**	**104.76**
Attainment Area	**2.37**	**805.03**
State Total	**5.45**	**1,852.99**

Table 4-42: Fuel Marketing Emissions – Stage II – Diesel

County	VOM (tpd)	VOM (tpy)
Cook	0.20	62.00
DuPage	0.05	16.87
Grundy Twps	0.00	0.42
Kane	0.02	7.64
Kendall Twps	0.00	0.69
Lake	0.04	11.52
McHenry	0.01	4.67
Will	0.04	11.99
Chicago NAA	**0.37**	**115.80**
Madison	0.04	13.78
Monroe	0.01	1.72
St. Clair	0.04	12.90
Metro-East NAA	**0.09**	**28.41**
Attainment Area	**0.56**	**173.65**
State Total	**1.01**	**317.86**

Table 4-43: Fuel Marketing Emissions – Stage II – Gasoline

County	VOM (tpd)	VOM (tpy)
Cook	1.11	328.69
DuPage	0.27	80.77
Grundy Twps	0.01	2.13
Kane	0.14	40.43
Kendall Twps	0.01	3.54
Lake	0.20	57.92
McHenry	0.08	24.31
Will	0.20	59.68
Chicago NAA	**2.01**	**597.48**
Madison	0.53	148.45
Monroe	0.06	17.64
St. Clair	0.50	140.53
Metro-East NAA	**1.09**	**306.63**
Attainment Area	**9.55**	**2,430.21**
State Total	**12.66**	**3,334.32**

Table 4-44: Fuel Marketing Emissions – Storage Tank Breathing

County	VOM (tpd)	VOM (tpy)
Cook	2.05	698.16
DuPage	0.56	190.08
Grundy Twps	0.01	4.71
Kane	0.25	86.24
Kendall Twps	0.02	7.76
Lake	0.38	130.15
McHenry	0.16	52.86
Will	0.40	135.06
Chicago NAA	**3.84**	**1,305.03**
Madison	0.19	66.18
Monroe	0.02	8.30
St. Clair	0.18	61.97
Metro-East NAA	**0.40**	**136.45**
Attainment Area	**2.73**	**923.39**
State Total	**6.97**	**2,367.87**

Table 4-45: Fuel Marketing Emissions – Tank Truck Leaks

County	VOM (tpd)	VOM (tpy)
Cook	0.12	41.23
DuPage	0.03	11.22
Grundy Twps	0.00	0.28
Kane	0.01	5.09
Kendall Twps	0.00	0.46
Lake	0.02	7.69
McHenry	0.01	3.12
Will	0.02	7.98
Chicago NAA	**0.23**	**77.06**
Madison	0.01	3.91
Monroe	0.00	0.49
St. Clair	0.01	3.66
Metro-East NAA	**0.02**	**8.06**
Attainment Area	**0.16**	**54.70**
State Total	**0.41**	**139.83**

Table 4-46: Gas Exploration Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-47: Gas Production Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.00	0.00	0.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.00**	**0.00**	**0.00**
Attainment Area	**0.00**	**0.00**	**0.00**	**0.00**
State Total	**0.00**	**0.00**	**0.00**	**0.00**

Table 4-48: Graphic Arts Emissions

County	VOM (tpd)	VOM (tpy)
Cook	3.83	997.89
DuPage	1.64	394.57
Grundy Twps	0.01	1.81
Kane	0.40	107.19
Kendall Twps	0.01	3.12
Lake	0.58	159.17
McHenry	0.02	24.11
Will	0.71	179.36
Chicago NAA	**7.38**	**1,867.22**
Madison	0.13	36.21
Monroe	0.04	10.66
St. Clair	0.19	51.79
Metro-East NAA	**0.37**	**98.67**
Attainment Area	**2.03**	**510.14**
State Total	**9.78**	**2,476.03**

Table 4-49: Incineration Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	1.87	681.81	1.22	445.60
DuPage	0.33	121.24	0.22	79.21
Grundy Twps	0.01	1.93	0.00	1.26
Kane	0.19	68.55	0.12	44.82
Kendall Twps	0.02	6.99	0.01	4.57
Lake	0.25	91.66	0.16	59.94
McHenry	0.11	39.84	0.07	26.11
Will	0.21	81.62	0.15	56.22
Chicago NAA	**2.99**	**1,093.63**	**1.97**	**717.74**
Madison	0.10	34.65	0.06	22.66
Monroe	0.01	4.38	0.01	2.87
St. Clair	0.00	0.00	0.06	22.31
Metro-East NAA	**0.11**	**39.04**	**0.13**	**47.84**
Attainment Area	**1.35**	**494.31**	**0.89**	**323.63**
State Total	**4.45**	**1,626.98**	**2.99**	**1,089.21**

Table 4-50: Industrial Surface Coating Emissions – Maintenance Coatings

County	VOM (tpd)	VOM (tpy)
Cook	6.09	1,582.13
DuPage	1.08	281.27
Grundy Twps	0.02	4.47
Kane	0.61	159.02
Kendall Twps	0.06	16.21
Lake	0.82	212.66
McHenry	0.36	92.66
Will	0.80	206.70
Chicago NAA	**9.84**	**2,555.11**
Madison	0.31	80.38
Monroe	0.04	10.17
St. Clair	0.31	80.13
Metro-East NAA	**0.66**	**170.69**
Attainment Area	**4.46**	**1,158.49**
State Total	**14.95**	**3,884.28**

Table 4-51: Industrial Surface Coating Emissions – Other Special Purpose Coatings

County	VOM (tpd)	VOM (tpy)
Cook	0.65	167.89
DuPage	0.11	29.85
Grundy Twps	0.00	0.47
Kane	0.06	16.87
Kendall Twps	0.01	1.72
Lake	0.09	22.57
McHenry	0.04	9.83
Will	0.08	21.93
Chicago NAA	**1.04**	**271.13**
Madison	0.03	8.53
Monroe	0.00	1.08
St. Clair	0.03	8.50
Metro-East NAA	**0.07**	**18.11**
Attainment Area	**0.47**	**122.93**
State Total	**1.59**	**412.18**

Table 4-52: Marine Vessel Loading and Transport Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.41	127.58
DuPage	0.00	0.00
Grundy Twps	0.02	7.29
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
McHenry	0.00	0.00
Will	0.42	131.22
Chicago NAA	**0.85**	**266.09**
Madison	0.56	174.96
Monroe	0.11	32.81
St. Clair	0.02	7.29
Metro-East NAA	**0.69**	**215.06**
Attainment Area	**1.99**	**624.39**
State Total	**3.53**	**1,105.54**

Table 4-53: Oil and Gas Production Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.00**	**0.00**	**0.00**
Madison	0.18	65.29	0.54	196.45
Monroe	0.02	5.84	0.05	17.69
St. Clair	0.03	9.55	0.08	28.43
Metro-East NAA	**0.22**	**80.68**	**0.67**	**242.57**
Attainment Area	**23.14**	**8,414.52**	**66.49**	**24,176.93**
State Total	**23.36**	**8,495.21**	**67.15**	**24,419.51**

Table 4-54: Oil Exploration Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00
DuPage	0.00	0.00
Grundy Twps	0.00	0.00
Kane	0.00	0.00
Kendall Twps	0.00	0.00
Lake	0.00	0.00
McHenry	0.00	0.00
Will	0.00	0.00
Chicago NAA	**0.00**	**0.00**
Madison	0.02	6.21
Monroe	0.00	0.55
St. Clair	0.00	0.91
Metro-East NAA	**0.02**	**7.67**
Attainment Area	**8.28**	**3,010.10**
State Total	**8.30**	**3,017.77**

Table 4-55: Open Burning Emissions – Land Clearing

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.38	0.00	0.88
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.00	0.00	0.00
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.38**	**0.00**	**0.88**
Madison	0.00	0.00	0.00	0.00
Monroe	0.03	5.16	0.07	11.98
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.03**	**5.16**	**0.07**	**11.98**
Attainment Area	**0.73**	**133.14**	**1.70**	**308.87**
State Total	**0.76**	**138.68**	**1.77**	**321.73**

Table 4-56: Open Burning Emissions – Prescribed Burning

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	59.20	0.00	129.88
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.24	0.00	0.52
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.04	0.00	0.08
Lake	0.00	14.23	0.00	31.23
McHenry	0.00	8.02	0.00	17.61
Will	0.00	3.55	0.00	7.80
Chicago NAA	**0.00**	**85.28**	**0.00**	**187.11**
Madison	0.00	2.07	0.00	4.55
Monroe	0.00	0.37	0.00	0.82
St. Clair	0.00	0.25	0.00	0.55
Metro-East NAA	**0.00**	**2.70**	**0.00**	**5.92**
Attainment Area	**0.00**	**124.89**	**0.00**	**274.02**
State Total	**0.00**	**212.86**	**0.00**	**467.05**

Table 4-57: Open Burning Emissions – Residential Household Waste

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	1.37	0.01	1.95
DuPage	0.00	0.24	0.00	0.35
Grundy Twps	0.01	1.88	0.01	2.69
Kane	0.03	9.78	0.04	13.96
Kendall Twps	0.01	2.92	0.01	4.17
Lake	0.01	4.67	0.02	6.66
McHenry	0.04	15.82	0.06	22.58
Will	0.04	14.04	0.06	20.03
Chicago NAA	**0.14**	**50.73**	**0.20**	**72.38**
Madison	0.05	18.53	0.07	26.44
Monroe	0.02	7.27	0.03	10.37
St. Clair	0.04	13.50	0.05	19.27
Metro-East NAA	**0.11**	**39.31**	**0.15**	**56.08**
Attainment Area	**1.84**	**669.75**	**2.63**	**955.51**
State Total	**2.09**	**759.79**	**2.98**	**1,083.97**

Table 4-58: Open Burning Emissions – Yard Waste – Brush

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.05	0.00	0.20
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.05**	**0.00**	**0.20**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.26	0.00	1.00
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.26**	**0.00**	**1.00**
Attainment Area	**0.00**	**14.35**	**0.00**	**54.54**
State Total	**0.00**	**14.67**	**0.00**	**55.74**

Table 4-59: Open Burning Emissions – Yard Waste – Leaves

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.00	0.00	0.00	0.00
DuPage	0.00	0.00	0.00	0.00
Grundy Twps	0.00	0.00	0.00	0.00
Kane	0.00	0.00	0.00	0.00
Kendall Twps	0.00	0.07	0.00	0.30
Lake	0.00	0.00	0.00	0.00
McHenry	0.00	0.00	0.00	0.00
Will	0.00	0.00	0.00	0.00
Chicago NAA	**0.00**	**0.07**	**0.00**	**0.30**
Madison	0.00	0.00	0.00	0.00
Monroe	0.00	0.33	0.00	1.47
St. Clair	0.00	0.00	0.00	0.00
Metro-East NAA	**0.00**	**0.33**	**0.00**	**1.47**
Attainment Area	**0.00**	**17.80**	**0.00**	**80.38**
State Total	**0.00**	**18.19**	**0.00**	**82.14**

Table 4-60: Pavement Marking Emissions

County	VOM (tpd)	VOM (tpy)
Cook	0.01	1.80
DuPage	0.00	0.52
Grundy Twps	0.00	0.02
Kane	0.00	0.41
Kendall Twps	0.00	0.02
Lake	0.00	0.49
McHenry	0.00	0.35
Will	0.00	0.59
Chicago NAA	**0.03**	**4.20**
Madison	0.00	0.40
Monroe	0.00	0.11
St. Clair	0.00	0.36
Metro-East NAA	**0.01**	**0.88**
Attainment Area	**0.11**	**16.20**
State Total	**0.14**	**21.28**

Table 4-61: Portable Fuel Container Emissions – Commercial

County	VOM (tpd)	VOM (tpy)
Cook	1.56	390.50
DuPage	0.61	152.44
Grundy Twps	0.00	1.03
Kane	0.28	70.20
Kendall Twps	0.01	3.29
Lake	0.49	122.57
McHenry	0.14	35.91
Will	0.23	57.93
Chicago NAA	**3.34**	**833.87**
Madison	0.08	18.99
Monroe	0.01	2.17
St. Clair	0.06	16.21
Metro-East NAA	**0.15**	**37.38**
Attainment Area	**1.16**	**289.23**
State Total	**4.64**	**1,160.48**

Table 4-62: Portable Fuel Container Emissions – Residential

County	VOM (tpd)	VOM (tpy)
Cook	6.93	1,733.45
DuPage	2.71	676.70
Grundy Twps	0.02	4.59
Kane	1.25	311.63
Kendall Twps	0.06	14.59
Lake	2.18	544.10
McHenry	0.64	159.40
Will	1.03	257.17
Chicago NAA	**14.81**	**3,701.63**
Madison	0.34	84.30
Monroe	0.04	9.64
St. Clair	0.29	71.97
Metro-East NAA	**0.66**	**165.91**
Attainment Area	**5.14**	**1,285.26**
State Total	**20.61**	**5,152.80**

Table 4-63: Solvent Cleaning Emissions

County	VOM (tpd)	VOM (tpy)
Cook	12.36	3,851.81
DuPage	3.71	1,156.32
Grundy Twps	0.03	9.32
Kane	1.30	405.13
Kendall Twps	0.12	36.02
Lake	2.05	639.05
McHenry	0.71	219.87
Will	1.31	409.00
Chicago NAA	**21.59**	**6,726.53**
Madison	0.86	269.38
Monroe	0.07	22.31
St. Clair	0.59	185.04
Metro-East NAA	**1.53**	**476.73**
Attainment Area	**11.92**	**3,711.88**
State Total	**35.04**	**10,915.13**

Table 4-64: Structure Fire Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	0.04	3.80	0.32	29.89
DuPage	0.01	0.59	0.05	4.67
Grundy Twps	0.00	0.03	0.00	0.25
Kane	0.01	0.50	0.04	3.97
Kendall Twps	0.00	0.03	0.00	0.23
Lake	0.00	0.14	0.01	1.12
McHenry	0.00	0.28	0.02	2.18
Will	0.01	0.51	0.04	4.01
Chicago NAA	**0.06**	**5.89**	**0.50**	**46.31**
Madison	0.00	0.31	0.03	2.47
Monroe	0.00	0.01	0.00	0.06
St. Clair	0.00	0.38	0.03	3.02
Metro-East NAA	**0.01**	**0.71**	**0.06**	**5.56**
Attainment Area	**0.06**	**5.51**	**0.47**	**43.28**
State Total	**0.13**	**12.11**	**1.03**	**95.15**

Table 4-65: Waste Water Treatment Emissions – POTWs

County	VOM (tpd)	VOM (tpy)
Cook	0.34	124.29
DuPage	0.05	19.14
Grundy Twps	0.00	0.30
Kane	0.00	0.54
Kendall Twps	0.00	0.08
Lake	0.02	8.94
McHenry	0.01	3.07
Will	0.03	9.45
Chicago NAA	**0.46**	**165.81**
Madison	0.01	3.25
Monroe	0.00	0.16
St. Clair	0.01	3.65
Metro-East NAA	**0.02**	**7.06**
Attainment Area	**0.18**	**65.37**
State Total	**0.66**	**238.23**

Table 4-66: Total Area Source Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	16.74	19,507.17	124.09	42,123.09
DuPage	5.14	4,517.19	26.98	9,053.99
Grundy Twps	0.04	44.03	0.50	175.41
Kane	2.01	1,989.45	14.00	4,684.37
Kendall Twps	0.18	155.18	1.30	444.27
Lake	3.87	3,255.34	19.05	6,455.85
McHenry	1.30	1,183.48	8.41	2,795.11
Will	1.37	1,850.91	17.95	6,018.82
Chicago NAA	**30.66**	**32,502.77**	**212.28**	**71,750.92**
Madison	0.83	859.66	9.41	3,178.41
Monroe	0.15	120.99	1.72	582.91
St. Clair	0.55	701.43	7.93	2,706.06
Metro-East NAA	**1.52**	**1,682.08**	**19.02**	**6,467.37**
Attainment Area	**38.72**	**23,827.24**	**313.79**	**94,612.63**
State Total	**70.90**	**58,012.09**	**510.20**	**172,830.91**

5 Mobile Sources

A mobile source of air pollution is a self-propelled or portable emitter of air pollutants. Emissions are generated by the engines or motors that power such sources. Most mobile sources, except jet or turboprop aircraft, are powered by internal combustion piston engines and nearly all use liquid fuels. Gaseous fuels, such as compressed natural gas (CNG) or liquefied petroleum gas (LPG), have a very small fraction of the motor fuel market in Illinois. Solid fuels have not been used by mobile sources in significant amounts since railroads retired their coal-powered steam locomotives in the 1950s.

For inventory and planning purposes, mobile sources are divided into two major categories.

1. On-road mobile sources (e.g., motor vehicles such as cars, vans, trucks, buses and motorcycles) used for transportation of goods and passengers on roads and streets
2. Off-road mobile sources including:
   - Modes of powered transportation that do not use roads, such as aircraft, trains, ships and boats, and motor vehicles used off-road; and
   - Self-propelled or portable motorized machines or equipment not used for transportation, ranging from construction equipment and farm tractors to lawnmowers and hand-held power weed choppers.

All on-road mobile sources are self-propelled. Some off-road mobile sources (e.g., farm tractors) are self-propelled, but many off-road sources are not. A gasoline-powered chainsaw is a familiar example of a non-self-propelled off-road mobile source. Not all movable or portable emission sources are mobile sources, however. A small truck-portable cement or hot-mix asphalt plant, for example, may be set up near a construction or road-building site. Such plants are classified as stationary sources, not mobile sources, for two reasons: (1) they may operate for weeks or months at a single location, and (2) the trucks that move the plants do not supply power for them.

Not all internal combustion or turbine engines are mobile sources. Fixed internal combustion engines are classified as stationary sources.

There are three categories of mobile source emissions:
- Exhaust or tailpipe emissions, which result from the combustion of fuel in the source's engine
- Evaporative emissions, which result from evaporation of fuel from the engine or its fuel system; and
- Refueling emissions

Exhaust emissions are the result of fuel combustion and occur only when the engine is running.

Evaporative emissions are VOM only and are continuously emitted from an engine's fuel system, whether the engine is running or not. Evaporative and exhaust VOM emissions were calculated separately for most mobile source categories in this inventory, but for purposes of this report they have been combined. Evaporative emissions do not include VOM emissions that occur during refueling.

Refueling emissions are a third category of mobile source emissions. Refueling emissions are entirely VOM. Although they result from the evaporation of fuel, they are distinct from, and not directly related to, evaporative emissions as defined above. Refueling emissions have two subcomponents:

- Displacement emissions. These occur when new fuel is transferred into a partly filled tank (be it a service station storage tank, a portable fuel container or gas can, or a vehicle or engine's fuel tank), displacing the air in the tank and forcing that vapor-rich air out the inlet pipe or other vent. There are two stages of displacement emissions:
  - "Stage I" emissions occur when the underground storage tanks at a service station are being refilled;
  - "Stage II" emissions occur when a motor vehicle (or gas can) is being refueled.
- Spill emissions. These occur when drops of fuel drip or splash on the ground during or after refueling and evaporate away.

Refueling emissions from on-road sources occur almost entirely at commercial or private service stations and have been included in the area source category.

Off-road sources also have refueling emissions. Some off-road sources (e.g., locomotives, aircraft, and boats) are refueled at fixed locations. However, many small non-highway sources (e.g., lawnmowers) are refueled where they are used from mobile or portable tanks or fuel containers. In this inventory, refueling emissions from off-road categories (except aircraft refueling) are not reported separately from exhaust and evaporative emissions, but rather are included in the reported overall off-road VOM emissions. Emissions from portable fuel containers are included in the area source category.

5.1 On-Road Mobile Source Inventory

The inventory of on-road mobile source emissions contains Illinois EPA's estimates of the amounts of NOx and VOM from highway vehicles statewide by county as calculated using USEPA's MOVES model. Exhaust and evaporative emissions were calculated separately but have been combined for this report. The MOVES model allows data to be pre-aggregated to different levels. Pre-aggregating data at a higher level than hourly reduces the time necessary for a calculation. An hourly run may take hours for a single county. The calculation of daily emissions was deemed to be quick enough so no pre-aggregation was performed. The estimates given here for on-road sources do not include refueling emissions. On-road motor vehicle refueling emissions are found in Section 4.

5.1.1 On-Road Motor Vehicle Types

Emissions are reported for the vehicle types for which the MOVES emission factor model reports emissions for the submittal of data to USEPA. The vehicle types used in this inventory are:

- Buses
  - Intercity
  - School
  - Transit
- Cars
- Motor Homes
- Motorcycles
- Trucks
  - Combination Long Haul
  - Combination Short Haul
  - Light Commercial
  - Passenger
  - Refuse
  - Single Unit Long Haul
  - Single Unit Short Haul

Different types of vehicles have different emission characteristics. Larger and heavier vehicles emit more than smaller, lighter vehicles using the same fuel. Generally speaking, diesel vehicles also emit less VOM but more NOx than their gasoline equivalents.

5.1.2 Model Input Data

The MOVES model allows the use to input various data used to calculate emissions into the model's database. If the user is sufficiently skilled, he can enter data directly into the database. Another method to import data into the database is to create a spreadsheet that includes multiple tabs. Each of those tabs represents a different table in the database. An XML file is created that tells MOVES which spreadsheet to use and which tabs of the spreadsheet are to be imported. This is the methodology the Illinois EPA used. A spreadsheet was created for each county and was imported into the database. The tabs of the spreadsheet and a description of the type of data in the tab are described in the table below.

Table 5-1: User Supplied Data for MOVES Model

Spreadsheet Tab	**Description of Data in Tab**
Age Distribution	The fraction of vehicles of a certain age for a given vehicle type.
Average Speed Distribution	The fraction of traffic for a given vehicle type, road type, hour of day and speed bin.
Day VMT Fraction	The fraction of VMT for a given vehicle type, month, road type and day.
Fuel Formulation	The RVP, sulfur level, ethanol volume, aromatic content, olefin content, benzene content of a fuel.
Fuel Supply	The market share of a given fuel for a particular month.
Fuel Usage Fraction	The fraction of each fuel type used in a given vehicle type
Hour VMT Fraction	The fraction of VMT for a given vehicle type, road type, day and hour.
HPMS VType	VMT for a given vehicle type
I & M Coverage	Type of program, inspection frequency, applicable model years, compliance factor. This data was provided only for the counties that are in a nonattainment area.
Month VMT Fraction	The fraction of VMT for a given vehicle type and month.
Road Type	The fraction of ramp traffic for a given road type.
Road Type Distribution	The fraction of VMT for a given vehicle type and road type.
Source Type	Number of vehicles for a given vehicle type.
Zone Month Hour	The temperature and relative humidity for a given month and hour of the day.

This information, and other data internal to MOVES (e.g., emission factors) was then used by the MOVES model to calculate emissions.

5.1.3 On-Road Mobile Source Emissions Summary

Table 5-2 is a summary of the on-road mobile source emissions in tons per year. Detailed tables of on-highway mobile source emissions are given in the appendices.

Table 5-2: On-Road Mobile Source Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	139.63	50,321.16	65.10	22,587.95
DuPage	35.09	12,658.17	15.27	5,299.95
Grundy Twps	0.88	317.20	0.33	112.60
Kane	17.15	6,179.09	7.91	2,742.55
Kendall Twps	1.55	561.24	0.79	275.65
Lake	24.90	8,981.73	11.25	3,904.71
McHenry	10.50	3,789.81	5.09	1,773.17
Will	25.47	9,172.26	10.76	3,712.42
Chicago NAA	**255.18**	**91,980.66**	**116.49**	**40,409.00**
Madison	14.11	4,904.63	5.57	1,788.35
Monroe	1.75	607.59	0.73	234.11
St. Clair	13.30	4,620.29	5.30	1,704.04
Metro-East NAA	**29.16**	**10,132.51**	**11.60**	**3,726.49**
Attainment Area	**207.67**	**72,660.59**	**90.99**	**29,633.89**
State Total	**492.01**	**174,773.76**	**219.08**	**73,769.38**

5.2 Off-Road Mobile Source Inventory

Off-road modes of transportation include trains (i.e., locomotives), aircraft, ships and boats, and motor vehicles used off-road. Several factors make off-road emissions important in Illinois. Illinois is at the heart of commercial aviation and the railroad network in the United States and much of the waterborne commerce originates in or passes through Illinois waters. In particular, the Chicago and the St. Louis area are both major centers of air and rail traffic. O'Hare Airport in Chicago is one of the busiest in the world. Waterborne commerce on the Illinois, Mississippi, and Ohio Rivers and on Lake Michigan is considerable, and the state is well supplied with rivers and lakes where much recreational boating takes place.

5.2.1 Railroad Locomotives

Rail traffic in Illinois is powered almost entirely by diesel locomotives. Most rail traffic in Illinois is freight, but there are several major Amtrak passenger routes in Illinois and an extensive diesel-powered commuter rail network (METRA) centered on Chicago. The major (Class I) railroads – Burlington Northern, Santa Fe, Canadian National, Canadian Pacific, CSX, Kansas City Southern, Norfolk Southern, and Union Pacific – all operate in Illinois, and most rail traffic is on their routes. There are also nearly 40 regional and short lines in the state. Most of these smaller railroads are very small – a few miles of track and an engine or two – but some have several hundred miles of track in the state and transport millions of tons of freight.

5.2.1.1 Calculation of Emissions

Illinois EPA used calculated emissions from locomotives by growing emissions from 2011. The growth factor was obtained from the NODA. The NODA presented emissions for 2011 and 2017. A growth factor was calculated by interpolating between 2011 and 2017 to obtain the 2014 growth factor. The growth factor, which differed for NOx and VOM for each locomotive type, was then applied to the 2011 inventory value. The growth factors are presented in Appendix F.

5.2.1.2 Railroad Locomotive Emissions

The following table represents the emissions of railroad locomotives.

Table 5-3: Railroad Locomotive Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	10.00	3,649.20	0.45	163.33
DuPage	2.85	1,041.63	0.13	47.28
Grundy Twps	0.31	111.93	0.01	4.98
Kane	2.28	832.54	0.10	37.76
Kendall Twps	0.11	41.32	0.01	1.84
Lake	1.89	690.30	0.08	30.31
McHenry	0.50	183.38	0.02	8.35
Will	2.86	1,043.70	0.13	45.99
Chicago NAA	**20.81**	**7,594.02**	**0.93**	**339.84**
Madison	1.76	641.17	0.08	29.39
Monroe	2.00	729.63	0.09	32.93
St. Clair	1.68	612.44	0.08	27.81
Metro-East NAA	**5.43**	**1,983.24**	**0.25**	**90.13**
Attainment Area	**80.92**	**29,534.16**	**3.65**	**1,330.88**
State Total	**107.15**	**39,111.42**	**4.82**	**1,760.85**

5.2.2 Aircraft

This inventory deals with aircraft emissions at Public Use Airports and military airfields in Illinois. There are many small, private airstrips and restricted landing areas scattered around the state. These airstrips are not public use in that they are not open to the flying public. Data, in general, is not available for these private airstrips, but few have more than a handful of operations a month involving small piston engine aircraft which results in extremely negligible emissions. Emissions from these private airstrips have not been included in the inventory.

5.2.2.1 Aircraft Description

The FAA recognizes four categories of aircraft operations:

- Air Carrier or Commercial operations: large aircraft capable of carrying more than 60 passengers or 18,000 pounds cargo, i.e., scheduled major airline operations.
- Air Taxi operations: smaller aircraft than air carrier, i.e., small-scale passenger operations.
- General Aviation: all other non-military aircraft operations including private, business, and civilian government operations.
- Military: all operations by military aircraft.

The FAA collects and publishes statistics on these categories for many airports nationwide. Large commercial airports usually have detailed information on aircraft operations by various aircraft makes and models and sometimes even engine types.

There are two basic types of aircraft engines:

- Turbine, turboprop, or turbojet engines which power virtually all military and commercial and many business aircraft. These use jet fuel, a kerosene blend of low volatility.
- Piston engines which power most small general aviation aircraft, private planes, and some business aircraft. These use a special high-octane aviation gasoline.

These aircraft operate chiefly in five modes:

- Taxi/Idle: at very low power when idling or during taxiing before taking off or after landing.
- Takeoff: at full power during takeoff until the aircraft is about 500 feet above the ground.
- Climbout: at slightly reduced power during which the aircraft climbs to its cruising altitude.
- Cruise: at further reduced power level at cruise where the aircraft maintains a constant speed and altitude.
- Approach: at a moderate to low power level during descent and the approach to landing.

Cruising emissions are not included in the inventory.

5.2.2.2 Estimating Emissions from Aircraft Operations

Emission factors for aircraft are usually expressed as mass of pollutant per LTO and are derived from measurements made by engine manufacturers. The emission factor for a given aircraft is a function of the make and model of the aircraft and its engine(s), the number of engines on the aircraft, the fuel flow rate for each mode, and the time the aircraft spends in each mode.

Emissions are calculated by summing the emission factors from each of the four modes of operation (taxi, takeoff, climbout, and approach) to obtain a single emission factor for a single LTO. This value is then multiplied by the number of LTOs for the given aircraft/engine type to obtain emissions. This calculation was performed using EDMS (Version 5.1.3).

In addition, APUs are small turbine engines installed in the hulls of many large and medium aircraft to generate electricity and compressed air to keep the aircraft's systems operating when the main engines are off. APUs use jet fuel and generate exhaust emissions like the main engines do. Most aircraft in the commercial category have APUs, but comparatively few air taxi or general aviation aircraft have them. APU emissions were also calculated using EDMS.

5.2.2.3 Aircraft Emissions

The following tables are the emissions calculated for aircraft for the 2014 inventory.

Table 5-4: Aircraft Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	17.71	5,526.48	3.32	861.15
DuPage	0.01	4.75	0.03	9.27
Grundy Twps	0.00	1.65	0.01	3.56
Kane	0.01	2.36	0.02	4.95
Kendall Twps	0.00	0.01	0.00	0.03
Lake	0.01	3.07	0.02	6.26
McHenry	0.01	3.45	0.02	7.57
Will	0.02	8.88	0.05	18.04
Chicago NAA	**17.78**	**5,550.66**	**3.38**	**910.83**
Madison	0.01	3.31	0.02	6.80
Monroe	0.00	0.22	0.00	0.47
St. Clair	0.03	8.92	0.06	19.33
Metro-East NAA	**0.04**	**12.45**	**0.08**	**26.61**
Attainment Area	**0.77**	**283.56**	**0.50**	**186.20**
State Total	**18.59**	**5,846.67**	**3.96**	**1,123.64**

Table 5-5: Emissions from APUs

Airport	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Midway	0.09	31.70	0.01	2.48
O'Hare	0.33	120.24	0.03	12.67

5.2.3 Commercial Marine Vessels

This category includes large cargo ships, passenger ships, oil tankers, etc., powered by steam or internal combustion engines and used for commercial purposes such as transport of passengers, cargo movement, commercial fishing, and the like. Tugboats and pushboats, both used in harbors and to propel barges on rivers, are included in this category. Emissions for pleasure boats are not included in this category, but rather in the other non-road engines and vehicles category.

LADCO funded a study (Emission Inventory Assistance for Commercial marine Vessels on the Great Lakes and Major Midwest Rivers – September 2015) by Enercon Services Inc. to provide a better estimate of emissions for the Region V states. The emissions provided in this report were for the calendar year 2013.

Table 5-6: Commercial Marine Vessel Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	6.73	1,378.95	0.21	42.73
DuPage	0.11	23.43	0.00	0.67
Grundy Twps	0.87	179.06	0.03	5.16
Kane				
Kendall Twps				
Lake	1.45	297.23	0.02	4.46
McHenry				
Will	1.67	342.61	0.05	9.87
Chicago NAA	**10.84**	**2,221.27**	**0.31**	**62.89**
Madison	2.58	528.26	0.07	15.22
Monroe	4.53	929.23	0.13	26.77
St. Clair	1.62	331.82	0.05	9.56
Metro-East NAA	**8.73**	**1,789.31**	**0.25**	**51.54**
Attainment Area	**61.14**	**12,534.19**	**1.76**	**361.06**
State Total	**80.70**	**16,544.77**	**2.32**	**475.49**

5.2.4 Other Off-Road Engines and Vehicles

This category includes all other portable motorized equipment, from lawnmowers to forklifts, and farm tractors to earthmoving equipment. Engines are powered by spark-ignition (usually fueled by gasoline) and some by compression ignition (diesels). There are two types of spark-ignition engines: 2-stroke and 4-stroke. The three types of engines, 2-stroke, 4-stroke, and diesel, have very different emission characteristics, so they are treated separately in the inventory. Some off-road emission sources use CNG or LPG as a fuel.

For this inventory, Illinois EPA used the MOVES model from USEPA to estimate off-road emissions by county. Fuel and temperature data previously compiled for on-road sources was also used to calculate off-road emissions. The equipment populations included with MOVES were not modified and were used as they existed in the model.

Emissions calculated for other off-road engines and vehicles for the 2014 inventory are as follows:

Table 5-7: Other Off-Road Engine Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	35.20	10,139.91	46.26	10,659.62
DuPage	8.90	2,632.76	12.46	3,070.44
Grundy Twps	0.55	97.85	1.28	198.96
Kane	6.63	1,824.92	6.57	1,549.15
Kendall Twps	0.54	165.34	0.99	585.38
Lake	9.86	2,324.14	18.60	3,785.90
McHenry	4.82	1,253.36	5.35	1,140.72
Will	8.53	2,286.15	9.11	1,932.57
Chicago NAA	**75.05**	**20,724.42**	**100.62**	**22,922.74**
Madison	4.18	951.45	6.45	1,188.02
Monroe	1.45	262.42	2.02	303.01
St. Clair	3.26	729.17	3.97	738.60
Metro-East NAA	**8.88**	**1,943.05**	**12.44**	**2,229.63**
Attainment Area	**170.95**	**32,636.44**	**195.50**	**44,266.91**
State Total	**254.88**	**55,303.91**	**308.56**	**69,419.28**

5.2.5 Total Off-Road Engine Emissions

The following table is the total of the commercial marine vessels, locomotives, aircraft, and other off-road engine emissions.

Table 5-8: Total Off-Road Engine Emissions

County	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Cook	70.06	20,846.49	50.19	11,741.98
DuPage	11.89	3,702.57	12.63	3,127.68
Grundy Twps	1.73	390.49	1.33	212.67
Kane	8.92	2,659.81	6.69	1,591.85
Kendall Twps	0.66	206.67	1.00	587.25
Lake	13.22	3,314.74	18.73	3,826.92
McHenry	5.34	1,440.20	5.39	1,156.64
Will	13.08	3,681.34	9.33	2,006.46
Chicago NAA	**124.89**	**36,242.32**	**105.28**	**24,251.45**
Madison	8.52	2,124.20	6.62	1,239.43
Monroe	7.98	1,921.50	2.24	363.18
St. Clair	6.58	1,682.40	4.15	795.31
Metro-East NAA	**23.08**	**5,728.11**	**13.01**	**2,397.93**
Attainment Area	**313.79**	**74,994.84**	**201.41**	**46,145.79**
State Total	**461.76**	**116,965.27**	**319.71**	**72,795.16**

6 Quality Assurance

6.1 Purpose of the Inventory

The objective of this emission inventory is to present an accurate and comprehensive account of ozone precursor emissions from point, area, and mobile sources for the entire State of Illinois in accordance with the requirements of the CAA. The ozone precursors included in the inventory are NOx and VOM. Emissions presented in the 2014 emission inventory are typical summer day and annual.

6.2 Scope of the Quality Assurance Plan

The Illinois EPA has implemented quality assurance (QA) procedures and quality control (QC) checks at various stages in the inventory process. The QA preparations involved in the development of the emission inventory were based on the procedures as outlined in the USEPA's publications EPA-450-4-88-023, *Guidance for the Preparation of Quality Assurance Plans for O3/CO SIP Emission Inventories* and EPA-450/4-91-022, *Quality Review Guidelines for 1990 Base Year Emission Inventories* and Illinois EPA's document, *Illinois Environmental Protection Agency Point Source Emissions Inventory Quality Assurance/Quality Control (QA/QC) Plan* by the Radian Corporation (November 1991). Details of the QA program are discussed in the following sections.

6.3 Summary of QA Activities

In general, four basic stages were involved in the preparation of the 2014 emission inventory: planning, data collection, data analysis, and data reporting. Data analyses include estimation of emissions for point sources that failed to report ozone season emissions in their AER. The reporting stage includes the presentation of summer ozone season data and emission estimates as a finished product in the required format. As a first step, the QA program was conceived earlier in the process and was implemented throughout the various stages of inventory development. Second, the collection of data (or representative samples of it) had undergone review for suitability, completeness, and correctness. Next, all the methodologies used in the calculation of missing or unreported emission data and those methodologies used for various data analyses were all reviewed to ensure the inventory of such emission data were appropriate representations of each respective emission category. Lastly, the finished periodic emission inventory product was checked and audited for completeness and accuracy.

6.3.1 Inventory and QA Planning

Illinois EPA's Air Quality Planning Section inventory staff used a QA plan largely based on requirements according to the CAA and USEPA quality assurance and quality control guidance documents. Also, the overall inventory QA plan was influenced by experiences gained in the development of previous inventories.

6.3.2 Resource Allocation for QA

In-house quality assurance activities required a person with experience and authority to carry out QA duties. The QA coordinator (QAC) interacts directly with the inventory staff or specialists for point, area, and mobile sources. The person responsible for this activity is the manager of the Inventory and Data Support Unit of the Air Quality Planning Section. As of the creation of this inventory, there were four staff under this manager whose jobs are to compile the point source inventory, review AERs, and compile the area source inventory.

6.3.3 Schedule and Project Planning

The Air Quality Planning Section's inventory staff's experience in the compilation of previous inventories was drawn upon in preparing the QA plan for the 2014 emission inventory.

To prepare the 2014 AER data for inventory use, inventory staff reviewed the emission data that was submitted. The experiences in such review were also included as bases in developing the QA plan for this inventory. Many data range checks are built into the CAERS and ISSIS systems. This ensures values entered into the database are within acceptable levels such as those ranges of values for parameters indicated in Section 6.4. Knowledge that such input value ranges are automatically validated contributed to the overall design of the QA plan.

As permits are issued, the emission data contained in the permit and application are compiled into the point source emission inventory by the inventory staff. Each source that is added to the inventory is reviewed for correctness and completeness by the Unit Manager. This review also contributes to the contribution of the overall design of the QA plan.

A review of the results of the AER data became the groundwork for planning and scheduling the QA efforts for the 2014 inventory. Specific key parameters identified in the inventory were tagged as a potential focus for QA work and incorporated in the planning for reviewing the point source emissions data.

The inventory staff charged with the mobile and area source portions of the inventory began their parallel QA efforts to enable a timely completion of the inventory. For on-road and off-road sources, review of emission factors was primarily confined to QA of the inputs to the appropriate model. The non-road source methodology and emission data were compared with previous studies done on this category.

6.4 QA Technical Information

As noted above, the emission inventory system the DAPC uses contributes to the overall quality assurance aspect for this inventory. The emission inventory data has already been range checked for the following parameters:

- Stack height ≤ 1250 feet
- Stack diameter ≤ 99.99 feet
- Hours per year ≤ 8760
- Peak ozone season hours ≤ 2208
- Weeks per year ≤ 52
- Peak ozone season weeks ≤ 13
- Days per week ≤ 7
- Hours per day ≤ 24
- Seasonal throughput totals = 100 percent

In addition to the validation of input data ranges, ISSIS and CAERS also perform automated validation of codes such as NAICS and SCC. With such tasks performed, the inventory staff is more focused on reviewing key parameters and other aspects of the inventory that may significantly affect the accurate representation of typical summer weekday emissions.

6.4.1 Prioritizing Sources and Data Elements

The data elements of the 2014 periodic emission inventory were based on the source-reported emissions for 2014. This reported data was deemed more representative compared to the emissions from growing a previous point source inventory. An analysis was performed by comparing the emission level in 2011 and 2014 on a point-by-point basis. With tens of thousands of records statewide to QA for purposes of this inventory, this methodology helped to focus resources towards emission points that were found to have a significant increase or decrease in emissions from 2011 to 2014.

Sources whose summation of emissions from the individual emission units at the source were significantly different than the source-reported total were sent a letter identifying the discrepancy. As revised data was received, it was checked to make sure the error was corrected. This updated data was entered into ICEMAN and used for the inventory.

6.4.2 Data Sources and Checking Procedures

Although the data used in the point source emission inventory came directly from the sources themselves, some data were deemed incorrectly represented and corrected accordingly. If necessary, all possible sources of information were used in this QA effort, including AERs from previous years, to determine reliability of the data for inclusion in the inventory. The inventory staff assessed all data that were presented and took into account the capabilities and biases of the organization supplying the data, the techniques used to collect the data, and the purpose for which the data had been compiled. All of these provided an overall understanding of the limitations of reported data and served as a guide in choosing the best data for use in the inventory.

All reported data from a source’s 2014 AER were checked and entered into CAERS. The point source reported data were reviewed and, in general, found acceptable as most companies had provided the necessary information required by Illinois EPA. Area source data, such as census and meteorological information, landings and takeoffs at airports, etc. came from federal or state government sources and are relatively accurate and found to be appropriate for use in this inventory. Data from high-quality sources are still subjected to QA checks for relevance and suitability for the inventory.

As an example, with the problems in the agricultural field burning category methodology developed by USEPA for the 2011 inventory, Illinois EPA scrutinized the new methodology for 2014. Once again it was found that USEPA’s methodology was over estimating the amount of acres burned. This was discovered by checking Google Earth images of the area the USEPA’s data said were part of a field burn. The Illinois EPA was able to find some cases where the Google Earth image was taken shortly (a matter of days, or in the case of one example, the same day) after the supposed burn. In all cases, there was no apparent burn area on the Google Earth image. Illinois EPA agrees that Illinois does have some agricultural field burning, but it is nowhere near at the level identified by USEPA. To account for that, the Illinois EPA divided the amount of acres burned by 10 for the inventory.

Review of the emission data was generally performed several times in the inventory development process. The inventory staff reviews the data as presented by each source to Illinois EPA. The QA Coordinator, through comparative analysis and other database review/manipulations, sorts and flags suspect emission points and values and returns them to the responsible inventory staff for another round of QA review and scrutiny. Finally, after the consolidated emission results are finalized, the inventory staff performs a last review of emission values for inclusion in the inventory. The second independent QA check is more formal than the other two and is usually done on a sample of the data. The first and third checks cover all data used.

6.5 Data Collection and Analysis

The following sections describe Illinois EPA's plans in collecting and analyzing emission data and the QA procedures used by the inventory staff in evaluating them.

6.5.1 Identification of Emission Sources

For point sources, all sources that (a) are located in the State of Illinois and (b) are shown to have emissions of NOx or VOM are automatically included in the inventory. Illinois EPA is confident all significant point sources are included in ISSIS. The Illinois EPA also identified sources that were known to have operated in 2014 but which did not have their emission data entered into the system by the end of 2014.

The 2011 periodic emission inventory was used as a comparison for all point emission categories in the 2014 inventory. The 2014 area source categories were also checked against the 2011 inventory. All area source and mobile source categories listed in the federal guidance are included in the inventory. Illinois EPA checks MOVES model inputs (particularly temperatures and volatility) and VMT data for completeness, in order to ensure their suitable use in the model.

For area sources, work performed by the USEPA for the 2014 inventory was used to identify additional source categories that may have not been calculated in previous years. There were very few categories that were not already inventoried (and some were exclusively in the point source inventory) and they were included in the inventory. With the USEPA's area source data not necessarily being final at the time of this document, Illinois EPA will continue to monitor the calculation methodology and categories for inclusion in the 2017 inventory.

6.5.2 Data Quality

To ensure the emission inventory is of the highest quality, QA procedures were in place for evaluating the quality and reliability of data for use in the inventory. These evaluation processes enable the inventory staff to make informed choices between sources of information, especially if the data from one source differs significantly in comparison with those that were obtained from another source. Also, the evaluation process allows the inventory staff and users of the inventory to make informed judgments about the validity of the emissions in any particular category.

Representative QA actions include checking the base year relevancy of the data; the use of 2014 data where possible, is emphasized. However, if such base year data are unavailable, the most recent reliable data is used and noted accordingly in the inventory documentation.

Data were crosschecked with similar published data. Appropriate caution was taken in the choice of "other published data," especially when such data may have originated from the same source that produced the original data. In such cases, the actual data is not easily verifiable, but some credibility and support is given for such data, especially when an independent organization had chosen to publish such data. Checking 2014 inventory data against those reflected in the past year or years is useful since magnitudes and trends may be verified in this manner.

Some QA actions were more subjective, i.e., the judgment and experience of the inventory staff is important in these evaluations. The professional capabilities and biases, if any, of the suppliers of the data were taken into consideration, including the purpose for which the data were collected. Data organized by government agencies for taxation purposes (e.g., gasoline sales) and industry information on purchases and sales of materials and products (e.g., coal usage at the power plant), were considered of acceptable quality since both entities have a specific incentive to obtain the most accurate information. Data collection techniques, if known, were assessed accordingly. For example, information from plant inspections was considered more reliable than data from mail surveys. However, unless the inventory staff or the QA Coordinator had any significant comment about one or more of these subjective assessments (for example, when one source of data for a category was chosen over another), such assessments, as a rule, are not part of the inventory documentation.

6.5.3 Emission Estimation Methods

Illinois EPA estimates emissions following the procedures outlined in these USEPA publications:

- EPA-450/4-88-019, Inventory Requirements for Post-1987 Ozone State Implementation Plans, December 1988
- EPA-450/88-021, Procedures for the Preparation of Emission Inventories for Precursors of Ozone: Volume I, Third Edition, December 1999
- EPA-450/4-81-026d (Revised), Procedures for the Preparation of Emission Inventories for Precursors of Ozone: Volume IV: Mobile Sources, July 1989
- AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition, January 1995 and supplements

Where specific USEPA guidance was not available, Illinois EPA used generally accepted engineering principles, calculations, and judgment, supplemented by technical information from other sources, in estimating emissions. In all such cases, the method, data, and other relevant information were identified accordingly.

The emission estimates were adjusted to reflect conditions on a typical 2014 summer weekday as follows:

- Point Sources: Emissions were calculated using peak ozone season emission rates from source-submitted 2014 AERs.
- Area Sources: Emissions were calculated using seasonal adjustment factors such as those reflected in USEPA guidance and by adjustments for representative 2014 summertime temperatures and volatility for certain categories (e.g., storage of gasoline and other VOM).

6.5.4 Consistency with Other States

Several conference calls were held for the 2008 inventory development process with the states of Indiana, Michigan, Minnesota, Ohio, and Wisconsin through LADCO to identify the emission factors or calculations methods to be used in calculating emissions from certain area source categories. There were no significant changes with the 2011 or 2014 inventory to warrant additional calls. Having a consistent approach in calculating area source emissions has been greatly improved since USEPA has been making the data and calculation methodology available before the inventory is to be developed.

6.5.5 Calculations and Data Handling

Computers were employed in all calculations for the inventory. Arithmetic errors are minimized in these calculations. Typographical errors and incomplete algorithms are of concern. The entry of point source emissions from AERs are monitored at different points in the process. Once data from the AER is entered, the emissions from the individual emission units are summed and compared to the reported total. The reports receive another level of inspection when they are reviewed. And finally, the point sources are check by means described elsewhere in this part of the document. Typographical errors should be at a minimum.

Computerized information was stored on the BOA's network and was backed up nightly. Original inventory data continued to be maintained in the database. This data was extracted from the database and was maintained in an Access® database on the network. The Access® database was manipulated to obtain the 2014 point source inventory.

6.5.6 Validation Procedures

Point and area sources were also checked against the list of categories shown in the QA Guidance to ensure all emission categories were covered.

- Data consistency: The input and output data are consistent with USEPA guidance documents as to the (1) area of coverage, (2) pollutants, (3) methodologies, and (4) units of measurement employed.
- Area covered: This inventory was compiled on a statewide basis.
- Pollutants covered: Ozone precursors NOx and VOM were inventoried in accordance with USEPA guidance requirements.
- Double-counting of emissions: This could occur in categories which have both point and area source emissions represented in the inventory (e.g., the dry cleaning category). The category's point source emissions are assumed to be included in the total or gross emissions, which are generally estimated based on a surrogate factor such as population. The net area source emissions are then calculated by subtracting the calculated point source emissions from the total in order to avoid accounting for point source emissions twice. Some other area source categories which have the potential for double counting of emission are Graphic Arts and Commercial/Institutional fuel use. These were reviewed to make sure no double counting occurred in the inventory.
- Methods and units used: This procedure ensures the methods of calculations employed are consistent with USEPA guidance and usage of such units is correct.

6.6 Data Handling

6.6.1 Data Coding and Recording

Coding and recording of data into the ISSIS and CAERS database is done by trained inventory staff and is subject to standard operating procedures (SOPs). Similarly, updates and corrections discovered in the course of QA efforts were updated by the inventory staff. Any changes to the database are monitored and reviewed by the Inventory and Data Support Unit Manager. QA of information was further carried out by the QA Coordinator before any inclusions were considered into the 2014 inventory.

6.6.2 Data Tracking

Illinois EPA keeps its data and calculations mainly on personal computers and/or the BOA's network. Raw data, especially for area sources, are obtained in various forms which are kept in files by the inventory staff for future reference purposes. Such files may include other information (e.g., sample calculations, estimates, sources of information, various relevant notes, and correspondence, etc.) also for reference purposes. Any data in electronic form was backed up so that every file is available for quick recovery and reconstruction of data. All AERs are now imaged after they are reviewed which yields another level of data security.

6.6.3 Correcting Data

When an inventory staff member discovers an error in reported data, the data are corrected in both the extracted data for the inventory and the originating data source. First, the person identifying the error consults with the Inventory and Data Support Unit Manager to determine whether a correction is truly necessary. If a correction is warranted, the person responsible for maintaining the extracted data is notified on what changes to make to that data set. Updates to the originating data set are performed by the inventory staff designated by the Inventory and Data Support Unit Manager.

6.6.4 Missing Data

This applies mainly to point source data. As noted above, missing emission data was not a major problem for Illinois EPA, but point source data have been known to be missing or in error for many small sources, and their absence, while not affecting emission totals, could be significant. For point sources, permit data has been used to obtain estimated values for missing data. In other categories, missing data, if they occurred, were treated as data needing correction and dealt with accordingly. Where any missing data could not be obtained, a note was made of the fact, and suitable values estimated. The methods used to estimate the data is documented in detailed records.

6.7 QA Audits

6.7.1 Internal

The Illinois EPA did not perform a complete internal or agency QA audit during its work on the 2014 inventory. Compilation of the 2014 inventory differs slightly from past inventories. USEPA continues to provide a common set of data (e.g., population, employment, etc.) and procedures for use in compilation of the area source component of the inventory. The Illinois EPA gave preference to available 2014 data since much of USEPA’s data was for 2013 or older. The Illinois EPA also gave preference to data sources it had used in the past to maintain a consistent inventory throughout the years.

A review of the initial data in the point source inventory was compared against the annual totals reported on the source's AER. Sources where the difference was greater than 10 tons were reviewed and updated as necessary.

6.7.2 External

The 2014 inventory data was required to be submitted to the USEPA by December 31, 2015. In early 2016, USEPA was providing some preliminary QA reports to the states. Based on the current reports available to Illinois EPA, there do not seem to be any significant problems. Most of the issues identified are minor in nature. In fact, some of the issues identified by USEPA are items previously identified by Illinois EPA that did not warrant corrections (e.g., significant change in emissions from a previous inventory). Issues that USEPA found that Illinois did revise in the inventory were related to hazardous air pollutants. QA reports provided by USEPA will be reviewed and appropriate data will be corrected. At this time, there does not seem to be a need to change previously calculated emissions or add new area source categories to the inventory.

7 Conclusion

This report summarizes and documents Illinois' 2014 inventory of ozone precursor emissions. This report includes emissions for the entire state, plus identification of emissions for the two nonattainment areas of the state and the remaining attainment area. The inventory was developed using actual 2014 emissions and data except in cases where noted.

This document presents the 2014 base year ozone inventory for both typical summer day and annual emissions for NOx and VOM from point, area, on-road mobile, and off-road mobile sources for the State of Illinois. In producing this document, Illinois EPA has followed the procedures outlined in USEPA's guidance documents pertaining to both preparation and quality assurance of the inventory and therefore believes the inventory to be complete, accurate, and of high quality.

Table 7-1: Emission Summary by Area

Area	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Chicago NAA	496.62	179,384.02	480.41	149,002.89
Metro-East NAA	77.05	24,776.88	53.05	15,686.76
Attainment Area	851.92	245,343.58	1,425.61	197,049.75
State Total	**1,425.61**	**449,503.62**	**1,195.83**	**361,740.27**

Table 7-2: Statewide Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	28.1	22.2	12.3	11.7
Area	5.0	12.9	42.7	47.8
On-Road	34.5	38.9	18.3	20.4
Off-Road	32.4	26.0	26.7	20.1

Table 7-3: Chicago NAA Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	17.3	9.6	9.7	8.5
Area	6.2	16.7	44.2	48.2
On-Road	51.4	47.2	24.2	27.1
Off-Road	25.1	26.6	21.9	16.3

Table 7-4: Metro-East NAA Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	30.2	29.2	17.7	19.7
Area	2.0	6.8	35.9	41.2
On-Road	37.8	40.9	21.9	23.8
Off-Road	30.0	23.1	24.5	15.3

Table 7-5: Attainment Area Emission Contributions (percent)

Category	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Point	34.2	30.1	13.8	13.5
Area	4.5	9.7	42.1	48.0
On-Road	24.4	29.6	13.7	15.0
Off-Road	36.8	30.6	30.4	23.4

Table 7-6: Geographic Contributions (percent)

Area	NOx Daily	NOx Annual	VOM Daily	VOM Annual
Chicago NAA	34.8	39.9	40.2	41.2
Metro-East NAA	5.4	5.5	4.4	4.3
Attainment Area	59.8	54.6	55.4	54.5

Appendix A

2014
Statewide Emissions by Category

Table A-1: Statewide Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Point Sources				
External Fuel Combustion				
Electric Generation				
Coal	141.74	45,106.08	4.29	1,372.90
Distillate Oil	0.03	0.63	0.00	0.01
Natural Gas	1.95	133.95	0.09	10.49
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Other	0.00	1.54	0.00	0.02
Industrial				
Coal	12.63	4,583.29	0.12	43.69
Distillate Oil	0.21	31.81	0.00	0.37
Natural Gas	14.84	4,378.92	0.81	264.80
Process Gas	2.44	841.08	0.07	25.90
Residual Oil	0.03	7.29	0.00	0.15
Other	0.46	98.77	0.02	6.06
Commercial/Institutional				
Coal	0.55	192.55	0.01	2.11
Distillate Oil	0.41	33.50	0.01	0.38
Natural Gas	5.86	1,793.38	0.28	87.72
Process Gas	0.11	37.38	0.01	2.06
Residual Oil	0.00	0.00	0.00	0.00
Other	0.03	2.84	0.00	0.12
Space Heating				
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.08	96.52	0.00	5.26
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	12.03	240.79	0.50	6.91
Landfill Gas	2.31	719.29	0.40	125.27
Natural Gas	20.10	1,269.72	2.14	124.10

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	4.26	59.12	0.11	1.32
Distillate Oil	12.61	595.12	0.50	50.03
Natural Gas	90.55	19,561.93	4.49	973.22
Other	0.19	13.46	0.01	1.34
Commercial/Institutional				
Distillate Oil	9.12	247.98	0.36	12.20
Landfill Gas	0.00	0.00	0.00	0.00
Natural Gas	2.03	156.03	0.42	19.62
Other	0.00	0.00	0.00	0.00
Engine Testing				
Diesel	1.18	338.46	0.18	60.82
Distillate Oil	0.40	97.57	0.02	3.70
Jet Fuel	0.01	0.02	0.00	0.00
Other	0.05	3.34	0.08	13.35
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.17	54.04
Ammonia	0.35	128.10	0.10	37.65
Cellulosic Fiber	0.00	0.00	5.52	1,922.89
Fixed Roof Tanks	0.02	5.62	0.06	18.43
Ink			0.62	160.22
Nitric Acid	0.05	18.59		
Paint	0.00	0.00	1.29	364.53
Pharmaceuticals	0.00	0.87	0.29	48.74
Phthalic Anhydride	0.19	71.63	0.28	173.27
Plastics	0.01	3.91	1.93	616.01
Pressure Tanks			0.00	0.13
Sulfuric Acid	0.00	0.42		
Synthetic Organic Fiber			0.15	36.19
Synthetic Rubber			0.04	12.39
Urea			0.00	0.17
Varnish			0.05	10.88

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other	1.69	510.19	9.96	2,740.59
Fuel Combustion	1.95	621.73	0.30	111.42
Fugitives	0.00	0.00	1.33	449.45
Food/Agriculture				
Bakeries	0.06	18.05	3.14	917.59
Beer			0.00	0.16
Biodiesel			0.06	18.55
Candy	0.00	0.00	0.83	242.97
Coffee	0.00	0.03	0.00	0.03
Distilled Spirits	0.21	71.87	0.26	94.29
Ethanol	0.22	82.03	0.27	97.32
Feed Manufacturing	0.10	37.36	0.07	24.42
Grain Elevators	0.21	40.35	0.07	29.23
Milling	0.27	91.80	3.16	1,107.46
Smokehouses	0.01	3.22	0.12	32.47
Starch Manufacturing	0.43	160.80	0.35	239.23
Vegetable Oil	0.02	6.74	6.64	2,232.52
Other	0.97	308.21	7.97	2,604.40
Fuel Combustion	2.32	629.11	0.69	219.56
Fugitives	0.00	0.00	2.74	995.02
Primary Metal Production				
Aluminum			0.00	2.64
By-product Coke	1.29	431.63	0.20	86.06
Ferroalloy	0.00	0.16	0.00	0.28
Iron	0.01	5.23	0.08	29.46
Steel	3.31	97.26	1.07	276.41
Zinc	0.00	0.00	0.00	0.00
Other	0.00	0.53	0.02	5.15
Fuel Combustion	1.20	365.30	0.06	14.74

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Secondary Metal Production				
Aluminum	0.09	26.66	0.20	66.77
Copper	0.01	3.06	0.08	30.25
Gray Iron	0.08	20.24	1.28	303.73
Heat Treating	0.03	8.75	0.16	43.59
Lead	0.00	0.45	0.00	0.24
Lead Battery			0.00	0.11
Steel	0.09	19.89	0.20	45.48
Zinc	0.17	52.57	0.06	16.14
Other	0.06	11.93	0.69	134.66
Fuel Combustion	1.58	441.72	0.13	30.95
Fugitives			0.00	0.00
Mineral Products				
Asphalt Manufacturing	2.63	279.06	2.48	282.85
Asphalt Roofing	0.00	1.79	0.21	57.99
Brick Manufacturing	0.04	10.35	0.01	2.94
Bulk Materials	0.01	6.11	0.00	1.40
Calcining	1.10	352.16	0.00	1.30
Cement Manufacturing	7.51	1,994.28	0.23	60.99
Concrete Manufacturing	0.01	1.12	0.02	5.91
Glass Manufacturing	8.85	3,115.21	0.27	95.55
Lime Manufacturing	0.00	0.00	0.00	0.00
Sand/Gravel	0.12	57.25	0.03	13.13
Stone Quarrying			0.01	2.50
Other	0.49	171.18	1.25	364.25
Fuel Combustion	1.00	287.01	0.21	35.82
Fugitives			0.00	1.27
Petroleum Industry				
Cooling Towers			0.07	37.03
Desulfurization	0.09	29.41	0.18	58.69
FCCU	0.92	396.44	0.26	85.26
Flares	0.47	91.98	0.93	169.32
Process Heaters	10.55	3,738.02	0.44	155.12

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Waste Water	0.00	0.74	0.71	241.57
Other	0.77	361.48	1.00	408.46
Fugitives	0.05	17.93	1.91	710.72
Paper and Wood Products				
Particleboard			0.01	2.71
Plywood	0.01	0.84	0.02	5.67
Pulpboard			0.08	26.32
Woodworking			0.01	1.49
Other	0.01	0.45	0.23	33.25
Fugitives			0.02	5.21
Rubber and Plastic Products				
Plastic Foam			1.92	667.46
Plastic Products	0.01	2.10	2.08	556.99
Tire Manufacturing	0.00	0.00	1.47	445.93
Other	0.00	0.40	0.38	106.96
Fuel Combustion	0.16	28.11	0.01	1.47
Fabricated Metal Products				
Drum Reclamation	0.00	0.82	0.01	3.28
Plating	0.02	5.15	0.12	31.37
Welding	0.00	0.31	0.02	3.88
Other	0.14	38.84	2.67	573.56
Fuel Combustion	0.58	191.14	0.06	23.33
Fugitives	0.00	0.00	0.01	3.16
Oil and Gas Production				
Crude Oil			0.46	164.06
Natural Gas	5.18	662.11	0.32	73.20
Other	0.00	2.53	0.42	79.29
Fuel Combustion	0.14	41.65	0.01	1.85
Fugitives			0.16	56.08
Miscellaneous Machinery	0.01	1.84	0.32	81.47
Electrical Equipment	0.01	2.52	0.12	38.95
Transportation Equipment			0.08	21.78

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Health Services				
Crematories	0.02	3.99	0.00	0.34
Sterilizers			0.06	15.73
Other			0.00	0.28
Leather and Leather Products			0.11	16.20
Textile Products	0.00	0.92	0.01	1.95
Process Cooling			0.22	77.12
In-Process Fuel Use				
Coal	0.00	0.24	0.00	0.03
Landfill Gas			0.00	0.44
Natural Gas	0.00	0.07	0.00	0.15
Process Gas	2.34	770.63	0.09	31.63
Other	0.27	32.13	0.00	0.46
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.03	2.85	0.47	152.29
Fuel Combustion	0.07	15.40	0.00	6.02
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.43	119.90
Degreasing	0.00	0.00	0.98	253.96
Dry Cleaning			1.58	380.98
Other			0.00	1.75
Fugitives			0.06	6.93
Surface Coating Operations				
Adhesives	0.00	0.16	0.63	160.13
Aircraft	0.00	0.10	0.07	20.60
Automobiles	0.02	5.42	5.30	1,418.95
Coating (general)	0.00	0.65	3.15	795.82
Fabric			0.04	12.48
Flatwood Products			0.53	139.89
Glass	0.00	0.92	0.00	0.07
Large Appliances			0.07	16.05
Magnet Wire			0.01	1.14

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Metal Cans	0.02	7.87	2.26	674.57
Metal Coils	0.00	0.00	0.46	118.09
Metal Furniture			0.40	90.10
Miscellaneous Metal Parts	0.00	1.49	5.70	1,450.71
Ovens	0.89	284.66	0.15	43.26
Paper	0.01	1.98	1.95	494.46
Plastic Parts			1.70	392.63
Steel Drums			0.89	230.87
Thinning Solvents	0.00	0.18	0.31	81.84
Wood Furniture			1.58	417.59
Other	0.00	1.47	1.35	331.75
Fuel Combustion	0.19	70.18	0.03	8.13
Fugitives			0.21	56.40
Petroleum Product Storage				
Fixed Roof Tanks			3.08	954.32
Floating Roof Tanks			3.85	1,414.11
Variable Vapor Space Tanks			0.17	59.10
Fugitives			0.18	59.44
Bulk Terminals/Plants				
Fixed Roof Tanks	0.00	0.00	0.62	208.92
Floating Roof Tanks	0.00	0.03	1.59	599.85
Losses	0.04	13.50	0.64	225.89
Variable Vapor Space Tanks			0.01	3.04
Printing/Publishing				
Cleanup			0.84	238.89
Dryers			0.04	11.49
Flexographic	0.00	1.36	3.08	834.38
Letterpress			0.15	38.57
Lithographic	0.00	0.00	3.60	1,068.79
Rotogravure	0.00	0.13	2.48	837.18
Screen Printing			0.45	102.36
Thinning Solvents			0.22	50.12

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other			0.12	35.91
Fugitive			0.00	0.01
Petroleum Marketing/Transport				
Pipelines			0.00	1.75
Stage I			0.01	5.02
Stage II	0.00	2.14	0.07	17.33
Tank Cars	0.01	3.03	0.41	119.17
Transportation	0.02	14.89	0.35	100.30
Fugitives	0.00	0.00	0.23	81.57
Organic Chemical Storage				
Fixed Roof Tanks			1.18	410.31
Floating Roof Tanks	0.01	1.61	0.19	65.99
Pressure Tanks			0.04	13.12
Organic Chemical Transport			0.68	144.78
Organic Solvent Evaporation				
Evaporation	0.00	0.09	0.05	62.99
Other	0.00	1.10	1.29	373.53
Fuel Combustion	0.12	12.53	0.01	2.05
Solid Waste Disposal				
Government				
Incineration	0.00	0.00	0.00	0.00
Landfills	1.93	552.64	0.82	248.87
Sewage Treatment	0.02	6.29	0.16	43.35
Other	0.00	0.00	0.06	20.81
Commercial/Institutional				
Incineration	0.07	17.08	0.01	0.99
Other	0.00	0.16	0.00	0.58
Fuel Combustion	0.00	0.00	0.00	0.00
Industrial				
Incineration	0.19	71.21	0.02	4.64
Landfills	0.43	127.97	0.05	16.19
TSDFs			0.00	1.02

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other	0.00	0.22	0.05	15.42
Fuel Combustion	0.05	14.98	0.00	1.21
Site Remediation				
Air Stripping			0.05	17.31
Soil Venting	0.01	1.51	0.10	24.98
Other	0.00	0.99	0.22	73.87
Point Source Total	**400.94**	**99,752.50**	**146.84**	**42,344.80**
Area Sources				
Agricultural Field Burning	0.00	34.57	0.00	59.00
Agricultural Pesticide Application			93.72	22,459.50
Aircraft Refueling			4.18	1,255.33
Architectural Coating			53.88	15,070.28
Asphalt Paving				
Cutback			0.00	58.47
Emulsion			1.04	161.57
Automobile Refinishing			2.77	719.35
Commercial Cooking			1.28	465.79
Consumer Solvent Use			149.30	54,291.64
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.26	67.30
Forest Fires	0.05	8.15	0.10	17.87
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.39	545.12	0.01	9.33
Kerosene	0.00	1.25	0.00	0.02
LPG	0.20	197.38	0.01	10.84
Natural Gas	7.90	10,636.32	0.45	592.87
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.74	364.33	0.01	3.50
Kerosene	0.03	11.77	0.00	0.11
LPG	0.00	0.00	0.00	0.00
Natural Gas	15.69	9,104.66	0.69	421.49
Residual Oil	0.11	49.76	0.00	0.30
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	88.44	0.00	97.18
Distillate Oil	0.02	30.62	0.00	1.19
Kerosene	0.00	3.88	0.00	0.15
LPG	1.30	2,150.77	0.05	83.46
Natural Gas	13.68	22,585.62	0.80	1,321.50
Wood				
Firelog	0.00	149.12	0.00	767.74
Fireplaces	0.00	273.70	0.00	3,115.76
Furnace	0.00	128.34	0.00	834.18
Hydronic Heater	0.00	112.71	0.00	4,220.54
Outdoor	0.00	40.43	0.00	293.90
Wood Stoves	0.00	216.66	0.00	2,419.62
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			5.45	1,852.99
Stage II				
Diesel			1.01	317.86
Gasoline			12.66	3,334.32
Storage Tank Breathing			6.97	12,367.87
Tank Truck Leaks			0.41	139.83
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			9.78	2,476.03

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Incineration	4.45	1,626.98	2.99	1,089.21
Industrial Surface Coating				
Maintenance			14.95	3,884.28
Other Special Purpose			1.59	412.18
Marine Vessel Loading and Transport			3.53	1,105.54
Oil and Gas Production	23.36	8,495.21	67.15	24,419.51
Oil Exploration			8.30	3,017.77
Open Burning				
Land Clearing	0.76	138.68	1.77	321.73
Prescribed Burning	0.00	212.86	0.00	467.05
Residential Household Waste	2.09	759.79	2.98	1,083.97
Yard Waste				
Brush	0.00	14.67	0.00	55.74
Leaves	0.00	18.19	0.00	82.14
Pavement Marking			0.14	21.28
Portable Fuel Containers				
Commercial			4.64	1,160.48
Residential			20.61	5,152.80
Solvent Cleaning			35.04	10,915.13
Structure Fires	0.13	12.11	1.03	95.15
Waste Water Treatment – POTWs			0.66	238.23
Area Source Totals	**70.90**	**58,012.09**	**510.20**	**172,830.91**
On-road Mobile Sources				
Bus				
Intercity	2.50	897.55	0.13	42.21
School	7.13	2,561.11	0.99	331.04
Transit	3.24	1,152.41	0.52	166.68
Car	100.30	35,774.84	87.27	30,124.61
Motor Home	2.10	775.23	0.90	278.53
Motorcycle	2.39	641.21	6.83	1,720.63

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Truck				
Combination Long Haul	137.56	49,902.26	13.60	4,482.43
Combination Short Haul	32.14	11,570.96	1.59	536.14
Light Commercial	34.23	11,766.28	20.36	6,924.01
Passenger	121.51	42,262.71	76.97	26,070.22
Refuse	3.84	1,383.31	0.21	71.61
Single Unit Long Haul	2.30	823.62	0.44	142.65
Single Unit Short Haul	42.77	15,262.27	9.27	2,878.63
On-road Mobile Source Totals	**492.01**	**174,773.76**	**219.08**	**73,769.38**
Off-road Mobile Sources				
Agricultural Equipment				
2-stroke	0.00	0.68	0.08	14.64
4-stroke	0.96	200.16	2.02	375.48
CNG	0.00	0.24	0.00	0.00
Diesel	113.84	20,829.71	10.04	1,837.27
LPG	0.00	0.46	0.00	0.12
Aircraft				
Air Taxi	0.27	92.98	0.34	117.43
APUs	0.43	158.51	0.04	15.91
Commercial	18.10	5,674.86	3.08	815.05
General Aviation	0.21	76.12	0.47	166.78
Military	0.01	2.71	0.07	24.37
Airport Service Equipment				
4-stroke	0.01	3.39	0.01	3.24
Diesel	1.16	427.94	0.09	32.74
LPG	0.01	3.02	0.00	0.66
Commercial Equipment				
2-stroke	0.04	14.37	1.17	422.94
4-stroke	2.38	1,102.40	9.07	3,008.63
CNG	0.28	102.84	0.00	1.20
Diesel	6.74	2,465.02	0.83	302.55
LPG	0.89	325.79	0.19	68.82
Commercial Marine Vessels	80.70	16,544.77	2.32	475.49

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Construction and Mining Equipment				
CNG	0.00	0.11	0.00	0.00
LPG	0.08	24.98	0.02	6.49
Construction Equipment				
2-stroke	0.03	8.85	1.19	366.38
4-stroke	0.23	88.28	0.63	189.04
Diesel	41.65	12,898.34	4.43	1,371.57
Industrial Equipment				
2-stroke	0.00	0.05	0.00	1.26
4-stroke	0.23	85.42	0.29	84.23
CNG	0.44	134.48	0.01	1.87
Diesel	10.99	3,344.78	0.91	276.50
LPG	6.21	1,892.53	1.48	449.58
Lawn and Garden Equipment				
2-stroke	0.73	174.07	22.51	6,854.55
4-stroke	10.36	2,271.39	46.00	9,001.88
Diesel	4.56	847.74	0.44	81.77
LPG	0.05	9.86	0.01	2.19
Locomotives				
Class I	100.42	36,654.03	4.57	1,668.09
Class II/III	6.73	2,454.91	0.25	92.59
Yard	0.01	2.47	0.00	0.16
Logging Equipment				
2-stroke	0.00	0.56	0.07	27.14
4-stroke	0.00	2.18	0.02	6.46
Diesel	0.09	31.17	0.01	2.76
Railroad Equipment				
4-stroke	0.00	1.18	0.01	3.00
Diesel	0.23	84.49	0.04	14.03
LPG	0.00	0.11	0.00	0.03

Table A-1: Statewide Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Recreational Marine Vessels				
2-stroke	18.22	2,399.24	131.26	17,764.51
4-stroke	14.68	2,066.53	10.31	1,503.22
Diesel	16.04	2,111.54	0.79	104.14
Recreational Vehicles				
2-stroke	0.59	616.50	49.91	22,262.05
4-stroke	1.99	463.81	14.48	2,919.89
Diesel	0.42	85.18	0.10	20.29
LPG	0.03	5.96	0.01	1.65
Underground Mining Equipment				
Diesel	0.69	178.55	0.13	34.50
Off-road Mobile Source Totals	**461.76**	**116,965.27**	**319.71**	**72,795.16**
Totals				
Point Source	**400.94**	**99,752.50**	**146.84**	**42,344.80**
Area Source	**70.90**	**58,012.09**	**510.20**	**172,830.91**
On-road Mobile	**492.01**	**174,773.76**	**219.08**	**73,769.38**
Off-road Mobile	**461.76**	**116,965.27**	**319.71**	**72,795.16**
Total	**1,425.61**	**449,503.62**	**1,195.83**	**361,740.27**

Appendix B

2014
Chicago NAA Emissions by Category

Table B-1: Chicago NAA Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Point Sources				
External Fuel Combustion				
Electric Generation				
Coal	21.07	7,043.22	0.08	24.23
Distillate Oil	0.00	0.01	0.00	0.00
Natural Gas	0.37	44.77	0.01	2.41
Wood	0.00	0.00	0.00	0.00
Industrial				
Coal	1.87	553.51	0.01	3.16
Distillate Oil	0.15	21.00	0.00	0.23
Natural Gas	6.56	1,922.54	0.37	123.64
Process Gas	1.04	373.24	0.03	10.49
Residual Oil	0.00	0.00	0.00	0.00
Other	0.39	10.10	0.01	0.05
Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.14	12.51	0.00	0.16
Natural Gas	3.54	1,212.67	0.19	64.48
Process Gas	0.11	37.38	0.01	2.06
Residual Oil	0.00	0.00	0.00	0.00
Space Heating				
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.06	43.72	0.00	2.37
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	5.16	147.55	0.12	2.76
Landfill Gas	0.91	322.82	0.14	45.98
Natural Gas	9.13	421.91	0.37	12.65

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	1.66	12.11	0.05	0.42
Distillate Oil	6.00	274.84	0.35	24.23
Natural Gas	2.82	723.18	0.30	65.37
Other	0.15	0.15	0.00	0.00
Commercial/Institutional				
Distillate Oil	6.78	171.18	0.27	7.58
Landfill Gas	0.00	0.00	0.00	0.00
Natural Gas	1.99	145.76	0.42	17.49
Other	0.00	0.00	0.00	0.00
Engine Testing				
Diesel	0.47	133.75	0.04	11.74
Distillate Oil	0.40	97.57	0.02	3.70
Other	0.03	3.31	0.08	13.35
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.12	38.74
Fixed Roof Tanks			0.01	2.90
Ink			0.45	115.73
Paint	0.00	0.00	1.00	284.73
Pharmaceuticals	0.00	0.87	0.27	45.58
Phthalic Anhydride	0.19	71.63	0.28	173.27
Plastics	0.00	0.36	0.89	293.15
Pressure Tanks	0.00	0.13	0.00	0.42
Synthetic Organic Fiber			0.00	0.38
Synthetic Rubber			0.02	6.45
Varnish			0.03	4.71
Other	1.40	408.31	2.65	664.95
Fuel Combustion	1.63	559.37	0.17	68.38
Fugitives	0.00	0.00	0.34	127.81

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Food/Agriculture				
Bakeries	0.06	18.08	2.91	857.40
Candy	0.00	0.00	0.49	122.96
Coffee	0.00	0.03	0.00	0.03
Distilled Spirits			0.01	2.54
Grain Elevators	0.02	1.38	0.00	0.08
Milling	0.04	9.76	0.44	136.73
Smokehouses	0.01	1.78	0.10	27.07
Starch Manufacturing	0.03	12.45	0.29	220.35
Vegetable Oil	0.02	6.74	0.06	18.06
Other	0.09	28.64	1.30	335.70
Fuel Combustion	0.28	96.26	0.02	7.71
Fugitives	0.00	0.00	0.00	0.35
Primary Metal Production				
Iron			0.00	0.00
Steel	0.22	68.53	0.10	28.31
Other	0.00	0.03	0.02	4.90
Fuel Combustion	0.29	107.61	0.01	5.08
Secondary Metal Production				
Aluminum	0.08	24.25	0.18	62.14
Copper	0.01	2.74	0.04	6.66
Gray Iron	0.00	0.34	0.10	24.77
Heat Treating	0.02	4.89	0.09	22.85
Lead	0.00	0.45	0.00	0.24
Lead Battery			0.00	0.11
Steel	0.02	4.55	0.02	3.98
Zinc	0.16	49.93	0.05	13.11
Other	0.06	11.92	0.11	24.18
Fuel Combustion	0.71	196.44	0.06	13.85

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Mineral Products				
Asphalt Manufacturing	1.07	147.12	1.20	168.76
Asphalt Roofing	0.00	1.79	0.07	23.71
Bulk Materials			0.00	0.00
Calcining	0.00	0.00	0.00	0.44
Concrete Manufacturing			0.02	5.91
Glass Manufacturing	1.10	388.90	0.08	27.06
Lime Manufacturing	0.00	0.00		
Sand/Gravel	0.02	4.19	0.00	0.13
Other	0.04	2.25	0.18	26.23
Fuel Combustion	0.43	111.26	0.03	6.25
Fugitives			0.00	1.27
Petroleum Industry				
Cooling Towers			0.02	17.99
FCCU	0.41	232.49	0.01	2.24
Flares	0.08	7.77	0.01	4.68
Process Heaters	3.43	1,269.49	0.08	31.94
Waste Water	0.00	0.74	0.18	48.95
Other	0.76	356.07	0.10	43.02
Fugitives	0.05	17.90	0.31	125.96
Paper and Wood Products				
Plywood			0.00	0.23
Pulpboard			0.05	16.23
Woodworking			0.01	1.49
Other	0.01	0.45	0.15	24.47
Fugitives			0.01	2.00

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Rubber and Plastic Products				
Plastic Foam			1.68	615.36
Plastic Products	0.00	0.42	0.74	210.86
Tire Manufacturing			0.03	6.53
Other	0.00	0.40	0.20	57.26
Fuel Combustion	0.16	27.72	0.01	1.47
Fabricated Metal Products				
Drum Reclamation	0.00	0.82	0.01	3.28
Plating	0.02	4.40	0.10	24.22
Welding	0.00	0.31	0.01	1.73
Other	0.07	19.80	1.65	347.74
Fuel Combustion	0.31	101.68	0.05	16.52
Fugitives			0.01	3.16
Oil and Gas Production				
Crude Oil			0.04	11.45
Natural Gas	0.06	18.37	0.03	10.68
Other	0.08	30.83	0.11	29.67
Fuel Combustion			0.01	0.91
Fugitives			0.01	4.39
Miscellaneous Machinery	0.01	1.51	0.04	8.66
Electrical Equipment	0.01	2.24	0.10	34.93
Transportation Equipment			0.02	5.67
Health Services				
Sterilizers			0.03	7.81
Other			0.00	0.28
Leather and Leather Products			0.11	16.20
Textile Products	0.0	0.92	0.00	0.00
Process Cooling			0.09	30.30

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
In-Process Fuel Use				
Coal	0.00	0.24	0.00	0.03
Landfill Gas			0.00	0.44
Other	0.27	32.13	0.00	0.02
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.00	0.30	0.26	82.75
Fuel Combustion	0.03	12.41	0.00	1.02
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.23	63.30
Degreasing			0.59	153.42
Dry Cleaning			0.73	195.93
Fugitives			0.06	6.49
Surface Coating Operations				
Adhesives	0.00	0.16	0.41	92.46
Aircraft	0.00	0.10	0.03	7.77
Automobiles	0.00	0.00	2.26	541.82
Coating (general)	0.00	0.65	0.25	65.88
Fabric			0.04	12.48
Flatwood Products			0.06	12.40
Magnet Wire			0.01	1.14
Metal Cans	0.01	1.50	0.60	162.23
Metal Coils			0.22	61.77
Metal Furniture			0.40	89.42
Miscellaneous Metal Parts	0.00	0.90	2.29	614.75
Ovens	0.35	135.59	0.09	25.94
Paper			0.94	242.92

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Plastic Parts			0.10	25.60
Steel Drums			0.74	189.22
Thinning Solvents	0.00	0.18	0.02	7.16
Wood Furniture			0.38	106.93
Other	0.00	1.32	1.03	248.52
Fuel Combustion	0.14	54.02	0.02	7.18
Fugitives			0.15	41.90
Petroleum Product Storage				
Fixed Roof Tanks			0.94	208.90
Floating Roof Tanks			1.35	498.88
Variable Vapor Space Tanks			0.09	31.20
Fugitives			0.07	28.29
Bulk Terminals/Plants				
Fixed Roof Tanks	0.00	0.00	0.09	30.61
Floating Roof Tanks	0.00	0.03	0.53	223.49
Losses	0.02	7.38	0.23	82.99
Variable Vapor Space Tanks			0.01	1.97
Printing/Publishing				
Cleanup			0.50	143.90
Dryers			0.04	11.49
Flexographic	0.00	0.08	1.80	457.29
Letterpress			0.10	23.01
Lithographic			2.13	612.50
Rotogravure	0.00	0.13	0.74	203.11
Screen Printing			0.29	65.70
Thinning Solvents			0.10	18.82
Other			0.06	14.05
Fugitive			0.00	0.00

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Petroleum Marketing/Transport				
Stage I			0.01	2.12
Stage II			0.04	7.85
Tank Cars	0.00	1.37	0.21	59.16
Transportation	0.00	0.11	0.15	19.13
Fugitives			0.09	30.93
Organic Chemical Storage				
Fixed Roof Tanks			0.46	135.33
Floating Roof Tanks			0.11	37.31
Pressure Tanks			0.04	11.02
Organic Chemical Transport			0.13	7.87
Organic Solvent Evaporation				
Evaporation	0.00	0.09	0.03	7.31
Other	0.00	1.10	0.68	217.99
Fuel Combustion	0.11	11.63	0.01	0.30
Solid Waste Disposal				
Government				
Incineration	0.48	173.49	0.07	26.35
Landfills	0.01	1.49	0.15	37.38
Sewage Treatment			0.00	0.01
Other				
Commercial/Institutional				
Incineration	0.00	0.26	0.00	0.36
Other	0.00	0.16	0.00	0.58
Fuel Combustion	0.00	0.00	0.00	0.00
Industrial				
Incineration	0.03	7.59	0.01	2.10
Landfills	0.10	31.84	0.01	5.77
Other	0.00	0.22	0.04	13.65
Fuel Combustion	0.05	14.98	0.00	1.21

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Site Remediation				
Air Stripping			0.01	3.79
Soil Venting	0.00	0.00	0.06	9.97
Other	0.00	0.70	0.02	3.98
Point Source Total	**85.89**	**18,658.28**	**46.36**	**12,591.53**
Area Sources				
Agricultural Field Burning	0.00	1.18	0.00	2.27
Agricultural Pesticide Application			2.33	558.38
Aircraft Refueling			1.17	351.88
Architectural Coating			35.44	9,913.34
Asphalt Paving				
Cutback			0.00	11.55
Emulsion			0.20	31.91
Automobile Refinishing			1.31	339.78
Commercial Cooking			0.84	306.40
Consumer Solvent Use			98.21	35,713.45
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.16	41.06
Forest Fires	0.00	0.52	0.01	1.15
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.30	410.78	0.01	7.03
Kerosene	0.00	0.93	0.00	0.02
LPG	0.15	146.49	0.01	8.04
Natural Gas	5.90	7,949.74	0.33	439.46
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.45	224.33	0.00	2.18
Kerosene	0.02	7.23	0.00	0.07
LPG	0.00	0.00	0.00	0.00
Natural Gas	10.92	6,229.35	0.46	287.87
Residual Oil	0.07	31.51	0.00	0.19
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	39.01	0.00	42.87
Distillate Oil	0.01	12.20	0.00	0.47
Kerosene	0.00	1.55	0.00	0.06
LPG	0.19	307.43	0.01	11.93
Natural Gas	9.46	15,610.96	0.55	913.41
Wood				
Firelog	0.00	104.38	0.00	537.38
Fireplaces	0.00	123.63	0.00	1,211.39
Furnace	0.00	0.38	0.00	2.44
Hydronic Heater	0.00	0.31	0.00	11.73
Outdoor	0.00	20.91	0.00	152.05
Wood Stoves	0.00	43.91	0.00	396.14
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			2.77	943.20
Stage II				
Diesel			0.37	115.80
Gasoline			2.01	597.48
Storage Tank Breathing			3.84	1,305.03
Tank Truck Leaks			0.23	77.06
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			7.38	1,867.22

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Incineration	2.99	1093.63	1.97	717.74
Industrial Surface Coating				
Maintenance			9.84	2,555.11
Other Special Purpose			1.04	271.13
Marine Vessel Loading and Transport			0.85	266.09
Oil and Gas Production	0.00	0.00	0.00	0.00
Oil Exploration			0.00	0.00
Open Burning				
Land Clearing	0.00	0.38	0.00	0.88
Prescribed Burning	0.00	85.28	0.00	187.11
Residential Household Waste	0.14	50.73	0.20	72.38
Yard Waste				
Brush	0.00	0.05	0.00	0.20
Leaves	0.00	0.07	0.00	0.30
Pavement Marking			0.03	4.20
Portable Fuel Containers				
Commercial			3.34	833.87
Residential			14.81	3,701.63
Solvent Cleaning			21.59	6,726.53
Structure Fires	0.06	5.89	0.50	46.31
Waste Water Treatment – POTWs			0.46	165.81
Area Source Totals	**30.66**	**32,502.77**	**212.28**	**71,750.92**
On-road Mobile Sources				
Bus				
Intercity	1.36	489.78	0.07	23.01
School	3.88	1,398.48	0.54	182.97
Transit	1.76	629.06	0.28	90.98
Car	53.54	19,580.53	49.45	17,594.99
Motor Home	1.14	424.97	0.50	158.35
Motorcycle	1.29	352.24	3.76	975.31

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Truck				
Combination Long Haul	72.69	26,495.73	7.20	2,375.74
Combination Short Haul	17.03	6,159.26	0.84	287.79
Light Commercial	17.01	5,965.58	10.23	3,602.52
Passenger	59.07	21,007.48	38.08	13,378.77
Refuse	2.03	735.68	0.11	38.48
Single Unit Long Haul	1.24	447.03	0.24	79.01
Single Unit Short Haul	23.14	8,294.82	5.18	1,621.08
On-road Mobile Source Totals	**255.18**	**91,980.66**	**116.49**	**40,409.00**
Off-road Mobile Sources				
Agricultural Equipment				
2-stroke	0.00	0.02	0.00	0.46
4-stroke	0.03	6.60	0.06	11.21
CNG	0.00	0.01	0.00	0.00
Diesel	3.64	666.06	0.32	58.75
LPG	0.00	0.01	0.00	0.00
Aircraft				
Air Taxi	0.21	68.92	0.26	84.86
APUs	0.42	151.94	0.04	15.15
Commercial	17.50	5,455.90	2.95	767.91
General Aviation	0.08	25.66	0.17	56.39
Military	0.00	0.19	0.01	1.67
Airport Service Equipment				
4-stroke	0.01	3.24	0.01	3.08
Diesel	1.11	409.31	0.09	31.32
LPG	0.01	2.89	0.00	0.64
Commercial Equipment				
2-stroke	0.03	10.64	0.87	313.07
4-stroke	1.77	823.29	6.64	2,210.75
CNG	0.21	76.17	0.00	0.89
Diesel	4.99	1,825.75	0.61	224.09
LPG	0.66	241.30	0.14	50.97
Commercial Marine Vessels	10.84	2,221.27	0.31	62.89

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Construction and Mining Equipment				
CNG	0.00	0.08	0.00	0.00
LPG	0.06	17.83	0.01	4.64
Construction Equipment				
2-stroke	0.02	6.32	0.85	261.21
4-stroke	0.17	63.60	0.44	132.48
Diesel	29.74	9,210.12	3.16	979.38
Industrial Equipment				
2-stroke	0.00	0.03	0.00	0.82
4-stroke	0.14	53.42	0.15	46.02
CNG	0.28	85.96	0.00	1.20
Diesel	7.08	2,160.70	0.59	179.01
LPG	4.05	1,235.14	0.96	293.41
Lawn and Garden Equipment				
2-stroke	0.53	126.35	16.46	5,000.77
4-stroke	7.27	1,598.32	31.39	6,150.13
Diesel	3.61	670.01	0.35	64.63
LPG	0.04	7.79	0.01	1.73
Locomotives				
Class I	19.12	6980.43	0.87	316.65
Class II/III	1.68	612.01	0.06	23.08
Yard	0.00	1.58	0.00	0.10
Logging Equipment				
2-stroke	0.00	0.06	0.01	2.78
4-stroke	0.00	0.24	0.00	0.64
Diesel	0.01	3.19	0.00	0.28
Railroad Equipment				
4-stroke	0.00	0.34	0.00	0.79
Diesel	0.06	23.42	0.01	3.89
LPG	0.00	0.03	0.00	0.01

Table B-1: Chicago NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Recreational Marine Vessels				
2-stroke	1.90	249.52	13.40	1,804.50
4-stroke	3.17	448.13	2.00	288.93
Diesel	3.38	444.94	0.17	21.86
Recreational Vehicles				
2-stroke	0.20	55.39	16.95	3,775.96
4-stroke	0.72	167.19	4.93	995.00
Diesel	0.14	28.97	0.03	6.90
LPG	0.01	2.03	0.00	0.56
Underground Mining Equipment				
Diesel	0.00	0.00	0.00	0.00
Off-road Mobile Source Totals	**124.89**	**36,242.32**	**105.28**	**24,251.45**
Totals				
Point Source	**85.89**	**18,658.28**	**46.36**	**12,591.53**
Area Source	**30.66**	**32,502.77**	**212.28**	**71,750.92**
On-road Mobile	**255.18**	**91,980.66**	**116.49**	**40,409.00**
Off-road Mobile	**124.89**	**36,242.32**	**105.28**	**24,251.45**
Total	**496.62**	**179,384.02**	**480.41**	**149,002.89**

Appendix C

2014
Metro-East NAA Emissions by Category

Table C-1: Metro-East NAA Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Point Sources				
External Fuel Combustion				
Electric Generation				
Coal	5.99	2180.59	0.15	55.87
Distillate Oil	0.00	0.00	0.00	0.00
Natural Gas	0.33	1.81	0.01	0.06
Other	0.00	1.54	0.00	0.02
Industrial				
Distillate Oil	0.02	4.17	0.00	0.08
Natural Gas	0.68	265.11	0.04	17.28
Process Gas	1.37	462.54	0.04	15.12
Residual Oil	0.03	7.28	0.00	0.15
Other	0.01	1.92	0.00	0.07
Commercial/Institutional				
Distillate Oil	0.02	1.09	0.00	0.02
Natural Gas	0.05	25.41	0.00	1.40
Residual Oil	0.00	0.00	0.00	0.00
Space Heating				
Natural Gas	0.00	0.54	0.00	0.03
Internal Fuel Combustion				
Electric Generation				
Distillate Oil	0.85	8.47	0.02	0.23
Landfill Gas	0.24	59.83	0.04	8.92
Natural Gas	0.27	12.22	0.03	0.76
Industrial				
Diesel	0.56	1.00	0.02	0.03
Distillate Oil	0.07	17.59	0.01	3.61
Natural Gas	0.03	28.27	0.00	0.35
Other	0.00	0.00	0.00	0.00

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Commercial/Institutional				
Distillate Oil	0.09	9.77	0.00	0.60
Engine Testing				
Other	0.00	0.03	0.00	0.00
Industrial Processes				
Chemical Manufacturing				
Ink			0.00	0.02
Paint			0.03	6.33
Plastics			0.03	11.79
Sulfuric Acid	0.00	0.00	0.00	0.10
Other	0.07	23.78	0.20	62.14
Fuel Combustion	0.02	5.91	0.01	2.52
Fugitives			0.12	39.14
Food/Agriculture				
Beer			0.00	0.16
Biodiesel			0.01	3.32
Ethanol	0.13	47.29	0.09	34.27
Milling	0.03	24.65	0.04	12.47
Vegetable Oil			0.00	0.03
Other	0.00	0.10	0.09	31.28
Fuel Combustion	0.00	1.05	0.00	0.08
Fugitives			0.04	13.10
Primary Metal Production				
By-product Coke	1.29	431.63	0.20	86.06
Ferroalloy			0.00	0.00
Iron	0.01	5.23	0.08	29.46
Steel	1.02	317.04	0.15	42.03
Zinc	0.00	0.00	0.00	0.00
Other	0.00	0.50		
Fuel Combustion	0.89	252.80	0.05	9.39

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Secondary Metal Production				
Copper	0.00	0.00	0.00	16.65
Gray Iron	0.00	1.07	0.00	0.71
Lead	0.00	0.00		
Steel	0.05	11.03	0.11	22.14
Zinc	0.00	0.00	0.00	0.00
Other	0.00	0.01	0.22	51.31
Fuel Combustion	0.47	126.05	0.03	6.75
Fugitives			0.00	0.00
Mineral Products				
Asphalt Manufacturing	0.20	19.38	0.19	17.61
Asphalt Roofing			0.00	0.09
Brick Manufacturing	0.00	1.01		
Concrete Manufacturing	0.01	1.12		
Other			0.00	0.03
Fuel Combustion	0.00	0.06	0.00	0.00
Petroleum Industry				
Cooling Towers			0.04	13.98
Desulfurization	0.06	19.55	0.00	0.28
FCCU	0.22	75.49	0.00	0.58
Flares	0.10	37.33	0.08	29.83
Process Heaters	5.03	1,730.56	0.20	68.76
Waste Water	0.00	0.00	0.40	144.22
Other	0.00	0.00	0.05	13.33
Fugitives	0.00	0.04	1.52	554.81
Rubber and Plastic Products				
Plastic Products			0.07	19.26
Fabricated Metal Products				
Welding	0.00	0.00	0.00	0.00
Other	0.03	10.92	0.03	7.16
Fuel Combustion	0.02	7.62	0.00	0.42

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Oil and Gas Production				
Natural Gas			0.00	0.00
Transportation Equipment			0.00	0.44
Health Services				
Crematories	0.00	0.86		
Sterilizers			0.01	1.59
Textile Products			0.01	1.95
Process Cooling			0.01	3.27
In-Process Fuel Use				
Process Gas	2.34	770.63	0.07	25.33
Other			0.00	0.44
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.00	0.30	0.01	3.62
Fuel Combustion	0.00	0.04	0.00	0.03
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.01	1.74
Degreasing			0.10	26.24
Dry Cleaning			0.08	23.25
Fugitives			0.00	0.44
Surface Coating Operations				
Adhesives			0.01	1.51
Aircraft			0.03	8.51
Automobiles			0.01	3.28
Coating (general)			0.19	56.74
Metal Coils	0.00	0.00	0.20	47.46
Metal Furniture			0.00	0.02
Miscellaneous Metal Parts	0.00	0.20	0.27	67.74
Ovens	0.00	21.60	0.00	1.19
Paper			0.15	12.72
Thinning Solvents			0.00	1.02

Table C-1: Metro-East NAA Emissions (continued)

Category	**NOx (tpd)**	**NOx (tpy)**	**VOM (tpd)**	**VOM (tpy)**
Wood Furniture			0.00	0.14
Other			0.01	1.83
Fuel Combustion	0.00	1.52	0.00	0.13
Petroleum Product Storage				
Fixed Roof Tanks			1.13	407.79
Floating Roof Tanks			1.00	358.93
Variable Vapor Space Tanks			0.00	0.50
Fugitives			0.00	0.52
Bulk Terminals/Plants				
Fixed Roof Tanks			0.17	58.89
Floating Roof Tanks			0.54	180.00
Losses	0.01	3.06	0.11	40.47
Printing/Publishing				
Cleanup			0.06	13.63
Flexographic			0.00	1.87
Lithographic			0.02	6.30
Rotogravure			0.00	0.75
Thinning Solvents			0.00	0.21
Other			0.02	2.89
Petroleum Marketing/Transport				
Stage I			0.00	1.32
Stage II	0.00	2.14	0.00	1.10
Tank Cars	0.00	1.66	0.10	35.14
Transportation	0.02	14.77	0.20	80.63
Fugitives			0.03	9.25
Organic Chemical Storage				
Fixed Roof Tanks			0.02	22.36
Floating Roof Tanks			0.02	10.13
Organic Solvent Evaporation				
Evaporation			0.01	3.01
Other			0.02	8.17

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Solid Waste Disposal				
Government				
Landfills	0.17	61.54	0.07	24.17
Sewage Treatment			0.00	0.87
Other	0.00	0.00		
Industrial				
Incineration	0.15	62.02	0.00	0.27
Landfills	0.17	52.28	0.01	3.73
TSDFs			0.00	0.02
Other			0.00	1.73
Fuel Combustion			0.00	0.00
Site Remediation				
Air Stripping			0.00	0.88
Soil Venting	0.00	0.84	0.01	3.69
Other	0.00	0.29	0.16	68.96
Point Source Total	**23.29**	**7,234.18**	**9.38**	**3,094.97**
Area Sources				
Agricultural Field Burning	0.00	0.30	0.00	0.55
Agricultural Pesticide Application			2.43	582.29
Aircraft Refueling			0.26	78.68
Architectural Coating			2.37	662.23
Asphalt Paving				
Cutback			0.00	2.42
Emulsion			0.00	6.68
Automobile Refinishing			0.10	26.84
Commercial Cooking			0.06	20.47
Consumer Solvent Use			6.56	2,385.74
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.01	1.82
Forest Fires	0.00	0.33	0.00	0.71

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	18.47	0.00	0.32
Kerosene	0.00	0.04	0.00	0.00
LPG	0.01	6.77	0.00	0.37
Natural Gas	0.38	398.14	0.02	21.90
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.01	7.70	0.00	0.04
Kerosene	0.00	0.35	0.00	0.00
LPG	0.00	0.00	0.00	0.00
Natural Gas	0.01	6.06	0.00	0.33
Residual Oil	0.00	0.03	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Residential				
Coal	0.00	1.80	0.00	1.97
Distillate Oil	0.00	1.85	0.00	0.07
Kerosene	0.00	0.23	0.00	0.01
LPG	0.09	154.12	0.00	5.98
Natural Gas	0.53	876.68	0.03	51.29
Wood				
Firelog	0.00	3.40	0.00	17.49
Fireplaces	0.00	17.57	0.00	214.72
Furnace	0.00	1.43	0.00	9.32
Hydronic Heater	0.00	1.21	0.00	45.27
Outdoor	0.00	2.88	0.00	20.92
Wood Stoves	0.00	14.55	0.00	154.06

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			0.31	104.76
Stage II				
Diesel			0.09	28.41
Gasoline			1.09	306.63
Storage Tank Breathing			0.40	136.45
Tank Truck Leaks			0.02	8.06
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			0.37	98.67
Incineration	0.11	39.04	0.13	47.84
Industrial Surface Coating				
Maintenance			0.66	170.69
Other Special Purpose			0.07	18.11
Marine Vessel Loading and Transport			0.69	215.06
Oil and Gas Production	0.22	80.68	0.67	242.57
Oil Exploration			0.02	7.67
Open Burning				
Land Clearing	0.03	5.16	0.07	11.98
Prescribed Burning	0.00	2.70	0.00	5.92
Residential Household Waste	0.11	39.31	0.15	56.08
Yard Waste				
Brush	0.00	0.26	0.00	1.00
Leaves	0.00	0.33	0.00	1.47
Pavement Marking			0.01	0.88
Portable Fuel Containers				
Commercial			0.15	37.38
Residential			0.66	165.91

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Solvent Cleaning			1.53	476.73
Structure Fires	0.01	0.71	0.06	5.56
Waste Water Treatment – POTWs			0.02	7.06
Area Source Totals	**1.52**	**1,682.08**	**19.06**	**6,467.37**
On-road Mobile Sources				
Bus				
Intercity	0.15	53.61	0.01	2.54
School	0.43	152.46	0.06	19.23
Transit	0.20	68.73	0.03	9.98
Car	5.23	1,797.36	4.35	1,407.84
Motor Home	0.12	45.11	0.05	15.55
Motorcycle	0.14	36.12	0.38	96.31
Truck				
Combination Long Haul	9.13	3,265.28	0.90	295.36
Combination Short Haul	2.12	751.06	0.10	34.39
Light Commercial	1.91	634.01	1.08	350.34
Passenger	6.71	2,262.99	4.06	1,315.31
Refuse	0.25	90.00	0.01	4.57
Single Unit Long Haul	0.14	50.16	0.03	8.39
Single Unit Short Haul	2.63	925.63	0.54	166.68
On-road Mobile Source Totals	**29.16**	**10,132.51**	**11.60**	**3,726.49**
Off-road Mobile Sources				
Agricultural Equipment				
2-stroke	0.00	0.02	0.00	0.41
4-stroke	0.03	5.35	0.06	10.82
CNG	0.00	0.01	0.00	0.00
Diesel	3.16	578.17	0.28	51.00
LPG	0.00	0.01	0.00	0.00

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Aircraft				
Air Taxi	0.01	2.73	0.01	3.50
APUs	0.00	0.05	0.00	0.01
Commercial	0.01	2.74	0.00	1.02
General Aviation	0.02	5.99	0.04	13.13
Military	0.00	1.00	0.03	8.97
Airport Service Equipment				
4-stroke	0.00	0.00	0.00	0.00
Diesel	0.00	0.48	0.00	0.04
LPG	0.00	0.00	0.00	0.00
Commercial Equipment				
2-stroke	0.00	0.34	0.03	10.00
4-stroke	0.05	24.27	0.23	74.35
CNG	0.01	2.42	0.00	0.03
Diesel	0.16	58.04	0.02	7.12
LPG	0.02	7.67	0.00	1.62
Commercial Marine Vessels	8.73	1,789.31	0.25	51.54
Construction and Mining Equipment				
CNG	0.00	0.01	0.00	0.00
LPG	0.00	1.27	0.00	0.33
Construction Equipment				
2-stroke	0.00	0.45	0.06	18.75
4-stroke	0.01	4.21	0.04	10.30
Diesel	2.12	656.48	0.23	69.81
Industrial Equipment				
2-stroke	0.00	0.00	0.00	0.04
4-stroke	0.01	2.63	0.01	3.21
CNG	0.01	4.18	0.00	0.06
Diesel	0.40	122.70	0.03	9.88
LPG	0.19	57.06	0.04	13.56

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Lawn and Garden Equipment				
2-stroke	0.03	6.04	0.77	236.92
4-stroke	0.38	81.49	1.88	367.37
Diesel	0.12	22.87	0.01	2.21
LPG	0.00	0.27	0.00	0.06
Locomotives				
Class I	5.34	1948.27	0.24	88.80
Class II/III	0.10	34.81	0.00	1.31
Yard	0.00	0.16	0.00	0.01
Logging Equipment				
2-stroke	0.00	0.02	0.00	0.87
4-stroke	0.00	0.07	0.00	0.21
Diesel	0.00	1.00	0.00	0.09
Railroad Equipment				
4-stroke	0.00	0.06	0.00	0.18
Diesel	0.01	4.77	0.00	0.79
LPG	0.00	0.01	0.00	0.00
Recreational Marine Vessels				
2-stroke	0.83	109.28	6.04	821.64
4-stroke	0.57	80.06	0.44	64.52
Diesel	0.64	84.72	0.03	4.18
Recreational Vehicles				
2-stroke	0.02	3.91	1.66	333.32
4-stroke	0.09	19.70	0.57	115.20
Diesel	0.01	2.82	0.00	0.67
LPG	0.00	0.20	0.00	0.05
Underground Mining Equipment				
Diesel	0.00	0.00	0.00	0.00
Off-road Mobile Source Totals	**23.08**	**5,728.11**	**13.01**	**2,397.93**

Table C-1: Metro-East NAA Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Totals				
Point Source	23.29	7,234.18	9.38	3,094.97
Area Source	1.52	1,682.08	19.06	6,467.37
On-road Mobile	29.16	10,132.51	11.60	3,726.49
Off-road Mobile	23.08	5,728.11	13.01	2,397.93
Total	77.05	24,776.88	53.05	15,686.76

Appendix D

2014
Attainment Area Emissions by Category

Table D-1: Attainment Area Emissions

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Point Sources				
External Fuel Combustion				
Electric Generation				
Coal	114.68	35,882.27	4.06	1,292.80
Distillate Oil	0.03	0.62	0.00	0.01
Natural Gas	1.24	87.37	0.07	8.02
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Industrial				
Coal	10.76	4,029.78	0.11	40.52
Distillate Oil	0.04	6.64	0.00	0.06
Natural Gas	7.60	2,191.27	0.40	123.88
Process Gas	0.02	5.30	0.00	0.29
Residual Oil	0.00	0.00	0.00	0.00
Other	0.06	86.75	0.01	5.95
Commercial/Institutional				
Coal	0.55	192.55	0.01	2.11
Distillate Oil	0.25	19.90	0.00	0.21
Natural Gas	2.27	555.29	0.09	21.85
Residual Oil	0.00	0.00	0.00	0.00
Other	0.03	2.84	0.00	0.12
Space Heating				
Distillate Oil	0.02	52.26	0.00	2.86
Natural Gas	6.02	84.77	0.35	3.92
Internal Fuel Combustion				
Electric Generation				
Landfill Gas	1.15	336.64	0.23	70.37
Natural Gas	10.70	835.58	1.73	110.69

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial				
Diesel	2.04	46.01	0.05	0.87
Distillate Oil	6.54	302.70	0.15	22.19
Natural Gas	87.70	18,810.48	4.19	907.50
Other	0.04	13.31	0.00	1.33
Commercial/Institutional				
Distillate Oil	2.25	67.03	0.09	4.02
Landfill Gas	0.00	0.00	0.00	0.00
Natural Gas	0.04	10.27	0.01	2.13
Other	0.00	0.00	0.00	0.00
Engine Testing				
Diesel	0.71	204.71	0.14	49.09
Jet Fuel	0.01	0.02	0.00	0.00
Other	0.02	0.01	0.00	0.00
Industrial Processes				
Chemical Manufacturing				
Adhesives			0.06	15.29
Ammonia	0.35	128.10	0.10	37.65
Cellulosic Fiber	0.00	0.00	5.52	1,922.89
Fixed Roof Tanks	0.02	5.62	0.05	15.53
Ink			0.17	44.48
Nitric Acid	0.05	18.59		
Paint			0.26	73.47
Pharmaceuticals			0.02	3.16
Plastics	0.01	3.55	1.00	311.06
Synthetic Organic Fiber			0.15	35.81
Synthetic Rubber			0.01	5.84
Urea			0.00	0.17
Varnish			0.02	6.17
Other	0.22	78.10	7.11	2,013.50
Fuel Combustion	0.31	56.44	0.13	40.52
Fugitives			0.88	282.50

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Food/Agriculture				
Bakeries	0.00	0.00	0.23	60.18
Beer			0.00	0.00
Biodiesel			0.05	15.23
Candy			0.34	120.01
Distilled Spirits	0.21	71.87	0.26	91.75
Ethanol	0.10	34.74	0.18	630.5
Feed Manufacturing	0.10	37.36	0.07	24.42
Grain Elevators	0.19	38.97	0.07	29.16
Milling	0.20	57.38	2.68	958.26
Smokehouses	0.00	1.44	0.02	5.40
Starch Manufacturing	0.40	148.35	0.05	18.88
Vegetable Oil			6.59	2,214.43
Other	0.88	279.47	6.58	2,237.42
Fuel Combustion	2.04	531.80	0.67	21.77
Fugitives			2.70	981.57
Primary Metal Production				
Aluminum			0.00	2.64
Ferroalloy	0.00	0.16	0.00	0.28
Steel	2.06	590.69	0.82	206.06
Other	0.00	0.00	0.00	0.24
Fuel Combustion	0.02	4.89	0.00	0.27
Secondary Metal Production				
Aluminum	0.01	2.40	0.02	4.63
Copper	0.00	0.31	0.04	6.94
Gray Iron	0.08	18.83	1.18	278.25
Heat Treating	0.01	3.86	0.07	20.74
Steel	0.01	4.31	0.07	19.36
Zinc	0.00	0.00	0.36	59.18
Other	0.40	119.23	0.04	10.34
Fuel Combustion	0.01	2.65	0.01	3.03

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Mineral Products				
Asphalt Manufacturing	1.36	112.56	1.09	96.48
Asphalt Roofing			0.13	34.19
Brick Manufacturing	0.04	9.34	0.01	2.94
Bulk Materials	0.01	6.11	0.00	1.40
Calcining	1.10	352.16	0.00	0.87
Cement Manufacturing	7.51	1994.28	0.23	60.99
Glass Manufacturing	7.76	2726.31	0.19	68.49
Lime Manufacturing	0.00	0.00	0.00	0.00
Sand/Gravel	0.09	53.07	0.03	13.00
Stone Quarrying			0.01	2.50
Other	0.46	168.93	1.07	338.00
Fuel Combustion	0.58	175.69	0.18	29.57
Petroleum Industry				
Cooling Towers			0.01	5.07
Desulfurization	0.03	9.86	0.18	58.41
FCCU	0.29	88.46	0.25	82.44
Flares	0.28	46.88	0.83	134.80
Process Heaters	2.10	737.97	0.15	54.43
Waste Water			0.13	48.39
Other	0.01	5.41	0.85	352.11
Fugitives			0.08	29.95
Paper and Wood Products				
Particleboard			0.01	2.71
Plywood	0.01	0.84	0.01	5.44
Pulpboard			0.03	10.09
Other			0.08	8.77
Fugitives			0.01	3.21

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Rubber and Plastic Products				
Plastic Foam			0.24	52.11
Plastic Products	0.00	1.68	1.27	326.87
Tire Manufacturing	0.00	0.00	1.44	439.40
Other			0.19	49.70
Fuel Combustion	0.00	0.38	0.00	0.00
Fabricated Metal Products				
Plating	0.00	0.74	0.02	7.14
Welding			0.01	2.16
Other	0.04	8.12	0.99	218.66
Fuel Combustion	0.25	81.84	0.01	6.39
Fugitives	0.00	0.00	0.00	0.00
Oil and Gas Production				
Crude Oil			0.42	152.61
Natural Gas	5.13	643.75	0.29	62.52
Other	0.00	2.53	0.33	48.46
Fuel Combustion	0.04	11.98	0.00	0.93
Fugitives			0.14	51.69
Miscellaneous Machinery	0.00	0.33	0.29	72.81
Electrical Equipment	0.00	0.27	0.02	4.02
Transportation Equipment			0.06	15.67
Health Services				
Crematories	0.02	3.13	0.00	0.34
Sterilizers			0.03	6.33
Leather and Leather Products				
Process Cooling			0.12	43.55

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
In-Process Fuel Use				
Natural Gas	0.00	0.07	0.00	0.15
Process Gas			0.02	6.30
Miscellaneous Manufacturing				
Miscellaneous Manufacturing	0.03	2.25	0.21	65.93
Fuel Combustion	0.04	2.95	0.00	4.97
Organic Solvent Emissions				
Organic Solvent Use				
Cold Cleaning			0.20	54.86
Degreasing	0.00	0.00	0.28	74.30
Dry Cleaning			0.77	161.80
Other			0.00	1.75
Surface Coating Operations				
Adhesives			0.20	66.16
Aircraft			0.01	4.31
Automobiles	0.02	5.42	3.03	873.86
Coating (general)	0.00	0.00	2.71	673.21
Fabric			0.00	0.00
Flatwood Products			0.48	127.49
Glass	0.00	0.92	0.00	0.07
Large Appliances			0.07	16.05
Metal Cans	0.02	6.38	1.66	512.34
Metal Coils			0.04	8.85
Metal Furniture			0.00	0.67
Miscellaneous Metal Parts	0.00	0.39	3.14	768.22
Ovens	0.44	127.48	0.05	16.13
Paper	0.01	1.98	0.86	238.83
Plastic Parts			1.60	367.03
Steel Drums			0.14	41.65
Thinning Solvents			0.28	73.67
Wood Furniture			1.19	310.52

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Other	0.00	0.15	0.31	81.39
Fuel Combustion	0.05	14.64	0.00	0.81
Fugitives			0.06	14.50
Petroleum Product Storage				
Fixed Roof Tanks			1.00	337.63
Floating Roof Tanks			1.51	556.31
Variable Vapor Space Tanks			0.08	27.40
Fugitives			0.10	30.62
Bulk Terminals/Plants				
Fixed Roof Tanks			0.36	119.42
Floating Roof Tanks			0.52	196.36
Losses	0.01	3.06	0.30	102.44
Variable Vapor Space Tanks			0.00	1.07
Printing/Publishing				
Cleanup			0.27	81.35
Flexographic	0.00	1.28	1.28	375.22
Letterpress			0.04	15.56
Lithographic	0.00	0.00	1.45	450.00
Rotogravure			1.74	633.32
Screen Printing			0.15	36.66
Thinning Solvents			0.12	31.09
Other			0.04	18.97
Fugitive			0.00	0.01
Petroleum Marketing/Transport				
Pipelines			0.00	1.75
Stage I			0.00	1.58
Stage II			0.03	8.38
Tank Cars			0.10	24.88
Transportation			0.00	0.54
Fugitives	0.00	0.00	0.12	41.40

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Organic Chemical Storage				
Fixed Roof Tanks			0.70	252.63
Floating Roof Tanks	0.01	1.61	0.05	18.54
Pressure Tanks			0.01	2.10
Organic Chemical Transport			0.54	136.91
Organic Solvent Evaporation				
Evaporation	0.00	0.00	0.02	52.67
Other	0.00	0.00	0.58	147.37
Fuel Combustion	0.00	0.89	0.00	1.76
Solid Waste Disposal				
Government				
Incineration	0.00	0.00	0.00	0.00
Landfills	1.28	317.60	0.68	198.35
Sewage Treatment	0.01	4.80	0.01	5.10
Other			0.06	20.79
Commercial/Institutional				
Incineration	0.07	16.82	0.00	0.63
Industrial				
Incineration	0.07	16.82	0.00	0.63
Landfills	0.16	43.85	0.02	6.68
TSDFs			0.00	1.00
Other			0.00	0.04
Site Remediation				
Air Stripping			0.04	12.65
Soil Venting	0.00	0.67	0.04	11.31
Other			0.05	0.92
Point Source Total	**291.74**	**73,860.91**	**91.13**	**26,657.44**

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Area Sources				
Agricultural Field Burning	0.00	33.09	0.00	56.18
Agricultural Pesticide Application			88.96	21,318.83
Aircraft Refueling			2.75	824.77
Architectural Coating			16.07	4,494.70
Asphalt Paving				
Cutback			0.00	44.51
Emulsion			0.79	122.99
Automobile Refinishing			1.36	352.72
Commercial Cooking			0.38	138.92
Consumer Solvent Use			44.53	16,192.46
Cremation				
Animal	0.00	0.00	0.00	0.00
Human	0.00	0.00	0.00	0.00
Dry Cleaning			0.09	24.43
Forest Fires	0.04	7.30	0.09	16.01
Fuel Combustion – Commercial/Institutional				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.08	115.87	0.00	1.98
Kerosene	0.00	0.28	0.00	0.00
LPG	0.05	44.13	0.00	2.43
Natural Gas	1.62	2,288.44	0.09	131.51
Residual Oil	0.00	0.00	0.00	0.00
Wood	0.00	0.00	0.00	0.00
Fuel Combustion – Industrial				
Coal	0.00	0.00	0.00	0.00
Distillate Oil	0.28	132.30	0.00	1.29
Kerosene	0.01	4.19	0.00	0.04
LPG	0.00	0.00	.0.00	0.00
Natural Gas	4.76	2,869.25	0.23	133.29
Residual Oil	0.04	18.21	0.00	0.11
Wood	0.00	0.00	0.00	0.00

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Residential				
Coal	0.00	47.63	0.00	52.34
Distillate Oil	0.01	16.57	0.00	0.64
Kerosene	0.00	2.10	0.00	0.08
LPG	1.02	1,689.22	0.04	65.55
Natural Gas	3.69	6,097.98	0.22	356.80
Wood				
Firelog	0.00	41.35	0.00	212.87
Fireplaces	0.00	132.50	0.00	1,689.66
Furnace	0.00	126.53	0.00	822.41
Hydronic Heater	0.00	111.19	0.00	4,163.54
Outdoor	0.00	16.64	0.00	120.97
Wood Stoves	0.00	158.21	0.00	1,869.41
Fuel Marketing				
Bulk Plants			0.00	0.00
Bulk Terminals			0.00	0.00
Stage I			2.37	805.03
Stage II				
Diesel			0.56	173.65
Gasoline			9.55	2,430.21
Storage Tank Breathing			2.73	926.39
Tank Truck Leaks			0.16	54.70
Gas Exploration	0.00	0.00	0.00	0.00
Gas Production	0.00	0.00	0.00	0.00
Graphic Arts			2.03	510.14
Incineration	1.35	494.31	0.89	323.63
Industrial Surface Coating				
Maintenance			4.46	1,158.49
Other Special Purpose			0.47	122.93
Marine Vessel Loading and Transport			1.99	624.39
Oil and Gas Production	23.14	8,414.52	66.49	24,176.93
Oil Exploration			8.28	3,010.10

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Open Burning				
Land Clearing	0.73	133.14	1.70	308.87
Prescribed Burning	0.00	124.89	0.00	274.02
Residential Household Waste	1.84	669.75	2.63	955.51
Yard Waste				
Brush	0.00	14.35	0.00	54.54
Leaves	0.00	17.80	0.00	80.38
Pavement Marking			0.11	16.20
Portable Fuel Containers				
Commercial			1.16	289.23
Residential			5.14	1,285.26
Solvent Cleaning			11.92	3,711.88
Structure Fires	0.06	5.51	0.47	43.28
Waste Water Treatment – POTWs			0.18	65.37
Area Source Totals	**38.72**	**23,827.24**	**278.87**	**94,612.63**
On-road Mobile Sources				
Bus				
Intercity	0.99	354.16	0.05	16.67
School	2.83	1,010.16	0.39	128.84
Transit	1.28	454.61	0.20	65.72
Car	41.53	14,396.95	33.47	11,121.78
Motor Home	0.83	305.15	0.34	104.63
Motorcycle	0.96	252.85	2.69	649.02
Truck				
Combination Long Haul	55.74	20,141.25	5.50	1,811.34
Combination Short Haul	12.99	4,660.63	0.64	213.95
Light Commercial	15.32	5,166.69	9.05	2,971.15
Passenger	55.73	18,992.24	34.83	11,376.14
Refuse	1.55	557.63	0.09	28.55
Single Unit Long Haul	0.91	326.44	0.17	55.26
Single Unit Short Haul	17.01	6,041.82	3.55	1,090.87
On-road Mobile Source Totals	**207.67**	**72,660.59**	**90.99**	**29,633.89**

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Off-road Mobile Sources				
Agricultural Equipment				
2-stroke	0.00	0.64	0.08	13.77
4-stroke	0.90	188.21	1.90	353.45
CNG	0.00	0.22	0.00	0.00
Diesel	107.04	19,585.48	9.44	1,727.52
LPG	0.00	0.43	0.00	0.12
Aircraft				
Air Taxi	0.06	21.33	0.08	29.07
APUs	0.02	6.51	0.00	0.76
Commercial	0.59	216.22	0.13	46.12
General Aviation	0.12	44.47	0.26	97.26
Military	0.00	1.53	0.04	13.73
Airport Service Equipment				
4-stroke	0.00	0.14	0.00	0.15
Diesel	0.05	18.15	0.00	1.39
LPG	0.00	0.13	0.00	0.03
Commercial Equipment				
2-stroke	0.01	3.39	0.28	99.86
4-stroke	0.55	254.84	2.20	723.54
CNG	0.07	24.25	0.00	0.28
Diesel	1.59	581.23	0.20	71.34
LPG	0.21	76.82	0.04	16.23
Commercial Marine Vessels	61.14	12,534.19	1.76	361.06
Construction and Mining Equipment				
CNG	0.00	0.03	0.00	0.00
LPG	0.02	5.87	0.00	1.53
Construction Equipment				
2-stroke	0.01	2.08	0.28	86.42
4-stroke	0.05	20.47	0.16	46.26
Diesel	9.79	3,031.74	1.04	322.39

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial Equipment				
2-stroke	0.00	0.02	0.00	0.40
4-stroke	0.08	29.38	0.12	35.00
CNG	0.15	44.33	0.00	0.61
Diesel	3.50	1,061.38	0.29	87.61
LPG	1.97	600.33	0.47	142.61
Lawn and Garden Equipment				
2-stroke	0.18	41.68	5.28	1,616.85
4-stroke	2.71	591.58	12.73	2,484.38
Diesel	0.83	154.86	0.08	14.94
LPG	0.01	1.80	0.00	0.40
Locomotives				
Class I	75.96	27,725.32	3.46	1,262.64
Class II/III	4.95	1,808.10	0.19	68.20
Yard	0.00	0.74	0.00	0.05
Logging Equipment				
2-stroke	0.00	0.49	0.06	23.49
4-stroke	0.00	1.88	0.02	5.62
Diesel	0.07	26.98	0.01	2.39
Railroad Equipment				
4-stroke	0.00	0.78	0.01	2.04
Diesel	0.15	56.30	0.03	9.35
LPG	0.00	0.07	0.00	0.02
Recreational Marine Vessels				
2-stroke	15.50	2,040.44	111.81	15,138.37
4-stroke	10.94	1,538.34	7.88	1,149.76
Diesel	12.02	1,581.89	0.59	78.09
Recreational Vehicles				
2-stroke	0.37	557.19	31.30	18,152.78
4-stroke	1.19	276.91	8.98	1,809.70
Diesel	0.27	53.39	0.06	12.71
LPG	0.02	3.74	0.01	1.03

Table D-1: Attainment Area Emissions (continued)

Category	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Underground Mining Equipment				
Diesel	0.69	178.55	0.13	34.50
Off-road Mobile Source Totals	**313.79**	**74,994.84**	**201.41**	**46,145.79**
Totals				
Point Source	**291.74**	**73,860.91**	**91.13**	**26,657.44**
Area Source	**38.72**	**23,827.24**	**278.87**	**94,612.63**
On-road Mobile	**207.67**	**75,660.59**	**90.99**	**29,633.89**
Off-road Mobile	**313.79**	**74,994.84**	**201.41**	**46,145.79**
Total	**851.92**	**245,343.58**	**662.39**	**197,049.75**

Appendix E

2014
County Level Emissions

Table E-1: County Level NOx Emissions

County	Point	Area	On-road	Off-road	Total
Adams	1.09 371.64	0.29 289.36	2.82 970.57	5.04 1,109.38	9.24 2,740.95
Alexander	0.10 26.59	0.02 20.52	0.60 204.79	11.10 2,314.48	11.82 2,566.38
Bond	0.03 15.06	0.13 81.78	1.53 523.44	1.72 446.89	3.41 1,067.17
Boone	0.67 137.71	0.31 240.55	2.69 955.96	1.15 315.47	4.82 1,649.68
Brown	0.01 0.01	0.08 39.26	0.31 105.53	1.02 198.16	1.42 342.96
Bureau	1.37 25.15	0.16 151.28	2.54 898.90	5.79 1,489.50	9.87 2,564.83
Calhoun	0.00 0.75	0.02 19.85	0.22 74.41	5.76 1,053.50	6.00 1,148.51
Carroll	0.06 20.62	0.06 63.24	0.75 266.28	4.98 1,309.41	5.84 1,659.55
Cass	0.10 35.20	0.11 108.90	0.62 213.31	2.62 537.32	3.45 894.73
Champaign	4.84 759.85	0.70 699.76	8.61 3,053.87	6.26 1,686.96	20.41 6,200.44
Christian	6.50 2,117.98	0.41 234.82	1.77 609.55	3.11 685.19	11.79 3,647.54
Clark	0.53 7.32	0.81 339.40	1.86 636.99	2.14 519.64	5.35 1,503.36
Clay	0.26 6.94	1.45 568.78	0.87 297.54	1.63 393.73	4.20 1,266.99
Clinton	13.01 3,196.28	0.54 272.53	2.03 695.82	3.81 776.54	19.38 4,941.17
Coles	0.39 87.75	0.22 217.15	2.78 954.12	1.98 471.07	5.38 1,730.09
Cook	30.43 4,924.61	16.74 19,507.17	139.63 50,321.16	70.06 20,846.49	256.86 95,599.43
Crawford	5.25 1,695.09	2.48 949.44	0.98 337.71	1.20 239.62	9.92 3,221.86
Cumberland	0.03 0.43	0.13 73.94	1.62 553.51	1.49 391.43	3.27 1,019.31
DeKalb	1.00 123.72	0.20 296.41	4.35 1,546.83	4.46 1,285.97	10.02 3,252.94
DeWitt	0.80 79.43	0.10 74.15	1.03 364.71	1.56 281.27	3.48 799.55
Douglas	17.67 4,348.14	0.18 129.37	1.41 484.35	2.14 567.35	21.39 5,529.21
DuPage	6.10 684.59	5.14 4,517.19	35.09 12,658.17	11.89 3,702.57	58.22 21,562.51
Edgar	6.40 408.51	0.25 154.23	0.95 327.85	2.18 484.73	9.43 1,375.33
Edwards	0.02 5.04	0.91 357.92	0.42 143.16	0.66 145.71	2.00 651.83

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Effingham	0.25 21.38	0.67 350.50	3.59 1,226.00	2.67 734.29	7.17 2,332.16
Fayette	0.09 13.48	1.81 714.44	2.29 782.32	2.83 637.26	7.03 2,147.50
Ford	0.39 121.60	0.04 47.00	0.77 274.04	1.77 387.94	2.98 830.57
Franklin	0.01 4.53	0.92 405.25	2.75 939.57	3.36 837.00	7.03 2,186.34
Fulton	3.47 1,066.34	0.15 136.26	1.67 591.77	4.65 971.89	9.94 2,766.26
Gallatin	0.00 0.96	0.73 277.67	0.39 134.36	0.93 162.64	2.05 575.63
Greene		0.05 48.91	0.67 229.84	2.88 579.98	3.59 858.74
Grundy	3.95 1,034.69	0.17 168.17	3.01 1,078.91	5.28 1,295.64	12.40 3,577.41
Hamilton	0.01 0.28	0.56 229.53	0.48 165.10	1.18 257.82	2.23 652.73
Hancock	0.02 0.71	0.07 66.15	1.05 374.64	5.43 1,135.19	6.58 1,576.69
Hardin	0.02 4.89	0.02 20.71	0.24 82.00	1.30 253.46	1.58 361.06
Henderson	0.04 3.82	0.06 43.89	0.62 219.51	4.10 1,129.26	4.82 1,396.48
Henry	6.88 1,007.63	0.15 174.83	3.42 1,210.94	3.96 1,012.05	14.40 3,405.45
Iroquois	0.16 24.12	0.09 102.59	2.38 842.15	6.16 1,629.83	8.79 2,598.69
Jackson	0.49 102.25	0.22 167.76	2.67 916.13	7.40 1,910.39	10.78 3,096.53
Jasper	8.87 2,915.21	0.70 286.21	0.75 258.20	1.48 275.52	11.80 3,735.14
Jefferson	0.24 52.44	0.95 457.66	3.68 1,255.52	3.54 938.08	8.40 2,703.69
Jersey		0.09 76.13	1.08 374.12	2.87 561.68	4.04 1,011.93
JoDaviess	1.58 537.37	0.09 94.92	1.15 410.77	5.05 1,356.76	7.88 2,399.82
Johnson	0.11 20.45	0.04 37.70	1.26 431.53	1.08 313.43	2.49 803.11
Kane	3.76 503.93	2.01 1,989.45	17.15 6,179.09	8.92 2,659.81	31.85 11,332.28
Kankakee	2.98 733.52	0.30 354.42	4.84 1,719.27	4.20 1,150.88	12.32 3,958.08
Kendall	3.89 606.85	0.40 354.86	3.50 1,266.92	2.52 713.62	10.32 2,942.26
Knox	0.10 24.75	0.14 179.71	2.74 971.27	6.07 1,863.24	9.04 3,038.98

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Lake	10.82 2,291.70	3.87 3,255.34	24.90 8,981.73	13.22 3,314.74	52.81 17,843.52
LaSalle	10.82 2,880.72	0.32 395.82	6.46 2,290.40	9.48 2,321.52	27.07 7,888.46
Lawrence	0.08 5.02	1.87 727.12	0.88 301.01	1.21 256.81	4.04 1,289.96
Lee	0.74 136.08	0.21 162.78	2.75 973.61	4.76 1,391.18	8.45 2,663.64
Livingston	1.47 375.32	0.12 148.97	2.48 878.00	4.14 923.70	8.22 2,326.00
Logan	1.31 468.29	0.12 117.95	2.38 843.13	2.01 408.12	5.83 1,837.50
McDonough	0.88 107.76	0.12 97.71	1.33 470.73	2.82 768.17	5.15 1,444.37
McHenry	1.27 216.58	1.30 1183.48	10.50 3,789.81	5.34 1,440.20	18.41 6,630.08
McLean	1.37 290.01	0.38 542.31	8.20 2,914.47	4.93 1,087.85	14.88 4,834.65
Macon	13.79 4,844.27	0.91 636.43	5.16 1,772.96	3.38 844.19	23.24 8,097.86
Macoupin	0.03 8.02	0.20 179.41	2.32 797.49	3.02 701.91	5.56 1,686.82
Madison	21.39 6,868.15	0.83 859.66	14.11 4,904.63	8.52 2,124.40	44.85 14,756.84
Marion	0.26 21.07	2.73 1,102.60	2.61 893.68	2.72 764.48	8.32 2,781.83
Marshall	0.25 73.69	0.05 60.12	0.93 328.84	4.29 1,080.26	5.51 1,542.91
Mason	3.87 1,188.82	0.05 55.67	0.63 223.47	4.51 825.23	9.06 2,293.19
Massac	22.88 6,757.91	0.04 46.49	1.15 391.69	1.20 318.24	25.27 7,514.33
Menard		0.04 43.90	0.54 186.28	0.92 196.94	1.51 427.12
Mercer	0.00 1.30	0.08 75.44	0.72 258.17	2.56 471.41	3.37 806.31
Monroe	0.48 5.91	0.15 120.99	1.75 607.59	7.98 1,921.50	10.35 2,655.99
Montgomery	6.09 1,888.98	0.14 115.84	2.60 889.34	3.26 810.25	12.09 3,704.41
Morgan	2.66 219.47	0.19 159.92	1.88 645.21	3.03 766.59	7.75 1,791.19
Moultrie	0.55 4.19	0.15 107.80	0.87 297.82	1.87 398.92	3.45 808.74
Ogle	2.44 284.30	0.25 241.02	3.46 1,224.71	4.42 1,256.53	10.57 3,006.55
Peoria	12.31 3,784.24	0.47 638.12	8.17 2,903.35	8.09 2,151.82	29.04 9,477.53

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Perry	0.21 32.19	0.08 75.60	1.07 367.43	1.62 369.80	2.99 845.01
Piatt	15.85 4,871.67	0.06 61.48	1.17 415.34	1.98 483.93	19.07 5,832.42
Pike	1.91 241.12	0.07 56.33	1.51 517.07	5.98 1,213.83	9.46 2,028.35
Pope		0.04 29.38	0.26 87.71	3.45 712.63	3.74 829.72
Pulaski	0.10 30.66	0.02 21.72	0.63 215.93	0.83 204.81	1.58 473.12
Putnam	4.84 1,534.17	0.02 21.91	0.32 114.90	2.56 472.41	7.75 2,143.39
Randolph	15.37 4,730.09	0.27 171.19	1.55 531.20	10.06 2,319.66	27.24 7,752.14
Richland	0.02 2.55	0.94 387.77	0.90 307.95	1.28 267.15	3.14 965.42
Rock Island	3.09 484.57	0.65 682.27	6.11 2,171.61	5.88 1,254.85	15.73 4,593.29
St. Clair	1.42 360.12	0.55 701.43	13.30 4,620.29	6.58 1,682.40	21.85 7,364.25
Saline	0.04 6.53	0.18 126.23	1.39 478.35	1.19 265.15	2.81 876.25
Sangamon	7.83 1,817.28	0.69 828.64	10.50 3,607.75	4.92 1,187.11	23.93 7,440.78
Schuyler	0.04 6.14	0.03 25.41	0.45 159.52	2.31 488.07	2.83 679.13
Scott	0.39 10.94	0.05 39.46	0.47 158.70	1.58 331.41	2.49 541.51
Shelby	1.27 37.49	0.16 120.17	1.38 473.47	3.02 632.39	5.82 1,263.52
Stark		0.03 28.46	0.35 124.94	0.94 189.21	1.33 342.60
Stephenson	0.34 93.51	0.17 207.20	2.06 734.22	1.86 452.48	4.43 1,487.41
Tazewell	25.08 6,814.07	0.61 640.16	6.27 2,227.12	4.85 1,058.66	36.81 10,740.02
Union	0.25 55.24	0.07 67.41	1.29 441.83	5.29 1,279.55	6.91 1,844.03
Vermilion	4.48 713.23	0.20 250.04	3.67 1,303.56	4.90 1,326.19	13.24 3,593.03
Wabash	0.00 0.07	1.01 396.85	0.53 181.65	0.98 203.50	2.52 782.06
Warren	0.06 28.59	0.10 84.60	1.09 386.96	3.77 1,106.60	5.03 1,606.75
Washington	9.82 2,817.03	0.52 234.69	1.91 653.02	2.26 525.94	14.50 4,230.68
Wayne	8.06 933.68	1.30 522.56	1.46 499.35	1.78 391.15	12.60 2,346.74

Table E-1: County Level NOx Emissions (continued)

County	Point	Area	On-road	Off-road	Total
White	4.80 381.44	2.73 1,031.46	1.15 393.84	1.90 378.84	10.58 2,185.58
Whiteside	1.84 389.68	0.35 287.68	2.69 957.74	6.40 1,767.88	11.28 3,402.99
Will	29.45 8,937.18	1.37 1,850.91	25.47 9,172.26	13.08 3,681.34	69.37 23,641.69
Williamson	13.19 3,557.31	0.39 250.60	4.12 1,409.81	2.60 602.43	20.30 5,820.14
Winnebago	1.75 253.93	1.56 1,360.38	12.36 4,390.60	3.55 935.48	19.22 6,940.38
Woodford	0.04 10.62	0.23 183.50	2.16 768.03	3.31 615.41	5.75 1,577.56

Top value has units of tons/day
Bottom value has units of tons/year

Table E-2: County Level VOM Emissions

County	Point	Area	On-road	Off-road	Total
Adams	2.27 811.47	3.39 1,159.83	1.45 458.39	4.69 794.86	11.80 3,224.55
Alexander	1.15 300.02	0.43 154.23	0.23 71.51	3.83 581.68	5.64 1,107.44
Bond	0.07 24.13	1.41 456.51	0.56 173.29	1.07 195.81	3.11 849.74
Boone	2.31 686.45	2.27 788.35	1.21 402.57	0.79 1,328.24	6.57 3,205.61
Brown	0.00 0.00	0.71 225.57	0.15 45.84	0.38 58.50	1.24 329.92
Bureau	0.48 40.63	2.93 920.07	0.99 324.10	1.87 342.20	6.26 1,627.00
Calhoun	0.00 0.11	0.59 199.71	0.13 40.34	5.72 794.21	6.44 1,034.36
Carroll	0.03 9.83	1.33 439.34	0.40 134.16	4.69 3,913.90	6.44 4,497.23
Cass	0.09 25.49	1.08 404.16	0.33 103.26	2.07 329.40	3.56 862.32
Champaign	1.80 482.01	7.55 2,565.62	3.62 1,202.85	2.10 491.48	15.07 4,741.97
Christian	1.53 478.04	3.43 1,094.33	0.88 278.42	2.07 346.99	7.91 2,197.78
Clark	0.52 140.53	3.99 1,368.92	0.66 205.44	0.92 150.17	6.09 1,865.06
Clay	0.48 117.36	5.48 1,921.99	0.40 125.61	1.20 239.22	7.56 2,404.18
Clinton	0.78 185.97	3.16 1,079.45	0.87 274.79	6.30 929.19	11.11 2,469.41
Coles	2.33 785.49	2.77 920.22	1.17 366.21	0.79 149.27	7.06 2,221.18
Cook	26.38 6,961.51	124.09 42,123.09	65.10 22,587.95	50.19 11,741.98	265.75 83,414.53
Crawford	4.16 1,351.44	9.11 3,258.75	0.52 163.80	0.66 108.64	14.44 4,882.64
Cumberland	0.03 19.17	1.23 401.48	0.51 158.41	0.39 69.90	2.16 648.95
DeKalb	0.93 223.78	4.34 1,397.49	1.99 66.09	0.99 811.43	8.24 3,098.78
DeWitt	0.60 152.44	1.55 479.95	0.44 146.31	2.04 318.62	4.63 1,097.32
Douglas	1.80 495.86	1.64 525.68	0.56 174.39	0.35 77.32	4.35 1,273.25
DuPage	4.39 1126.18	26.98 9,053.99	15.27 5,299.95	12.63 3,127.68	59.28 18,607.80
Edgar	0.68 137.95	2.32 696.89	0.47 149.74	0.45 87.09	3.93 1,071.68
Edwards	0.04 10.26	3.05 1,089.40	0.20 63.02	0.18 34.84	3.47 1,197.53

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Effingham	0.91 262.80	3.24 1,134.60	1.30 403.40	1.07 220.01	6.51 2,020.81
Fayette	0.02 5.92	7.56 2,662.29	0.79 245.73	2.40 383.81	10.77 3,297.75
Ford	1.65 584.04	1.66 478.29	0.35 117.92	0.31 62.81	3.98 1,243.07
Franklin	0.16 37.22	4.15 1,515.96	1.15 360.12	4.37 666.19	9.83 2,579.49
Fulton	0.17 52.08	2.04 700.94	0.87 290.39	3.93 593.73	7.00 1,637.14
Gallatin	0.00 0.02	3.30 1,138.84	0.17 54.00	0.98 141.23	4.45 1,334.09
Greene	0.00 0.40	1.41 431.82	0.36 115.57	1.26 219.68	3.04 767.47
Grundy	1.60 533.21	2.21 732.01	1.13 383.00	3.22 547.78	8.15 2,196.00
Hamilton	0.00 0.83	2.68 930.67	0.24 74.71	0.30 53.74	3.22 1,059.95
Hancock	0.02 3.48	2.11 647.40	0.53 178.52	4.06 581.75	6.72 1,411.15
Hardin	0.01 2.06	0.45 159.04	0.12 36.58	1.06 175.14	1.63 372.83
Henderson	0.02 1.73	1.03 316.69	0.25 80.48	3.21 467.09	4.51 865.99
Henry	1.72 343.52	3.19 1,052.23	1.40 461.76	1.79 351.81	8.10 2,209.32
Iroquois	1.35 475.58	3.66 1,075.30	0.95 312.59	2.15 436.21	8.12 2,299.68
Jackson	0.16 31.53	2.42 870.58	1.24 390.05	3.71 612.29	7.54 1,904.45
Jasper	0.44 145.98	3.55 1,209.43	0.34 106.45	0.83 125.96	5.16 1,587.83
Jefferson	1.21 355.77	4.33 1,568.76	1.28 395.99	3.23 518.85	10.05 2,839.37
Jersey	0.03 10.34	1.22 418.46	0.52 168.82	2.10 333.43	3.87 931.05
JoDaviess	0.25 71.35	1.42 503.95	0.57 189.96	4.03 2,988.38	6.26 3,753.65
Johnson	0.06 3.71	0.53 228.66	0.44 135.29	1.45 265.21	2.47 632.87
Kane	3.20 894.90	14.00 4,684.37	7.91 2,742.55	6.69 1,591.85	31.80 9,913.67
Kankakee	3.12 903.41	4.45 1,541.44	2.27 762.27	1.94 856.38	11.78 4,063.50
Kendall	0.94 215.07	3.47 1,131.42	1.78 622.23	2.68 1,389.78	8.87 3,358.50
Knox	0.12 33.67	2.74 896.06	1.24 412.34	1.73 348.23	5.84 1,690.30

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Lake	2.04 443.88	19.05 6,455.85	11.25 3,904.71	18.73 3,826.92	51.08 14,631.36
LaSalle	4.02 1,075.69	5.69 1,876.49	2.72 903.63	6.07 1,108.53	18.50 4,964.33
Lawrence	0.06 14.20	6.78 2,415.35	0.42 130.88	0.57 96.09	7.83 2,656.52
Lee	0.87 228.61	2.79 883.14	1.05 345.75	2.04 1,864.96	6.75 3,322.46
Livingston	0.98 283.42	3.71 1,089.06	0.96 316.77	0.84 158.98	6.48 1,848.22
Logan	0.19 47.36	2.41 730.80	0.85 278.08	0.47 91.24	3.93 1,147.48
McDonough	0.29 92.07	2.04 640.60	0.61 204.45	0.50 105.32	3.45 1,042.43
McHenry	1.07 252.69	8.41 2,795.11	5.09 1,773.17	5.39 1,156.64	19.95 5,977.61
McLean	3.23 929.17	7.30 2,427.47	3.42 1,142.46	2.42 507.00	16.37 5,006.09
Macon	10.49 3,713.53	5.85 2,023.19	2.43 766.30	1.97 377.67	20.74 6,880.68
Macoupin	0.02 5.29	2.90 958.78	1.21 381.98	1.63 295.86	5.75 1,641.91
Madison	7.52 2,555.26	9.41 3,178.41	5.57 1,788.35	6.62 1,239.88	29.11 8,761.90
Marion	1.95 602.68	9.87 3,570.10	1.16 363.38	1.47 274.50	14.44 4,810.66
Marshall	1.95 377.87	1.13 374.47	0.38 124.87	2.54 376.21	6.01 1,253.41
Mason	0.20 64.05	1.33 425.65	0.37 125.44	5.14 742.31	7.05 1,357.44
Massac	1.07 287.09	0.76 269.92	0.44 138.76	0.73 114.66	3.00 810.43
Menard	0.04 15.42	0.97 314.50	0.30 94.99	0.78 145.99	2.09 570.90
Mercer	0.01 2.97	1.59 499.85	0.40 135.94	2.06 321.89	4.06 960.65
Monroe	0.10 17.37	1.72 582.91	0.73 234.11	2.24 363.18	4.78 1,197.56
Montgomery	0.48 145.16	2.41 729.45	0.96 299.60	1.92 331.46	5.77 1,505.67
Morgan	0.28 60.76	2.09 656.69	0.84 263.20	1.49 273.85	4.69 1,254.50
Moultrie	1.14 293.15	1.22 399.47	0.37 115.77	1.86 272.45	4.59 1,080.83
Ogle	2.51 694.50	3.25 1,128.20	1.43 472.16	4.64 1,910.09	11.83 4,204.95
Peoria	4.88 1,440.71	6.05 2,095.39	3.77 1,263.49	4.87 948.91	19.58 5,748.50

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
Perry	0.05 13.64	1.24 432.90	0.50 158.63	1.31 199.89	3.10 805.05
Piatt	0.42 121.91	1.62 495.63	0.47 155.68	0.32 67.10	2.83 840.32
Pike	0.24 42.05	1.95 584.27	0.58 181.73	4.68 724.77	7.45 1,532.82
Pope		0.29 125.50	0.12 36.71	0.85 126.55	1.26 288.76
Pulaski	0.03 10.70	0.53 182.76	0.22 69.50	0.60 90.27	1.38 353.22
Putnam	0.36 116.27	0.47 164.66	0.15 50.65	2.80 414.27	3.78 745.86
Randolph	1.05 327.90	2.02 671.05	0.81 255.10	4.51 703.40	8.39 1,957.46
Richland	0.04 12.20	4.08 1,418.04	0.45 140.81	0.58 97.34	5.14 1,668.38
Rock Island	2.28 556.14	4.72 1,662.88	2.96 997.39	7.61 1,286.65	17.57 4,503.06
St. Clair	1.76 522.33	7.93 2,706.06	5.30 1,704.04	4.15 795.31	19.15 5,727.73
Saline	0.06 8.94	1.41 502.70	0.64 202.76	0.91 149.67	3.02 864.06
Sangamon	1.02 178.97	7.28 2,486.51	4.39 1,381.02	6.02 1,177.78	18.71 5,224.29
Schuyler	0.02 6.06	0.79 237.87	0.21 68.20	0.93 139.42	1.95 451.55
Scott	0.01 0.79	0.60 187.60	0.18 54.99	0.48 75.33	1.27 318.71
Shelby	0.19 65.43	2.31 721.18	0.62 195.97	2.59 411.72	5.71 1,394.31
Stark	0.01 4.52	0.90 266.67	0.16 54.75	0.20 35.81	1.28 361.75
Stephenson	0.48 134.17	2.44 831.31	1.06 356.40	0.52 1,219.07	4.50 2,540.95
Tazewell	3.57 1,064.39	5.08 1,785.31	2.92 978.68	4.04 749.74	15.62 4,578.13
Union	0.04 3.29	0.79 320.21	0.53 166.35	1.79 302.65	3.15 792.50
Vermilion	7.30 2,378.97	4.09 1,367.93	1.77 592.21	2.17 431.31	15.33 4,770.42
Wabash	0.02 5.87	3.93 1,399.56	0.28 90.19	0.94 142.45	5.17 1,638.07
Warren	0.04 14.39	1.77 528.29	0.46 150.89	0.48 106.16	2.75 799.72
Washington	0.33 88.17	3.03 1,000.82	0.63 196.49	0.66 124.71	4.65 1,410.19
Wayne	0.42 53.45	5.58 1,936.38	0.58 180.74	0.97 180.88	7.55 2,351.44

Table E-2: County Level VOM Emissions (continued)

County	Point	Area	On-road	Off-road	Total
White	0.23 45.84	9.96 3,548.03	0.48 149.35	1.55 229.77	12.21 3,972.99
Whiteside	0.59 166.99	3.14 1,059.55	1.33 447.46	3.37 564.83	8.43 2,238.83
Will	7.74 2,390.18	17.95 6,018.82	10.76 3,712.42	9.33 2,006.46	45.77 14,127.89
Williamson	0.65 172.83	2.37 892.51	1.66 519.43	5.44 875.06	10.11 2,459.82
Winnebago	2.33 610.32	9.27 3,242.74	5.96 2,001.50	4.12 878.18	21.69 6,732.74
Woodford	0.20 50.47	2.28 778.12	0.89 293.96	3.96 630.04	7.33 1,752.58

Top value has units of tons/day
Bottom value has units of tons/year

Electronic Filing: Received, Clerk's Office 6/1/2018 P.C. #2751

Appendix F

Area Source Emission Factors And Growth Factors

Table F-1: Area Source Emission Factors

Area Source Category	NOx Emission Factor	VOM Emission Factor	Units
Agricultural field burning			
Corn	14.49	20.79	lb/acre
Corn/soybeans	13.73	30.07	lb/acre
Corn/wheat	11.41	17.32	lb/acre
Cotton	9.76	16.96	lb/acre
Fallow	9.15	19.57	lb/acre
Grass	6.97	17.28	lb/acre
Other	6.97	17.28	lb/acre
Rice	14.02	11.25	lb/acre
Soybeans	11.86	22.44	lb/acre
Sugar cane	18.72	27.79	lb/acre
Wheat	7.67	12.27	lb/acre
Wheat/cotton	8.90	18.31	lb/acre
Wheat/soybeans	9.75	17.22	lb/acre
Agricultural pesticide application		2.07	lb/acre
Architectural coating		2.34	lb/person
Asphalt paving – cutback		88	lb/bbl
Asphalt paving – emulsion		9.2	lb/bbl
Automobile refinishing		94.69	lb/employee
Commercial cooking		72.32	lb/1000 persons
Consumer solvent use		8.43	lb/person
Forest fires	22.41	49.16	lb/acre
Fuel Combustion – Commercial/Institutional			
Distillate oil	20	0.34	lb/1000 gallons
Kerosene	19.29	0.33	lb/1000 gallons
LPG	9.48	0.52	lb/1000 gallons
Natural gas	100	5.5	lb/million ft^3
Residual oil	47	1.13	lb/1000 gallons
Fuel combustion – Industrial			
Distillate oil	20	0.2	lb/100 gallons
Natural gas	100	5.5	lb/million ft^3
Residual oil	55	0.28	lb/1000 gallons

Table F-1: Area Source Emission Factors (continued)

Area Source Category	NOx Emission Factor	VOM Emission Factor	Units
Fuel combustion – Residential			
Coal	9.1	10	lb/ton
Distillate oil	18	0.7	lb/1000 gallons
Kerosene	17.4	0.68	lb/1000 gallons
LPG	13.4	0.52	lb/1000 gallons
Natural gas	94	5.5	lb/million ft^3
Graphic arts		201	lb/employee
Incineration	0.26	0.17	lb/person
Industrial surface coating – maintenance		0.6	lb/person
Industrial surface coating – other special purpose		0.064	lb/person
Open burning			
Land clearing	5	11.6	lb/ton
Prescribe burning	20.14	44.19	lb/acre
Residential waste	6	8.56	lb/ton
Yard waste – brush	5	19	lb/ton
Yard waste – leaves	6.2	28	lb/ton
Pavement marking		0.29	lb/road-mile
Solvent cleaning		37	lb/employee
Structure fires	1.61	12.65	lb/fire
Waste water treatment - POTW		0.85	lb/million gallons

Table F-2: Area Source Growth Factors

Area Source Category	**Growth factor from 2011 to 2014**
Aircraft refueling – Stage I	1
Aircraft refueling – Stage II	1
Gasoline marketing – gasoline storage tanks	Varies by county
Gasoline marketing – tank trucks	Varies by county
Locomotives – Class I – NOX	0.92
Locomotives – Class I – VOM	0.8281
Locomotives – Class II/III – NOX	1.0279
Locomotives – Class II/III – VOM	1.05
Marine vessel loading	1
Portable fuel containers – commercial	0.946
Portable fuel containers – residential	0.946

Appendix G

Area Source
Daily Adjustment Factors
Seasonal Adjustment Factors
Control Efficiencies

Table G-1: Area Source Daily Adjustment Factors, Seasonal Adjustment Factors and Control Efficiencies

Area Source Category	Daily Adjustment Factor	Seasonal Adjustment Factor	Control Efficiency (%)
Agricultural field burning	0	0	
Agricultural pesticide application	0.00321	1.3	
Architectural coating	0.00275	1.3	
Asphalt paving – cutback	0	0	
Asphalt paving – emulsion	0.00321	2	
Automobile refinishing	0.00385	1	Note 1
Commercial cooking	0.00275	1	
Consumer solvent use	0.00275	1	
Forest fires	0.00275	2.1	
Fuel combustion – commercial/institutional – distillate oil	Note 2	Note 2	
Fuel combustion – commercial/institutional – kerosene	Note 2	Note 2	
Fuel combustion – commercial/institutional – LPG	Note 2	Note 2	
Fuel combustion – commercial/institutional – natural gas	Note 2	Note 2	
Fuel combustion – commercial/institutional – residual oil	Note 2	Note 2	
Fuel combustion – industrial – distillate oil	Note 2	Note 2	
Fuel combustion – industrial – natural gas	Note 2	Note 2	
Fuel combustion – industrial – residual oil	Note 2	Note 2	
Fuel combustion – residential – coal	Note 2	Note 2	
Fuel combustion – residential – distillate oil	Note 2	Note 2	
Fuel combustion – residential – kerosene	Note 2	Note 2	
Fuel combustion – residential – LPG	Note 2	Note 2	
Fuel combustion – residential – natural gas	Note 2	Note 2	
Fuel combustion – residential – wood (all types)	0	0	
Graphic arts	0.00385	1	
Incineration	0.00275	1	
Industrial surface coating – maintenance	0.00385	1	
Industrial surface coating – other special purpose	0.00385	1	

Table G-1: Area Source Daily Adjustment Factors, Seasonal Adjustment Factors and Control Efficiencies (continued)

Area Source Category	Daily Adjustment Factor	Seasonal Adjustment Factor	Control Efficiency (%)
Open burning – land clearing	0.00366	1.5	
Open burning – prescribed burning	0	0	
Open burning – residential waste	0.00275	1	
Open burning – yard waste – brush	0	0	
Open burning – yard waste – leaves	0	0	
Pavement marking	0.00385	1.72	
Portable fuel containers – commercial	1	1	
Portable fuel containers – residential	1	1	
Solvent cleaning	0.00321	1	
Structure fires	Note 3	Note 3	
Waste water treatment – POTW	0.00275	1	

Notes:

1: 72% for nonattainment areas and 33% for attainment areas

2: Actual consumption data for June, July, and August was used so there is no need to convert annual data to peak ozone season. The daily consumption rate was the amount of fuel used in those three months divided by the number of days (92) in those months.

3: The actual number of fires for June, July, and August were used so there is no need to convert annual data to peak ozone season. The daily rate was the number of fires in those three months divided by the number of days (92) in those months.

Electronic Filing: Received, Clerk's Office 6/1/2018 P.C. #2751

APPENDIX H

Nonattainment Township Surrogates and Apportionment

Table H-1: Nonattainment Township Surrogates and Apportionment

		Percent of County Value	
Surrogate	**Category**	**Grundy County Townships**	**Kendall County Townships**
Area	Agricultural Pesticide Application Forest Fires Prescribed Burning	13.00	12.00
Miles of Roadway	Asphalt Paving Pavement Markings	11.00	23.00
Miles of Track	Locomotives	20.0	19.0
Miles of Water	Commercial Marine Vessels Marine Vessel Loading and Transport	50.00	0.00
Population	Architectural Coating Automobile Refinishing Commercial Cooking Consumer Solvent Use Dry Cleaning Fuel Combustion Fuel Marketing Graphic Arts Incineration Industrial Coating On-road Mobile Open Burning Portable Fuel Containers POTWs Solvent Cleaning Structure Fires	29.4	44.3

ATTACHMENT 3

2016

ILLINOIS REGISTER

Rules of Governmental Agencies

Volume 40, Issue 33

August 12, 2016

Pages 10,728 - 11,078

Index Department
Administrative Code Division
111 E. Monroe St.
Springfield, IL 62756
217-782-7017

Printed by authority of the State of Illinois August — 90

PUBLISHED BY JESSE WHITE • SECRETARY OF STATE

TABLE OF CONTENTS

August 12, 2016 Volume 40, Issue 33

ENVIRONMENTAL PROTECTION AGENCY

NOTICE OF PUBLIC INFORMATION

The Illinois Environmental Protection Agency ("Illinois EPA") Bureau of Air will hold a public hearing on Wednesday, September 14, 2016, at 10:00 a.m. in the Regional Conference Room at the Illinois Department of Transportation Regional Office, 1102 Eastport Plaza Drive in Collinsville IL. The public hearing will be held for the purpose of gathering public comments on the draft "Maintenance Plan for the Illinois Portion of the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard" ("Maintenance Plan") and the "Illinois EPA Certification of Emissions Statement Requirement for the 2008 Ozone National Ambient Air Quality Standard" ("Certification of Emissions Statement").

The Maintenance Plan requests that the United States Environmental Protection Agency ("USEPA") redesignate the Metro-East Nonattainment Area to attainment of the 2008 8-hour ozone National Ambient Air Quality Standard ("NAAQS") and sets forth additional information supporting redesignation. The Maintenance Plan also sets forth the State's plan for continued attainment of the 2008 ozone standard for the area for a period of at least ten years after USEPA formally redesignates the area. The Illinois EPA intends to submit the Maintenance Plan to USEPA as a revision to Illinois' State Implementation Plan ("SIP") under the Clean Air Act ("CAA"), 42 USC 7401 et seq.

The Certification of Emissions Statement verifies that the Illinois EPA's current emission statement program, also known as the Annual Emissions Report, which was approved by USEPA into the Illinois SIP on May 15, 2002, remains in place for all Illinois areas designated nonattainment for the 2008 Ozone NAAQS. It also certifies that the existing emissions statement program meets the requirements of Section 182(a)(3)(B) of the CAA for the Chicago and Metro-East nonattainment areas. The Illinois EPA intends to submit the Certification of Emissions Statement to USEPA as a revision to Illinois' SIP under the CAA.

The hearing will be held in accordance with the provisions of the Illinois EPA's "Procedures for Informational and Quasi-Legislative Public Hearings," set forth at 35 Ill. Adm. Code 164. Any questions about the hearing procedures, requests for copies of the hearing rules, or other requests should be directed to Dean Studer, the Illinois EPA's Hearing Officer, at the address and telephone number listed below.

Dean Studer, Hearing Officer
Illinois EPA
1021 North Grand Avenue East
P.O. Box 19276
Springfield IL62794-9276

ENVIRONMENTAL PROTECTION AGENCY

NOTICE OF PUBLIC INFORMATION

217/558-8280 or TDD: 217/782-9143

The Hearing Record will close on Friday, October 14, 2016. Written comments will be accepted but must be directed to Dean Studer at the address above, and must be physically received by October 14, 2016.

Copies of the proposed SIP revisions may be viewed by the public during regular business hours (Monday through Friday 8:30 a.m. to 4:30 p.m., except for State holidays) at the following Illinois EPA offices: 1021 North Grand Avenue East, Springfield IL; 2009 Mall Street, Collinsville IL; and 9511 Harrison Street, Des Plaines IL. No walk-in requests for copies of this material will be accommodated, unless advance notice is provided. Requests and public inquiries should be directed to Dean Studer at the address and phone number listed above.

This notice is intended to satisfy the requirements of Section 110(a) and (l) of the CAA regarding public notice for SIP submittals, 42 USC 7410(a) and (l).

ATTACHMENT 4

Responsiveness Summary of the Illinois Environmental Protection Agency
Following a Public Hearing on September 14, 2016

BACKGROUND

On September 14, 2016, the Illinois Environmental Protection Agency ("Illinois EPA") held a public hearing in Collinsville, Illinois, for the purpose of gathering public comments on the draft "Maintenance Plan for the Illinois Portion of the Metro-East St. Louis Ozone Nonattainment Area for the 2008 8-Hour Ozone Standard" ("Maintenance Plan"). The Maintenance Plan requests that the United States Environmental Protection Agency ("USEPA") redesignate the Metro-East Nonattainment Area to attainment of the 2008 8-hour ozone National Ambient Air Quality Standard ("NAAQS"). The Maintenance Plan also sets forth the State's plan for continued attainment of the 2008 ozone standard for the area for a period of at least ten years after the USEPA redesignates the area to attainment.

The Illinois EPA is submitting the Maintenance Plan to USEPA as a revision to Illinois' State Implementation Plan ("SIP") under the Clean Air Act ("CAA") 42 USC § 7401 *et seq*. Prior to submittal to USEPA, the Illinois EPA accepted public comments on the proposed Maintenance Plan. The comment period closed on October 14, 2016.

DECISION

The Illinois EPA is submitting the redesignation request as planned.

QUESTIONS AND COMMENTS WITH RESPONSES FROM ILLINOIS EPA

During the public hearing, the Illinois EPA received questions from hearing attendees. A summary of those questions and the Illinois EPA's response are below:

1. Who is the East-West Gateway? (pg. 23)

   The East-West Gateway Council of Governments is an organization based in St. Louis but they cover both the Illinois and Missouri side. They work with the Illinois government, Missouri government, and many local governments. They have many goals, but in particular, related to this proceeding, they are the organization that handles transportation conformity.

2. Can you explain a little bit what some of the assumptions were in how the NO_x emissions are going to go down, if it was mostly mobile reductions due to standards that are coming for mobile sources or if it's more pointed towards stationary sources. (pg. 24)

   Area sources don't usually typically emit a lot of NO_x, so you're not really going to see much change there. Where you do see a lot of the NO_x reductions are on the on-road and off-road.

With different fleet standards coming in, car, truck turnover, any new standards that the federal government has implemented or will be implementing, that is where you're going to see a lot of those reductions come from.

3. Can you talk a little bit about on-road and things like E15 fuels? Are those part of this modeling? IS there anything assumed as far as emission impacts from that? (pg. 27)

   The MOVES runs performed by the Agency for the on-road mobile portion of the inventory included the use of E-15. The default market shares included in the MOVES model were used when calculating emissions. For the runs applicable to this redesignation request, the market shares were as follows:

   2014: 3.1%
   2020: 9.7%
   2030: 20.0%

Comments Received During the Comment Period:

The Illinois Environmental Regulatory Group ("IERG") supports the Illinois EPA's request to USEPA to redesignate the area to attainment of the 2008 8-hour ozone standard.

IERG believes the Illinois EPA has sufficiently demonstrated successful and continued attainment of the 2008 8-hour ozone standard in the Metro-East Area and supports the Agency's request to the USEPA for redesignation of the nonattainment area. IERG supports prompt redesignations in instances where areas of nonattainment make air quality improvements to reach attainment, as accurate designation status is important to convey to the public the quality of the air, and also to ensure that businesses located in these areas are not unnecessarily burdened.

FOR ADDITIONAL INFORMATION

Requests for documents and additional questions should be directed to:

Brad Frost
Illinois Environmental Protection Agency
Office of Community Relations
1021 North Grand Avenue, East
PO Box 19506
Springfield, IL 62794

217/782-7027
TDD: 217/782-9143
brad.frost@illinois.gov

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R18-20
AMENDMENTS TO 35 ILL. ADM.	)	(Rulemaking-Air)
CODE 225.233, MULTI-POLLUTANT	)	
STANDARDS	)	

POST-HEARING COMMENTS
OF THE ILLINOIS ATTORNEY GENERAL'S OFFICE

Attachment 3

Maintenance Plan for the Chicago Nonattainment Area for the 1997 PM2.5 National Ambient Air Quality Standards (Revised) (Jul. 7, 2011)

DRAFT

Maintenance Plan for the Chicago Nonattainment Area for the 1997 $PM_{2.5}$ National Ambient Air Quality Standards (Revised)

AQPSTR 11-05

July 7, 2011

Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

This document describes Illinois' Maintenance Plan for the Illinois portion of the Chicago fine particulate matter ($PM_{2.5}$) nonattainment area (NAA), hereafter referred to as the Chicago NAA. An approved Maintenance Plan is required before an area can be redesignated from nonattainment to attainment of a National Ambient Air Quality Standard (NAAQS). This document provides technical information required to support a request to redesignate the Chicago NAA to attainment of the 1997 annual $PM_{2.5}$ NAAQS. This revision incorporates motor vehicle emissions estimates developed using the U.S. EPA's MOVES model. The Indiana Department of Environmental Management (IDEM), has prepared a similar plan for the Indiana portion of the Chicago NAA.

$PM_{2.5}$ air quality has improved in the Chicago area as a result of the implementation of State and Federal emissions control measures since the designation of the area as nonattainment in 2004. The air quality improvement is due to permanent and enforceable emissions control measures. The entire Chicago NAA has at least three years of complete, quality assured ambient air quality monitoring data for 2007-2009 that demonstrates compliance with the 1997 NAAQS. The U.S. EPA has made a determination that the Chicago NAA has attained the 1997 fine particle standard (40 CFR 52.74, p. 62243-62249).

This Maintenance Plan provides for continued attainment of the 1997 $PM_{2.5}$ air quality standards for the Chicago nonattainment area for a period of at least ten years after U.S. EPA has formally redesignated the area to attainment. The Plan also provides assurances that, even if there is a subsequent violation of the air quality standard, contingency measures listed in the Plan will be triggered to prevent any future occurrences. Finally, the Plan includes on-road motor vehicle emissions budgets for the years 2008 and 2025 for use in transportation conformity determinations to assure that any increases in emissions from this sector do not jeopardize continued attainment of the $PM_{2.5}$ standards during the maintenance period.

1.0 INTRODUCTION

The Illinois Environmental Protection Agency (Illinois EPA) has prepared this document to describe Illinois' $PM_{2.5}$ Maintenance Plan for the Chicago NAA. This Maintenance Plan is required before the area can be redesignated from nonattainment to attainment of the annual National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ promulgated by the U.S. Environmental Protection Agency (U.S. EPA) in 1997. The Illinois EPA intends to submit such a request to the U.S. EPA in conjunction with this Maintenance Plan. The entire Chicago nonattainment area, including Lake and Porter counties in Indiana, has at least three years of complete, quality assured ambient air quality monitoring data for the most recent 3-year period, 2007-2009, demonstrating attainment of the annual $PM_{2.5}$ NAAQS promulgated in 1997. U.S. EPA finalized its determination that the entire Chicago NAA attains the 1997 $PM_{2.5}$ NAAQS in November 2009.

This document provides the technical information needed to support a request to redesignate the Chicago area to attainment of the 1997 annual $PM_{2.5}$ NAAQS. Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for a nonattainment area to be considered for redesignation. Before an area can be reclassified to attainment:

- U.S. EPA must make a determination that the area has attained the NAAQS based on at least three complete years of ambient monitoring data.
- U.S. EPA must have approved a State Implementation Plan (SIP) for the area under Section 110 and Part D of the CAA.
- The state must demonstrate that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
- The state must submit, and U.S. EPA must approve, a Maintenance Plan under Section 175(A) of the CAA, including provisions for contingency measures that will be implemented if future violations of the NAAQS are measured.

This Maintenance Plan provides for the continued attainment of the annual $PM_{2.5}$ NAAQS for the Chicago NAA for a period of at least ten years after U.S. EPA has formally redesignated the area to attainment. The Plan also provides assurances that even if a subsequent violation of the annual $PM_{2.5}$ NAAQS occurs, provisions in the Plan will prevent any future occurrences through the enactment of contingency measures that would be triggered upon such occurrence.

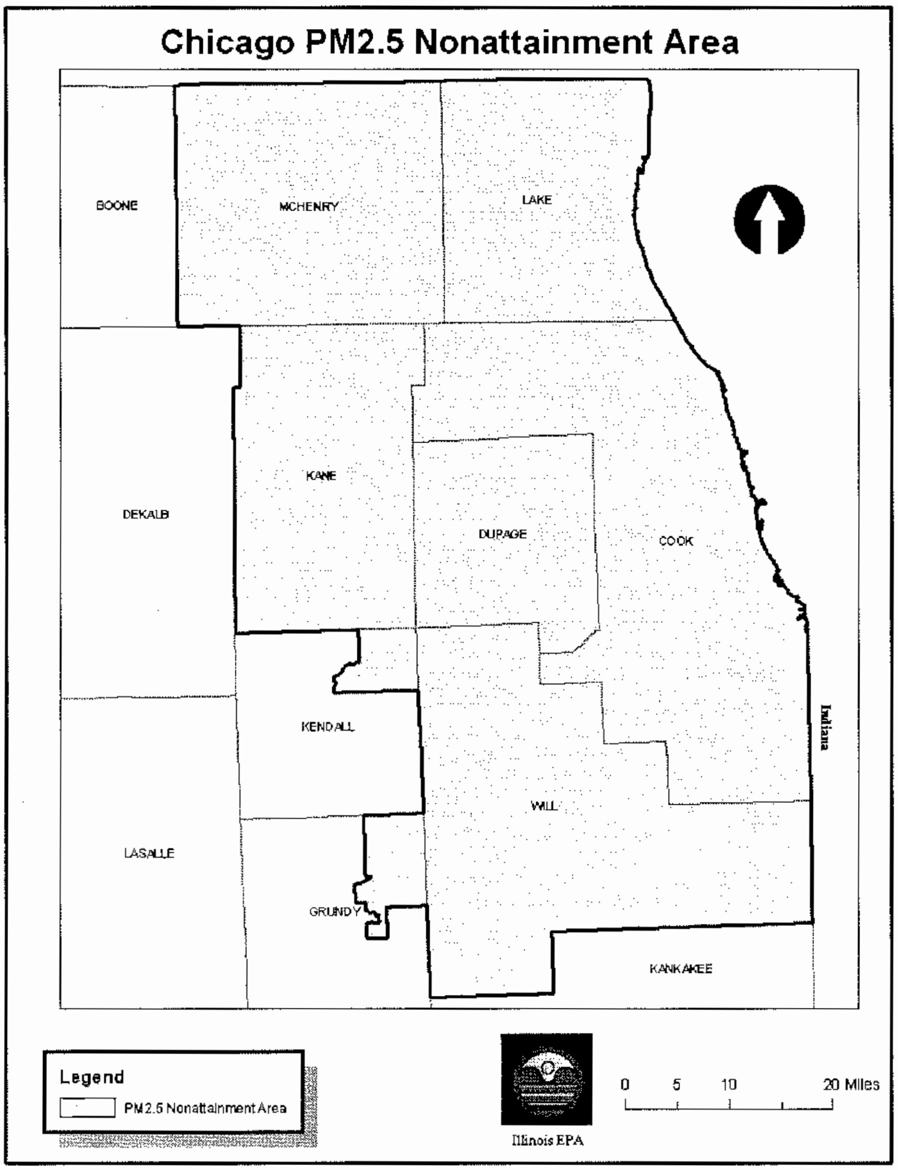
This document addresses the Maintenance Plan requirements established by the CAA and U.S. EPA, and includes additional information to support continued compliance with the $PM_{2.5}$ NAAQS.

1.1 Regulatory Background

The CAA requires areas that fail to meet the NAAQS for $PM_{2.5}$ to develop SIPs to expeditiously attain and maintain the NAAQS. Historically, one-year exceedances of the annual $PM_{2.5}$ NAAQS have been monitored as recently as 2007 at one monitor in Cook County, but all monitors in the NAA are now in attainment of the $PM_{2.5}$ NAAQS.

The Chicago NAA, which includes all of Cook, DuPage, Kane, Lake, McHenry and Will counties, as well as portions of Grundy and Kendall counties, was originally designated as nonattainment of the 1997 annual $PM_{2.5}$ in 2004. The Chicago area was designated unclassifiable/attainment for the 24-hour $PM_{2.5}$ standard that was also promulgated in 1997, and revised in 2006. Since the Chicago area is not a nonattainment area for the 24-hour $PM_{2.5}$ NAAQS, any reference to the $PM_{2.5}$ NAAQS in the remainder of this document refers only to the annual $PM_{2.5}$ standard promulgated in 1997. Figure 1.1 depicts the boundaries of the Chicago $PM_{2.5}$ NAA in Illinois.

Figure 1.1- Chicago $PM_{2.5}$ Nonattainment Area



The following is a list of the counties contained in the Chicago $PM_{2.5}$ nonattainment area:

- Cook County, IL
- DuPage County, IL
- Kane County, IL
- Lake County, IL
- McHenry County, IL
- Will County, IL
- Aux Sable and Goose Lake Townships in Grundy County, IL, and
- Oswego Township in Kendall County, IL

As a result of the nonattainment designation, this area was subject to new requirements, including development of an attainment strategy that would allow the area to meet the federal $PM_{2.5}$ NAAQS by June 15, 2010. The attainment strategy recognizes the importance of reducing both locally-generated as well as incoming (transported) $PM_{2.5}$ and precursor emissions. State and Federal emissions control measures have reduced primary and secondary $PM_{2.5}$ emissions both locally and regionally and have enabled the Chicago NAA to attain the $PM_{2.5}$ NAAQS by the attainment deadline established by the U.S. EPA.

1.2 Status of Air Quality

$PM_{2.5}$ monitoring data for the most recent three-year period, 2007 through 2009, demonstrates that air quality has met the 1997 $PM_{2.5}$ NAAQS in the Chicago NAA. Information regarding the air monitoring network and air quality monitoring data is included in Section 3.0 and Appendix A.

2.0 REDESIGNATION AND MAINTENANCE PLAN REQUIREMENTS

Sections 107 and 110 of the CAA list a number of requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. One of those requirements is the development of a Maintenance Plan, which describes a state's plan for maintaining the NAAQS for a minimum ten-year period after redesignation. The Illinois EPA developed this Maintenance Plan according to the guidance published by the U.S.EPA entitled "Procedures for Processing Requests to Redesignate Areas to Attainment" (September 4, 1992).

Before a redesignation to attainment can be promulgated, U.S. EPA must:

- Determine that the NAAQS for $PM_{2.5}$, as published in 40 CFR 50.4, has been attained. $PM_{2.5}$ monitoring data must show that violations of the NAAQS are no longer occurring. This showing must rely on three consecutive years of data. The ambient air monitoring data must be quality assured in accordance with 40 CFR 58.10, recorded in U.S. EPA's Air Quality System (AQS) data base, and made available to the public. U.S. EPA has already finalized and published a finding that the area has, in fact, attained the NAAQS. This finding was published in the Federal Register in November 2009.

- Approve the state's plan for demonstrating attainment. The attainment plan, which is based on air quality modeling, must contain enforceable control measures and must be submitted as a revision to the state's SIP after a public hearing.

- Determine that the improvement in air quality between the year violations occurred and the year that attainment was achieved is based on permanent and enforceable emissions reductions.

- Approve the state's Maintenance Plan. The requirements for the Maintenance Plan are discussed below.

- Determine that all other requirements applicable to the nonattainment area have been met.

A $PM_{2.5}$ Maintenance Plan provides for the continued attainment of the $PM_{2.5}$ NAAQS for a nonattainment area for a period of at least ten years after U.S. EPA has formally redesignated the area to attainment. To be approvable, the state is required to have a public comment period and provide the opportunity for a public hearing on the Maintenance Plan prior to adoption. The Maintenance Plan must contain the following elements:

- A comprehensive "attainment year" emissions inventory of primary $PM_{2.5}$ and the precursors of secondary $PM_{2.5}$: oxides of nitrogen (NO_x) and sulfur dioxide (SO_2);

- A projection of the emissions inventory forward to a year at least ten years after redesignation and a demonstration that the projected level of emissions is sufficient to maintain attainment of the $PM_{2.5}$ NAAQS;
- A commitment that, once redesignated, the state will continue to operate an appropriate monitoring network to verify maintenance of the attainment status;
- A demonstration of legal authority to implement and enforce all control measures contained in the SIP;
- Provisions for future updates of the inventory to enable tracking of emissions levels, including an annual emissions statement from major sources;
- Motor vehicle emissions budgets for transportation conformity for the ten-year maintenance period;
- A commitment to submit a revised Maintenance Plan eight years after redesignation;
- A commitment to enact and implement additional contingency measures expeditiously in the event that future violations of the NAAQS occur; and
- A list of potential contingency measures that would be implemented in such an event.

This Maintenance Plan has been prepared in accordance with the requirements specified in U.S. EPA's guidance document and additional guidance received from U.S. EPA staff. The following sections of this document describe how U.S. EPA's requirements have been met.

3.0 $PM_{2.5}$ MONITORING

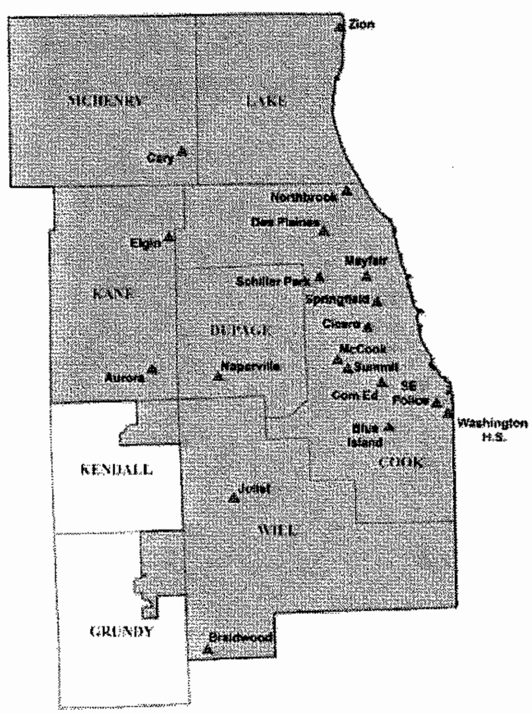
U.S. EPA's published guidance document, "Procedures for Processing Requests to Redesignate Areas to Attainment" (September 4, 1992), details specific requirements regarding the collection and use of ambient air monitoring data needed to support a redesignation request. Before the Chicago NAA can be redesignated, Illinois must demonstrate that the $PM_{2.5}$ NAAQS has been attained. $PM_{2.5}$ monitoring data must show that violations of the NAAQS are no longer occurring within the nonattainment area. This showing must rely on three complete, consecutive calendar years of quality assured data. Further, the air monitoring data must be quality assured in accordance with 40 CFR 58.10, recorded in U.S. EPA's AQS data base, and made available to the public. As previously mentioned, U.S.EPA has made a finding that the Chicago NAA has met these requirements and is attaining the 1997 $PM_{2.5}$ NAAQS. Finally, Illinois must commit to continue to operate an appropriate monitoring network to verify the maintenance of the attainment status, once the area has been redesignated.

The following subsections describe how each of these requirements has been addressed.

3.1 Monitored Design Values

Currently there are 19 $PM_{2.5}$ monitors located in the nonattainment counties in the Illinois portion of the Chicago nonattainment area. Figure 3.1 shows the locations of these monitors.

Figure 3.1 - $PM_{2.5}$ Monitors in the Chicago Nonattainment Area



To determine whether the NAAQS has been met, the annual $PM_{2.5}$ design value has been calculated for the 3-year period, 2007-2009. The current U.S. EPA method for calculating the annual $PM_{2.5}$ design value is to average each monitor's annual average values over a 3-year period and compare the calculated design values to the 15.0 microgram per cubic meter level of the NAAQS. The calculated annual $PM_{2.5}$ design values for the monitors in the Chicago NAA for 2007-2009 are included as Appendix A of this report. Figure 3.2 compares the design values for 2000-2002, when the area was initially recommended for designation as a nonattainment area, and the 2007-2009 period for monitoring stations in the Chicago region. The comparison shows that $PM_{2.5}$ air quality has improved considerably since 2000-2002 throughout the Chicago NAA. The 2007-2009 data shows that the design values at all monitoring sites are less than the level of the annual $PM_{2.5}$ NAAQS, demonstrating that the area attains the annual $PM_{2.5}$ air quality standard.

3.2 Quality Assurance

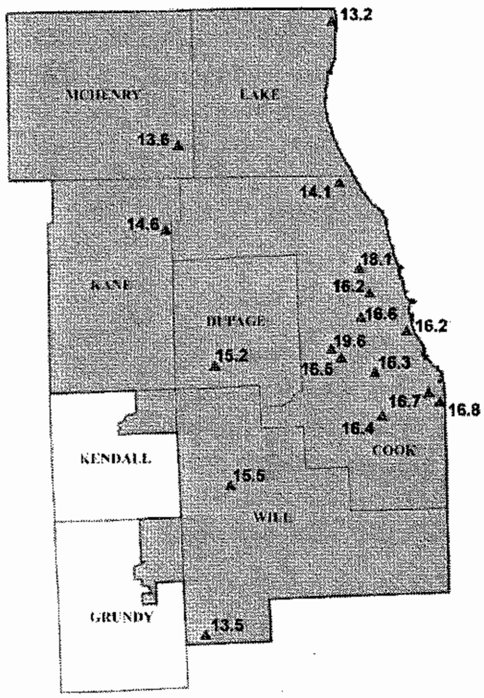
The Illinois EPA has quality assured all monitoring data shown in Appendix A for all sites located in Illinois in accordance with 40 CFR 58.10 and the Illinois EPA's Quality Assurance Plan, which describes Illinois EPA's standard operating procedures for operating the ambient monitoring network and validating the data. The Illinois EPA has recorded the monitoring data in the U.S. EPA's AQS database, which is available to the public.

3.3 Continued Monitoring

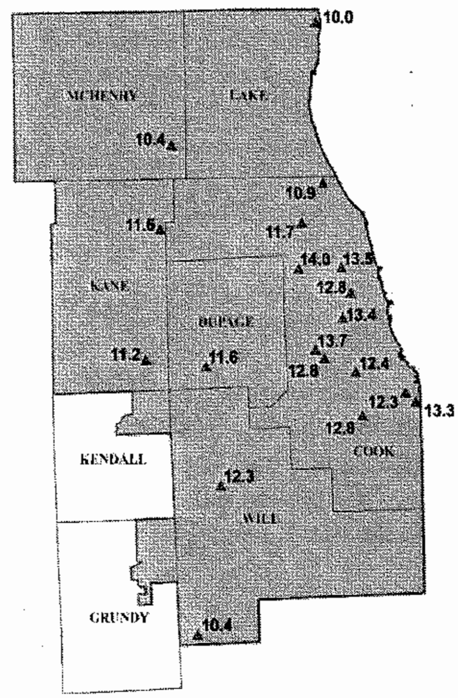
Illinois commits to continue monitoring $PM_{2.5}$ levels according to a U.S. EPA approved monitoring plan, as required to ensure maintenance of the $PM_{2.5}$ NAAQS. Should changes in the location of a $PM_{2.5}$ monitor become necessary, the Illinois EPA will work with U.S. EPA to ensure the adequacy of the monitoring network. The Illinois EPA will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. The Illinois EPA will continue to enter all data into AQS on a timely basis in accordance with federal guidelines.

Figure 3.2 - $PM_{2.5}$ Design Values for the Chicago Nonattainment Area Between 2000-2002 and 2007-2009

2000-2002 Design Values



2007-2009 Design Values



4.0 EMISSIONS INVENTORY

A redesignation request must contain a demonstration that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emissions reductions. As described previously in Section 3.0, a three-year monitoring period is used to evaluate whether actual air quality attainment has been achieved. In this Section, the "attainment year" refers to the mid-point year (2008) of the three-year period (2007-2009) used to demonstrate attainment. As required by U.S.EPA redesignation guidance, this request also includes a projection of the emissions inventory to a year at least 10 years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the $PM_{2.5}$ NAAQS, and a commitment to provide future updates of the inventory to enable tracking of emissions levels during the 10-year maintenance period.

4.1 Attainment Year Inventory

The Illinois EPA has prepared a comprehensive emissions inventory for the Chicago $PM_{2.5}$ nonattainment area, including point, area, and on-road and off-road mobile sources for primary $PM_{2.5}$ as well as precursors of $PM_{2.5}$ (NOx and SO_2) for the year 2008. The Illinois EPA selected 2008 emissions data to represent the "attainment year" since it is the middle year of the 3-year period (2007-2009) which demonstrates monitored attainment. This inventory is based on actual activity levels. Point source information was compiled from 2008 Annual Emissions Reports (AERs) submitted to the Illinois EPA by emissions sources. Area source emissions were calculated using the most recently available methodologies and emissions factors from U.S. EPA along with activity data (typically population, employment, fuel use, etc.) specific to 2008. On-road mobile source emissions were calculated using U.S. EPA's MOVES emissions model with 2008 vehicle miles traveled (VMT) data provided by the Illinois Department of Transportation (IDOT). Off-road mobile source exhaust emissions, such as those from lawn and garden equipment, agricultural equipment, and construction equipment were calculated for summer 2008 using U.S. EPA's NONROAD emissions model. Emissions sources such as commercial marine vessels, locomotives and aircraft were not included in the NONROAD model and were calculated separately. Biogenic emissions were not included in these summaries.

Table 4.1 summarizes the 2008 emissions estimates for the Chicago $PM_{2.5}$ nonattainment area.

Table 4.1
2008 $PM_{2.5}$, NOx, and SO_2 Emissions (tons per year)

Source Category	$PM_{2.5}$	NOx	SO_2
Point Sources	3,859	35,939	90,706
Area Sources*	9,189	32,318	4,109
On-Road Mobile Sources	5,100	127,951	537
Off-Road Mobile Sources	3,653	51,184	779
Total	21,800	247,391	96,130

*does not include fugitive dust emissions from construction (residential, road and other) and agricultural tilling

4.2 Air Quality Improvements and Emissions Controls

The Chicago area was designated as nonattainment of the 1997 $PM_{2.5}$ NAAQS in 2004. Since that time, permanent and enforceable reductions of primary $PM_{2.5}$ and secondary $PM_{2.5}$ precursor emissions have contributed to improvements in $PM_{2.5}$ air quality and to the attainment of the $PM_{2.5}$ NAAQS. Some of these emissions reductions were due to the application of tighter federal emissions standards on motor vehicles and fuels, and some due to the requirements of the federal NOx SIP Call. Section 5.0 of this report describes these reductions in more detail, along with an explanation of their regulatory status. In this subsection, the 2008 attainment year emissions levels are compared to the base year 2002 emissions levels.

The U.S. EPA's $PM_{2.5}$ Emissions Inventory Guidance requires that states with $PM_{2.5}$ nonattainment areas prepare and submit a 2002 base year inventory of anthropogenic sources of direct $PM_{2.5}$ and precursors of secondary $PM_{2.5}$ emissions, namely NO_x and SO_2. This base year inventory included emissions from point, area, on-road mobile and off-road mobile emissions. The Illinois EPA prepared and submitted this inventory in May 2006. Table 4.2 summarizes 2002 emissions by major source category and by pollutant for the Chicago NAA. This summary has been revised to incorporate emissions estimates for on-road mobile sources using U.S. EPA's MOVES model.

Table 4.2
2002 $PM_{2.5}$ NOx, and SO_2 Emissions (tons per year)

Source Category	$PM_{2.5}$	NOx	SO_2
Point Sources	2,757	54,050	121,598
Area Sources	22,356	32,325	3,290
On-Road Mobile Sources	6,573	187,632	4,472
Off-Road Mobile Sources	4,834	87,426	3,743
Total	36,520	361,433	133,103

Comparing the 2002 inventory to that for 2008 indicates that the total direct $PM_{2.5}$ emissions in the Chicago area were reduced by 14,720 tons per year. NOx emissions in the Chicago area decreased significantly, by 114,042 tons per year, during the same time period. These reductions were primarily from on-road and off-road mobile sources. SO_2 emissions in the Chicago area decreased by 36,973 tons per year, due largely to reductions from point sources. These sizeable emissions reductions in direct $PM_{2.5}$ emissions and secondary $PM_{2.5}$ precursor emissions, as well as corresponding reductions in upwind areas in Illinois and other nearby states resulted in a substantial improvement in $PM_{2.5}$ air quality in the Chicago area, ultimately resulting in attainment of the 1997 $PM_{2.5}$ NAAQS.

4.3 Emissions Projections

A Maintenance Plan must contain a demonstration that the level of emissions projected for the ten-year period following redesignation are sufficient to maintain the NAAQS. Accordingly, Illinois EPA has projected $PM_{2.5}$, NOx, and SO_2 emissions for the Chicago NAA for 2025. Illinois EPA has also projected emissions to 2015 and 2020 to represent midpoint years during the maintenance period. Emissions for these projection years are compared to emissions levels in 2008 to determine if emissions are sufficient to maintain the NAAQS during this period.

Chicago area point and area source emissions for 2015, 2020, and 2025 were estimated using the 2008 base year inventory and growth factors appropriate for each source category. Off-road emissions projections were developed using the growth factors contained in U.S. EPA's NONROAD model. On-road motor vehicle emissions were estimated using U.S. EPA's MOVES motor vehicle emissions model. The figures assume the continued use of reformulated gasoline, the continued phase-in of the Tier 2 motor vehicle emissions standards, and operation of an enhanced vehicle inspection and maintenance program. Total vehicle miles of travel (VMT) for 2015, 2020 and 2025 were assumed to increase at a rate of 1.5 percent per year from 2008.

Tables 4.3, 4.4 and 4.5 include the direct NOx, $PM_{2.5}$ and SO_2 emissions estimates for the years 2015, 2020 and 2025 respectively, for the Chicago nonattainment area.

Table 4.3
2015 $PM_{2.5}$, NOx, and SO_2 Emissions (tons per year)

Source Category	$PM_{2.5}$	NOx	SO_2
Point Sources	4,169	27,082	58,092
Area Sources	9,676	32,997	4,266
On-Road Mobile Sources	3,071	68,491	504
Off-Road Mobile Sources	2,995	35,927	866
Total	19,911	164,497	63,727

4.4 Demonstration of Maintenance

Table 4.6 provides a comparison of emissions for the years 2008, 2015, 2020, and 2025. The table demonstrates that the level of emissions projected through the maintenance period are less than emissions estimated for the attainment year and are, therefore, sufficient to maintain the $PM_{2.5}$ NAAQS. As shown in the table, both SO_2 and NOx emissions within the nonattainment area are expected to decrease significantly between 2008 and 2025 with $PM_{2.5}$ decreasing slightly. Projected emissions of those pollutants for the mid-point years of 2015 and 2020, are also less than their respective emissions levels in 2008. Based on these emissions trends it is expected that air quality will continue to meet the $PM_{2.5}$ NAAQS throughout the maintenance period.

Table 4.4
2020 $PM_{2.5}$, NOx, and SO_2 Emissions (tons per year)

Source Category	$PM_{2.5}$	NOx	SO_2
Point Sources	4,391	28,500	53,452
Area Sources	10,009	33,277	4,332
On-Road Mobile Sources	2,119	40,599	477
Off-Road Mobile Sources	2,398	28,271	919
Total	18,918	130,648	59,180

Table 4.5
2025 $PM_{2.5}$, NOx, and SO_2 Emissions (tons per year)

Source Category	$PM_{2.5}$	NOx	SO_2
Point Sources	4,604	29,638	56,310
Area Sources	10,377	33,687	4,407
On-Road Mobile Sources	2,067	38,456	488
Off-Road Mobile Sources	2,267	27,173	1,215
Total	19,316	128,954	62,420

Table 4.6
Comparison of 2008, 2015, 2020 and 2025 Emissions
(Emissions stated in tons per year)

	2008	2015	2020	2025	Decrease (2008-2015)	Decrease (2008-2020)	Decrease (2008-2025)
$PM_{2.5}$	21,800	19,911	18,918	19,316	1,889	2,882	2,484
NOx	247,391	164,497	130,648	128,954	82,894	116,743	118,437
SO_2	96,130	63,727	59,180	62,420	32,403	36,950	33,710

In addition to the overall emissions reductions projected to occur within the nonattainment area, significant reductions of statewide NOx and SO_2 emissions resulting from implementation of Illinois' multi-pollutant standards affecting electric utilities during the maintenance period, will also help to ensure continued attainment of the $PM_{2.5}$ NAAQS.

It should also be noted that the emissions projections included here do not reflect the reductions expected from a range of measures being implemented to reduce diesel emissions in the Chicago NAA. These measures have been funded through sources such as the:

- U.S. EPA's Midwest Clean Diesel Initiative
- Congestion Mitigation and Air Quality Improvement (CMAQ) Program
- Diesel Emissions Reduction Act (DERA)

- American Recovery and Reinvestment Act of 2009
- Various Supplemental Environmental Projects

These projects include the installation of particulate filters, diesel oxidation catalysts, closed-crankcase ventilation systems, and direct-fired heaters on school and transit buses, and municipally-owned utility vehicles, repowering diesel locomotive engines with generator sets, upgrading diesel construction engines with engines meeting more stringent emissions standards, and installing auxiliary power units on over-the-road trucks to reduce idling. We anticipate DERA and CMAQ funding to continue to support additional diesel emissions reduction projects in the near future.

4.5 Provisions for Future Updates

As required by Section 175A(b) of the CAA, Illinois commits to submit to U.S. EPA, eight years after redesignation, a revised version of this Maintenance Plan. The revision will contain Illinois' plan for maintaining the $PM_{2.5}$ NAAQS for ten years beyond the initial maintenance period.

5.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in the Chicago NAA. These include CAA requirements, and other state and federal measures. These control measures have been fully promulgated, and will provide emissions reductions in future years. Illinois EPA commits to keep these measures in effect after redesignation, or to maintain equivalent emissions levels using alternate measures. Illinois' SIP contains acceptable provisions to provide for preconstruction review of new emissions sources. After redesignation to attainment, Prevention of Significant Deterioration (PSD) requirements will apply to the construction of new major sources and to significant modifications of existing sources. Illinois has accepted delegation from U.S. EPA of this program. Illinois further commits to continue to require that all future regional transportation plans for the Chicago area conform to the SIP.

5.1 Control Measures

A variety of control measures are in place that reduce emissions of direct $PM_{2.5}$, NO_x and SO_2, and have contributed to the attainment of the annual fine particle standard. The emissions reduction measures for demonstrating attainment of the $PM_{2.5}$ standard are as follows:

- NOx SIP Call
- New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAPS)/Maximum Achievable Control Technology (MACT) Standards
- VOM Solvent Categories: Aerosol Coatings, Architectural and Industrial Maintenance (AIM) Coatings, Consumer Solvents
- Vehicle Inspection & Maintenance Program
- Reformulated Gasoline
- Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements
- On-Highway Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements
- Federal Emissions Standards for Off-Road Equipment (e.g., Nonroad Diesel Engine Rule, Evaporative Large Spark Ignition and Recreational Vehicle Standards) incorporated into NONROAD Model
- Tier 4 Nonroad Diesel Engine Standards and Diesel Fuel Sulfur Content Restrictions
- Marine Compression-Ignition Engine Standards and Locomotive Engine Standards
- Consent Decrees (CITGO and ExxonMobil)

5.2 Reasonable Further Progress (RFP) and Reasonably Available Control Technology (RACT)

Since U.S. EPA has published an attainment finding for the Chicago area for the 1997 $PM_{2.5}$ standard, the requirements for Illinois to submit an attainment demonstration, RACM, RFP, contingency measures, and any other planning SIP's related to attainment are suspended as long as the area continues to attain the 1997 $PM_{2.5}$ NAAQS.

5.3 Controls to Remain in Effect

Illinois will maintain all of the control measures listed in this Section to ensure maintenance of the annual $PM_{2.5}$ NAAQS. Any revisions to the control measures included as part of the Maintenance Plan will be submitted as a SIP revision to U.S. EPA for approval, and will be accompanied by a showing that such changes will not interfere with maintenance of the NAAQS.

In addition to the control measures identified in subsection 5.1, additional control measures that will remain in effect are:

- NO_x RACT, as a requirement for the 1997 ozone NAAQS attainment demonstration.
- Multi-Pollutant Standard/Combined Pollutant Standards---Ameren, Midwest Generation, and Dynegy (35 Ill. Adm. Code Part 225)
- VOC RACT

Though Illinois believes that control of organic compounds may help improve PM air quality, we have not relied on the control of organics, consistent with the $PM_{2.5}$ Implementation Rule.

In addition, clean construction standards are in place as part of Cook County Ordinance No. 09-O-36, 5-19-2009 (Article IX, Section 30-952) that mandates that contractors must use Ultra Low Sulfur Diesel fuel in diesel vehicles, nonroad vehicles, and stationary generators for Cook County government projects exceeding $2 million. Furthermore, by the start of 2014, any primary contractor working on a construction project in Cook County shall be required to meet a PM emission reduction of at least 85% from uncontrolled for any heavy duty diesel vehicle or diesel nonroad vehicle. This level of control of diesel vehicles must be met by subcontractors by the start of 2016. This is not included as a contingency measure, but is further evidence of current and future PM emissions reductions in the heart of the urban area.

The O'Hare Airport Modernization Program already has in place an Ultra Low Sulfur Diesel fuel requirement for all off-road diesel powered vehicles and equipment (both mobile and stationary) that are utilized on-site. (O'Hare Modernization Project Site

Preparation, Project No. OH6126.200.50.023, specification no. 35491) This requirement is in place for the remainder of the project.

The Illinois EPA has the necessary resources to enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emissions of primary $PM_{2.5}$ and precursors to secondary $PM_{2.5}$ in the Chicago nonattainment area.

5.4 Provisions for Permitting New or Modified Emissions Sources

Illinois has longstanding and fully implemented programs for the review of new major sources and significant modifications of existing sources. The PSD program, which includes requirements for Best Available Control Technology (BACT) on major new sources or significant modifications of existing sources, will be applicable in the Chicago area once the area has been redesignated to attainment. Illinois has been delegated full authority to implement the PSD program by U.S. EPA.

5.5 Transportation Conformity

The purpose of this section is to describe and establish the Chicago nonattainment area motor vehicle emissions budgets associated with the $PM_{2.5}$ Maintenance Plan SIP. Annual motor vehicle emissions budgets are being proposed for the attainment year, 2008, and for the final year of the Maintenance Plan, 2025, for primary $PM_{2.5}$ and the precursor pollutant NOx. The Maintenance Plan also includes motor vehicle emissions estimates for the interim years 2015 and 2020 in order to demonstrate that total emissions from all sectors remain below the 2008 attainment year total; however, these interim year motor vehicle emissions estimates are not being proposed as formal motor vehicle emissions budgets. The Maintenance Plan also includes estimates of emissions of SO_2, however, as motor vehicles have not been identified as a significant source of SO_2, motor vehicle emissions budgets are not being proposed for this pollutant. The proposed 2008 and 2025 annual NOx and direct PM2.5 motor vehicle emissions budgets were developed consistent with the motor vehicle activity assumptions and emissions control strategies incorporated into the 8-hour ozone Attainment Demonstration and Maintenance Plan SIPs. The budgets reflect an emissions level determined using actual motor vehicle VMT for 2008 and VMT growth at an annual rate of 1.5% from year 2008 levels to 2025.

A motor vehicle emissions budget is that portion of the total allowable emissions allocated to highway and transit vehicle use that are defined in the SIP for a certain year. The rules governing transportation conformity require certain transportation activities to be consistent with motor vehicle emissions budgets contained in control strategy implementation plans (40 CFR § 93.118). Section 93.101 of the rule defines a "control strategy [State] implementation plan revision" as a "plan which contains specific strategies for controlling the emissions and reducing ambient levels of pollutants in order to satisfy CAA requirements of reasonable further progress and attainment." In order to demonstrate conformity to the motor vehicle emissions budget, emissions from the implementation of a transportation plan or a transportation improvement program must be less than or equal to the budget level (40 CFR § 93.118(a)).

The motor vehicle emissions budgets established and described herein were developed consistent with the methodology and control strategy assumptions in place in the region. The effects of motor vehicle control measures are incorporated into the emissions produced by the U.S. EPA's MOVES model. These control measures include the implementation of national motor vehicle emissions standards, the operation of a vehicle inspection and maintenance (I/M) program, and the required use of reformulated gasoline and low sulfur gasoline and diesel fuel.

The U.S. EPA's transportation conformity regulations allow for the use of a "safety margin" in the development of motor vehicle emissions budgets for Maintenance Plans. A safety margin is defined as "the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance." According to table 4.6, $PM_{2.5}$ and NOx emissions for the end of the maintenance plan year 2025 are 2,484 and 118,437 tons per year, respectively, less than the year 2008 attainment year levels. As year 2025 emissions levels are projected to be substantially less than the attainment year 2008 emissions, a 15% safety margin is being proposed to be added to the 2025 estimated motor vehicle emissions to make up the motor vehicle emissions budget. The 15% increase would equate to an increase of 310 tpy of $PM_{2.5}$ and 5,768 tpd of NOx.

The motor vehicle emissions budgets, which reflect the VMT and control program assumptions and methodology described here, are listed in Table 5.1.

Table 5.1
Proposed Chicago $PM_{2.5}$ Maintenance Plan
2008 and 2025
Motor Vehicle Emissions Budgets
(tons per year)

	Estimated Emissions		**Safety Margin**		**Motor Vehicle Emissions Budgets**	
Year	**$PM_{2.5}$**	**NOx**	**$PM_{2.5}$**	**NOx**	**$PM_{2.5}$**	**NOx**
2008	5,100	127,951	--	--	5,100	127,951
2025	2,067	38,456	310	5,768	2,377	44,224

Complete details on the derivation of the motor vehicle emissions budgets, including discussion of the MOVES model inputs and assumptions are included in Appendix B of this report.

6.0 CONTINGENCY MEASURES

6.1 Contingency Measures

Section 175(A) of the CAA specifies the requirements for Maintenance Plans, including provisions for contingency measures that will be implemented if violations of the annual $PM_{2.5}$ NAAQS are measured after redesignation to attainment. A list of potential contingency measures that would be implemented in such an event should also be included in the Maintenance Plan. Finally, the plan should provide a commitment to submit a revised Maintenance Plan eight years after redesignation to ensure continued maintenance for the next ten-year maintenance period.

Contingency measures are intended to provide further emissions reductions in the event that violations of the annual $PM_{2.5}$ NAAQS occur after redesignation to attainment. While these measures do not need to be fully adopted by the Illinois Pollution Control Board (IPCB) prior to the occurrence of NAAQS violations, the contingency plan should ensure that the contingency measures are adopted expeditiously once they are triggered. The Maintenance Plan must identify the triggers that determine when contingency measures will be adopted, and the measures that the state will consider.

Illinois EPA's contingency plan for the Chicago NAA is described in Table 6.1. Consistent with this plan, Illinois agrees to adopt and implement, as expeditiously as practicable, the necessary corrective actions in the event that violations of the annual $PM_{2.5}$ NAAQS occur within the Chicago maintenance area after redesignation to attainment. As described in Section 5.0 of this report, Illinois has adopted and is continuing to implement a range of control measures that will greatly reduce precursor emissions, both locally and statewide. Illinois commits to continue to implement the identified control measures, although the Illinois EPA anticipates that these emissions reductions will be sufficient to mitigate exceedances or violations of the NAAQS that may occur in the coming years without further regulatory action.

The contingency plan provides for different levels of corrective responses should ambient annual $PM_{2.5}$ levels exceed the NAAQS in any year; if emissions in the NAA increase significantly above current attainment levels; or if the NAAQS is violated. A Level I response would occur in the event that: 1) the average of the annual $PM_{2.5}$ concentration for the three most recent years at any monitoring site in the Illinois portion of the Chicago NAA exceeds 15 micrograms per cubic meter, or 2) if total $PM_{2.5}$, SO_2 or NOx emissions increase more than 5% above the levels contained in the attainment year (2008) emissions inventory. If exceedances of the annual $PM_{2.5}$ NAAQS are observed in Lake and Porter counties in Indiana, Illinois commits to work with the Indiana Department of Environmental Management (IDEM) to develop appropriate corrective measures. It should be noted that U.S. EPA does not require a state to implement contingency measures when occasional exceedances are recorded. The Illinois EPA's voluntary commitment to initiate a Level I response is intended to prevent future violations of the NAAQS from ever occurring.

Table 6.1
Contingency Plan for the Chicago $PM_{2.5}$ Nonattainment Area

<table>
<tr><th>Contingency Measure Trigger</th><th>Action to be Taken</th><th>List of Potential Contingency Measures</th></tr>
<tr><td>Level I Trigger
• Highest monitored $PM_{2.5}$ concentration exceeding 15.0 ug/m**3 in any year at any monitoring station in the Chicago maintenance area.
• The Chicago maintenance area's total $PM_{2.5}$, NOx or SO_2 emissions increase more than 5% above the levels included in the 2008 emissions inventories.</td><td>IL will evaluate air quality, or determine if adverse emissions trends are likely to continue. If so, IL will determine what and where controls may be required, as well as level of emissions reductions needed, to avoid a violation of the NAAQS. The study shall be completed within 9 months. If necessary, control measures shall be adopted within 18 months of determination and implemented as expeditiously as practicable, taking into consideration the ease of implementation and the technical and economic feasibility of the selected measures.</td><td rowspan="2">**Point Source Measures**
• IL Multi-Pollutant Program for electric generating units
• NOx RACT
• Clean Air Transport Rule, after promulgation by U.S.EPA
• Best Available Retrofit Technology (BART)
• Broader geographic applicability of existing measures

Mobile Source Measures
• Tier 2 Vehicle Standards and Low Sulfur Fuel
• Heavy Duty Diesel Standards and Low Sulfur Diesel Fuel
• High-enhanced I/M (OBDII)
• Federal railroad/locomotive standards
• Federal commercial marine vessel engine standards

Area Source Measures
• Architectural/Industrial Maintenance (AIM) Coatings
• Commercial and Consumer Products
• Aerosol coatings
• Portable fuel containers</td></tr>
<tr><td>Level II Trigger
• A violation of the NAAQS at any monitoring station in the Chicago maintenance area.</td><td>IL will conduct a thorough analysis to determine appropriate measures to address the cause of the violation. Analysis shall be completed within 6 months. Selected measures shall be implemented within 18 months of a violation.</td></tr>
</table>

Illinois commits to compiling $PM_{2.5}$, SO_2, and NOx emissions inventories for the Chicago area every three years for the duration of the Maintenance Plan to facilitate the emissions trends analysis included in the contingency plan under Level I. The Illinois EPA will evaluate the causes of high $PM_{2.5}$ levels or the emissions trends and to determine appropriate control measures needed to assure continued attainment of the annual $PM_{2.5}$ NAAQS. Under Level I, measures that could be implemented in a short time would be selected so as to be in place quickly after the Illinois EPA is aware that corrective measures have been triggered. Control measures selected under Level I will be adopted in most cases within 18 months after a determination is made, and implemented, generally, within 24 months of adoption by the IPCB.

A Level II response would be implemented in the event that a violation of the annual $PM_{2.5}$ NAAQS were to be measured at a monitoring site within the Chicago maintenance area (including sites in Indiana and Illinois). In order to select appropriate corrective measures, the Illinois EPA will work with IDEM to conduct a comprehensive study to determine the causes of the violation and the control measures necessary to mitigate the problem. The analysis will examine the following factors:

- the location and severity of the ambient $PM_{2.5}$ exceedances;
- the weather patterns contributing to the elevated $PM_{2.5}$ levels;
- potential contributing emissions sources;
- the geographic applicability of possible contingency measures;
- emissions trends, including timeliness of implementation of scheduled control measures;
- current and recently identified control technologies; and
- air quality contributions from outside the maintenance area.

Contingency measures will be selected from those listed in Table 6.1 or from any other measure deemed appropriate and effective at the time the selection is made. It is expected that implementation of only a few of these measures would be necessary. The selection between measures will be based upon cost-effectiveness, emissions reduction potential, ease and timing of implementation, and other appropriate factors. Implementation of necessary controls in response to a Level II trigger will take place as expeditiously as possible, but in no event later than 18 months after the Illinois EPA makes a determination, based on quality-assured ambient data, that a violation of the NAAQS has occurred.

Adoption of additional control measures is subject to necessary administrative and legal processes. The Illinois EPA will solicit input from all interested and affected persons in the area prior to selecting appropriate control measures. No contingency measure will be implemented without providing the opportunity for full public participation. This process will include publication of notices, an opportunity for public hearing, and other measures required by Illinois law.

6.2 Commitment to Revise Plan

As noted in Section 4.5 above, the Illinois EPA commits to review its Maintenance Plan eight years after redesignation, as required by Section 175(A) of the CAA. The Maintenance Plan revision is intended to ensure continued attainment of the annual $PM_{2.5}$ NAAQS for an additional ten-year period.

6.3 Public Participation

In accordance with Section 110(a)(2) of the CAA, Illinois is required to have a public comment period and provide the opportunity for a public hearing on the Maintenance Plan prior to adoption. Public participation in the SIP process is provided for as follows:

- Notice of availability of the Chicago $PM_{2.5}$ Maintenance Plan document and the time and date of the public hearing was published in the Chicago Sun-Times on July 8, 2011.

- If requested, the public hearing to receive comments on the Chicago Maintenance Plan was scheduled for August 18, 2011, at 1:00 p.m. in the Sangamo Room at the Illinois EPA's Headquarters at 1021 N. Grand Ave. East, Springfield, Illinois.

- A 30-day public comment period was open after the public hearing to receive comments on the Maintenance Plan. A summary of the comments received and Illinois EPA's responses thereto is included as part of the submittal to U.S. EPA.

6.4 Legal Authority to Implement and Enforce

The Maintenance Plan must contain a demonstration that the State of Illinois has the necessary legal authority to implement and enforce the measures relied upon to attain and maintain the NAAQS. Illinois has the legal authority to implement and enforce the requirements of this SIP submittal pursuant to the Illinois Environmental Protection Act.

7.0 CONCLUSIONS

The Chicago nonattainment area has attained the 1997 annual $PM_{2.5}$ NAAQS and has complied with the applicable provisions of the CAA required of $PM_{2.5}$ NAAs. Illinois has performed an analysis that demonstrates that the Chicago NAA has attained the 1997 annual $PM_{2.5}$ NAAQS and believes the air quality improvements are due to permanent and enforceable control measures. Supporting documentation is contained herein.

The Illinois EPA has prepared a Maintenance Plan that meets the requirement of the Clean Air Act. This Maintenance Plan provides for the continued attainment of the 1997 annual $PM_{2.5}$ NAAQS for a period of at least ten years after U.S. EPA has formally redesignated the area to attainment. This Maintenance Plan provides adequate contingency measures for potential, additional emissions reductions in the event that future violations of the 1997 annual $PM_{2.5}$ NAAQS are observed in the area.

The Illinois EPA has prepared a comprehensive emissions inventory of $PM_{2.5}$ and its precursors for the "attainment" year, 2008, and has prepared projections of the emissions inventory to 2015, 2020 and 2025. These emissions projections indicate that emissions levels in the Chicago nonattainment area will continue to remain much lower than emissions from the attainment year 2008 levels, thereby maintaining the $PM_{2.5}$ NAAQS in future years. The Illinois EPA commits to continue to operate an appropriate air quality monitoring network to verify the maintenance of the attainment status once the area has been redesignated. The Illinois EPA has the legal authority to implement and enforce all control measures.

Finally, the Chicago $PM_{2.5}$ Maintenance Plan includes year 2008 and 2025 on-road motor vehicle emissions budgets for $PM_{2.5}$ and NOx for use in transportation conformity determinations to assure that any increases in emissions from this sector do not jeopardize continued attainment of the annual $PM_{2.5}$ standard during the ten-year maintenance period. The Chicago Maintenance Plan has been prepared in accordance with the requirements specified in U.S. EPA's guidance document, and additional guidance received from U.S. EPA staff.

APPENDIX A

Summary of Ambient Air Monitoring Data (2007-2009)

Table A.1
2007-2009 Annual $PM_{2.5}$ Design Values
for Monitors in the Chicago Nonattainment Area

County	Monitoring Site	2007	2008	2009	Design Value
Cook	Blue Island	14.3	12.5	11.7	**12.8**
Cook	Chicago-Com Ed	14.3	11.9	11.1	**12.4**
Cook	Chicago-Springfield	15.2	12.0	11.3	**12.8**
Cook	Chicago-Mayfair	15.5	12.2	12.7	**13.5**
Cook	Chicago-SE Police	14.1	11.8	11.0	**12.3**
Cook	Chicago-Washington	15.7	12.5	11.6	**13.3**
Cook	Cicero	14.8	<u>*13.3*</u>	<u>*12.0*</u>	**13.4**
Cook	Des Plaines	12.7	11.4	11.0	**11.7**
Cook	McCook*	15.6	12.9	12.6	**13.7**
Cook	Northbrook	13.2	10.1	9.3	**10.9**
Cook	Schiller Park*	15.4	<u>*13.6*</u>	12.9	**14.0**
Cook	Summit	14.8	12.0	11.6	**12.8**
Du Page	Naperville	13.8	11.3	9.8	**11.6**
Kane	Aurora	14.5	10.3	10.0	**11.6**
Kane	Elgin	13.2	10.8	9.6	**11.2**
Lake	Zion	11.9	9.3	8.8	**10.0**
McHenry	Cary	11.6	10.1	9.6	**10.4**
Will	Braidwood	<u>*12.1*</u>	10.3	8.7	**10.4**
Will	Joliet	14.6	11.7	10.5	**12.3**
Lake IN	Franklin School	14.4	12.0	11.3	**12.6**
Lake IN	Griffith	13.2	11.7	11.0	**12.0**
Lake IN	Madison St.	14.6	12.3	12.1	**13.0**
Lake IN	Hammond-Purdue	13.8	11.7	15.9	**13.8**
Lake IN	Clark HS	13.7	12.4	10.8	**12.3**
Porter IN	Ogden Dunes	13.8	10.9	11.3	**12.0**

*- Annual Standard does not apply at these monitoring sites
Annual averages listed in <u>*underlined italics*</u> based on incomplete data.

APPENDIX B

Transportation Conformity

TRANSPORTATION CONFORMITY

This section describes the development of the Chicago NAA motor vehicle emissions budgets associated with the $PM_{2.5}$ Maintenance Plan SIP. Annual motor vehicle emissions budgets are being proposed for the attainment year, 2008, and 2025, the final year of the initial maintenance period for direct motor vehicle $PM_{2.5}$ emissions and for the precursor pollutant NOx. These budgets were developed consistent with the motor vehicle activity assumptions and emissions control strategies incorporated into the $PM_{2.5}$ maintenance plan analysis.

Background

Section 176(c)(4) of the Clean Air Act (CAA) Amendments of 1990 requires that transportation plans, programs, and projects which are funded or approved under Title 23 USC must be determined to conform with State or Federal air implementation plans. A motor vehicle emissions budget is that portion of the total allowable emissions allocated to highway and transit vehicle use that are defined in the SIP for a certain year. Section 93.101 of the rule defines a "control strategy [State] implementation plan revision" as a "plan which contains specific strategies for controlling the emissions and reducing ambient levels of pollutants in order to satisfy CAA requirements of reasonable further progress and attainment." In order to demonstrate conformity to the motor vehicle emissions budget, emissions from the implementation of a transportation plan or a transportation improvement program (TIP) must be less than or equal to the budget level (40 CFR § 93.118(a)).

Transportation conformity will be based on these submitted on road motor vehicle emissions budgets after the U.S. Environmental Protection Agency ("U.S.EPA") determines that the budgets meet the adequacy criteria of the transportation conformity rule under §93.118(e). The motor vehicle emissions budgets in this submittal are adequate as each of the six criteria under §93.118(e) is satisfied. These six criteria include:

1. The submitted control strategy implementation plan revision or maintenance plan was endorsed by the Governor (or his or her designee) and was subject to a State public hearing.

2. Before the control strategy implementation plan or maintenance plan was submitted to EPA, consultation among federal, State, and local agencies occurred: full implementation plan documentation was provided to [US]EPA; and [US]EPA's stated concerns, if any, were addressed;

3. The motor vehicle emissions budgets(s) is clearly identified and precisely quantified;

4. The motor vehicle emissions budget(s), when considered together with all other emission sources, is consistent with all applicable requirements for reasonable further

progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission);

5. The motor vehicle emissions budget(s) is consistent with and clearly related to the emissions inventory and the control measures in the submitted control strategy implementation plan revision or maintenance plan, and

6. Revisions to previously submitted control strategy implementation plans explain and document any changes to previously submitted budgets and control measures, impacts on point and area source emissions; any changes to established safety margins; and reasons for the changes (including the basis for any changes related to emission factors or estimates of vehicle miles traveled).

The $PM_{2.5}$ attainment demonstration SIP and the associated motor vehicle emissions budgets have been developed by the Illinois Environmental Protection Agency (Illinois EPA), the designated air quality agency for the State of Illinois. The required public hearing to accept public comment on the proposed motor vehicle emissions inventory was held at 1:00 PM, on July 14, 2010 in Room 9-040 of the James R. Thompson Center in downtown Chicago. Notification of this hearing was printed in the Chicago Sun Times on June 11, 2010. Comments on the proposed attainment demonstration and motor vehicle emissions budgets were accepted for 30 days after the public hearing. A "Responsiveness Summary" which addresses the comments received was included in the final submission.

Regarding this revision to the Chicago $PM_{2.5}$Maintenance Plan, notice of a comment 30-day comment period will be posted on the Illinois EPA's website and printed in the State newspaper, the XXXXX XXXXXXX on July XX, 2011. A public hearing to discuss the revised Maintenance Plan and associated motor vehicle emissions budgets will be held on August 18, 2011, if it is requested. If the public hearing is held, comments will be accepted for an additional 30 days. All comments and responses will be included in a Responsiveness Summary which will be submitted to the U.S. EPA with the Final Maintenance Plan document.

In compliance with adequacy criterion #2, an interagency consultation meeting was held with members of the Chicago Metropolitan Agency for Planning (CMAP) Tier 2 Consultation Team on June 25, 2010 in Chicago. At this meeting, the Illinois EPA representative discussed the requirements for the maintenance plan as they relate to transportation conformity and explained the derivation of the proposed motor vehicle emissions budgets. A follow-up meeting of the Tier 2 Conformity Consultation Team to discuss the revised MOVES-based motor vehicle emissions budgets was held at the CMAP offices on June 28, 2011.

Compliance with the remaining adequacy criteria is contained within the narrative of the attainment demonstration document and this transportation conformity section.

The motor vehicle emissions budgets proposed and described herein were developed consistent with the methodology and control strategy assumptions used in the development of the emissions estimates contained in the Chicago $PM_{2.5}$ Maintenance Plan. The effects of these controls are incorporated into the emissions inventory estimates generated by the U.S.EPA's MOVES2010 (MOVES) model. Following is a discussion of the inputs and assumptions used in the development of the motor vehicle emissions budgets.

Vehicle Miles Travelled: The attainment year 2008 motor vehicle emissions estimates contained Chicago $PM_{2.5}$ Maintenance Plan incorporate county-and township-level 2008 annual vehicle miles traveled (VMT) levels from the Illinois Department of Transportation (IDOT). The 2008 annual VMT total for the 6-county-3-township Chicago NAA was approximately 58.8 billion miles. For future year emission estimates, VMT was grown to the target year at a compound growth rate of 1.5% per year. Applying this growth factor to the 2008 VMT level yields future year annual VMT projections of 65.2 billion for 2015, 70.3 billion for 2020, and 75.7 billion for 2025.

Meteorological Data: U.S. EPA guidance for the use of the MOVES model requires the use of representative local temperature and absolute humidity data. Average 2008 maximum and minimum monthly temperatures for the region were obtained from the National Weather Service local climatological data (LCD) for O'Hare International Airport. Absolute humidities corresponding to the average temperatures were calculated from LCD information as well. These 2008 temperatures and absolute humidity values, shown below, were used in the year 2025 emissions modeling.

2008 Minimum and Maximum Temperatures for Chicago, from O'Hare NWS Data

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Min, (°F)	15	16	27	39	45	61	64	64	57	47	32	14
Max, (°F)	32	30	43	60	66	81	84	82	75	62	46	32

2008 Absolute Humidity Corresponding to the Temperatures Above

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
AH, grains/lb	17	14	21	34	41	73	83	74	71	39	25	15

Motor Vehicle Emissions Controls: Beyond the U.S. EPA's federal motor vehicle control program emissions standards, the primary local motor vehicle emissions control programs that were in place in the Chicago NAA in 2008, and are projected to still be required in 2025 are a vehicle inspection and maintenance (I/M) program and the required use of reformulated gasoline (RFG).

Inspection and Maintenance (I/M): The Illinois I/M program in effect since 2007 requires biennial On-Board Diagnostics II (OBD) testing on all model year (MY) 1996 and newer (MY96+) light-duty gasoline vehicles (cars and light-duty trucks), and biennial exhaust idle and gas cap testing on MY96+ heavy duty gasoline vehicles including gasoline-powered buses, registered in the I/M testable area. Motorcycles and diesel vehicles are not subject to I/M. The program includes a 4-year grace period for new vehicles. This post-2007 I/M program was established when the Illinois legislature amended the Illinois Vehicle Inspection law in 2005 to (a) end dynamometer testing of vehicles, (b) require an OBD-based program beginning in February 2007, and (c) remove the requirement for testing compliant pre-MY96 vehicles.

The Chicago I/M program vehicle testing domain includes the urbanized areas in the Chicago NAA. An "I/M Coverage" percentage was developed based on the amount of VMT from vehicles subject to the inspection program compared to total area VMT. The I/M Coverage percentage for the Chicago 8-hour ozone NAA is 91.5%.

Fuels: The use of federal RFG has been required in the Chicago NAA since 1995. The 8-hour ozone Attainment Demonstration and original Maintenance Plan assumed the use of northern grade RFG in 2008 and beyond. RFG was and is assumed to contain 10% ethanol. The MOVES model can account for other fuels, such as E85, natural gas, methanol, etc, but for all practical purposes the gallons of such alternative fuels and hence the number of vehicles using them is very small compared to the number of gasoline and diesel vehicles, therefore, the use of such fuels was not considered.

Gasoline Sulfur: The federal Tier 2 regulations require gasoline sulfur levels to average no greater than 30 parts per million (ppm) with a maximum of 80 ppm beginning in 2007. There are no Illinois gasoline sulfur requirements, therefore, the MOVES default gasoline sulfur levels were used in the emissions modeling.

Diesel Sulfur: The federal Tier 2 regulations limit the level of sulfur in diesel fuel requiring on- highway diesel fuel to 15 ppm beginning in 2006. There are no Illinois diesel sulfur requirements, therefore, the MOVES default diesel sulfur levels were used in the emissions modeling.

Fuel Volatility: The volatility of summer RFG, measured as Reid vapor pressure (RVP), is not specifically regulated. However, a fuels' RVP is one of the primary characteristics controlled by refiners in order to meet the RFG performance standards. The MOVES model contains default RVP levels for different seasons of the year based on fuel compliance testing. Therefore, the MOVES default RVP levels were used in the emissions modeling.

Vehicle Registration Distribution: A Chicago area-specific vehicle registration distribution (RD) profile based upon 2008 information data was developed by Illinois EPA's Division of Mobile Source Programs from vehicle age data for 2008 provided by the Illinois Secretary of State's Department of Motor Vehicles. The RD is the fraction of vehicles of a given vehicle type and age in the fleet of vehicles of that type as a whole. Different vehicle types have different RDs Chicago-area RDs generally show fewer older vehicles than the nationwide average or default, because vehicles in the Chicago area tend to wear out faster than they do in the rest of the country due to rust from road salt and heavy city driving.

Source Type Population represents the number of vehicles of each MOVES vehicle type in the fleet as a whole within the area under consideration. Accurate local source-type populations were not available; therefore the MOVES default fractions modified by VMTs by vehicle type were used.

VMT Temporal Fractions are the VMT fractions of annual VMT by month of the year, of weekly VMT by day of the week, and daily VMT by hour of the day. The Illinois EPA uses temporal fractions derived from data collected from continuous count stations and presented by IDOT. Temporal fractions vary by road type.

Speed distributions are the fractions of VMT on a given road type by given vehicle types in various speed ranges (bins). Thus, on a typical Urban Arterial, a small fraction of the vehicles are traveling at less than 10 mph (plus or minus 5 mph), more at 20 mph, more at 30mph, most at 40 mph, less at 50 mph, and so on. These fractions differ by hour of the day—in more congested conditions during rush hours, the maximum fraction might be in the 30 mph range rather than the 40 mph range. MOVES uses speed distributions when aggregating emissions (or emission rates) for vehicles at different speeds. The Illinois EPA used the speed distributions derived from the CMAP transportation demand model.

Ramp fraction is the fraction of total VMT on limited-access highways such as Interstates that is from on- and off-ramps to or from those highways. Driving on limited-access highways is more or less at uniform speed, but driving on ramps involves considerable acceleration and deceleration; and these speed changes affect emissions. The default MOVES Ramp Fractions are 15% on Rural Interstates, 10% on Urban Interstates, and 2% on Other Freeways and Expressways. Illinois does not have actual or observed Ramp Fraction data; therefore the MOVES default values were used.

Road Type Distribution is the (fraction of) VMT on different road categories within an area under consideration. The Illinois EPA uses VMT data by HPMS functional class (FC) published by IDOT as the basis of its emission calculations. The Road Type Distribution for Rural Interstates in a county is the county's Rural Interstate VMT divided by the county's total all-road-type VMT. Similar calculations can be made for MOVES road types and vehicle types.

Safety Margin: The U.S. EPA's transportation conformity regulations allow for the use of a safety margin in the development of motor vehicle emissions budgets for Maintenance Plans. A Safety Margin is defined as "the amount by which the total projected emissions from all sources of a given pollutant are less than the total emissions that would satisfy the applicable requirement for reasonable further progress, attainment, or maintenance." According to table 4.6, $PM_{2.5}$ and NOx emissions for the end of the maintenance plan year 2025 are 2,484 and 118,437 tons per year, respectively, less than the year 2008 attainment year levels. As year 2025 emissions levels are projected to be substantially less than the attainment year 2008 emissions, a 15% safety margin is being proposed to be added to the 2025 estimated motor vehicle emissions to make up the motor vehicle emissions budget. The 15% increase would equate to an increase of 310 tpy of $PM_{2.5}$ and 5,768 tpd of NOx.

The motor vehicle emissions budgets, which reflect the VMT, motor vehicle fleet characteristics, emissions and control program assumptions, and safety margin described herein, are identified below.

Proposed Chicago $PM_{2.5}$ Maintenance Plan
2008 and 2025
Motor Vehicle Emissions Budgets
(tons per year)

	Estimated Emissions		Safety Margin		Motor Vehicle Emissions Budgets	
Year	**$PM_{2.5}$**	**NOx**	**$PM_{2.5}$**	**NOx**	**$PM_{2.5}$**	**NOx**
2008	5,100	127,951	- -	- -	5,100	127,951
2025	2,067	38,456	310	5,768	2,377	44,224

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	R18-20
AMENDMENTS TO 35 ILL. ADM.	)	(Rulemaking-Air)
CODE 225.233, MULTI-POLLUTANT	)	
STANDARDS	)	

POST-HEARING COMMENTS
OF THE ILLINOIS ATTORNEY GENERAL'S OFFICE

Attachment 4

IEPA *Draft Beneficiary Mitigation Plan—Volkswagen Environmental Mitigation Trust Agreement* (Feb. 2018)

State of Illinois

Draft
Beneficiary Mitigation Plan

Volkswagen Environmental Mitigation Trust Agreement

Illinois Environmental Protection Agency

February 2018

TABLE OF CONTENTS

FIGURES

I. INTRODUCTION

The Illinois Environmental Protection Agency ("Agency") has been designated as the lead agency to administer funds allocated to Illinois from the Volkswagen Environmental Mitigation Trust Agreement for State Beneficiaries ("Trust Agreement"). As directed by the Trust Agreement, these funds are to be used for environmental mitigation projects that reduce emissions of nitrogen oxides ("NO_x") in Illinois. In compliance with Section 4.1 of the Trust Agreement, Illinois provides this draft Beneficiary Mitigation Plan ("BMP") which addresses Illinois' plan for use of the funds. The draft BMP proposes to fund cleaner diesel, alternate fuel, and electric projects with corresponding electric charging infrastructure. The BMP is not binding and may be revised at any time. In addition, this document provides a brief overview of the Volkswagen case and settlement and a discussion of the status of ozone air quality in Illinois. **The Agency will accept public input on this draft BMP through ~~April 13, 2018~~ April 20, 2018. Public input should be provided in writing and submitted electronically to epa.vwsettlement@illinois.gov.**

II. VOLKSWAGEN CASE BACKGROUND AND SETTLEMENT SUMMARY

A. Case Background

On January 4, 2016, the United States, on behalf of the United States Environmental Protection Agency ("U.S. EPA"), filed a complaint against Volkswagen AG, et al. ("Volkswagen") alleging the manufacture of vehicles with prohibited defeat devices that caused emission control systems to perform differently during normal vehicle operation than during emissions testing. As a result of the defeat devices, the vehicles emitted NO_x in excess of federal vehicle emission standards. Approximately 500,000 (model year 2009 to 2015) vehicles containing 2.0 liter diesel engines and approximately 80,000 (model year 2009 to 2016) vehicles containing 3.0 liter diesel engines were affected in the country. Approximately 23,600 of the affected vehicles are registered in Illinois. The U.S. EPA has indicated that NO_x emission levels from the 2.0 liter vehicles with defeat devices were 10 to 40 times higher than federal emission standards, and NO_x emission levels from the 3.0 liter vehicles were up to nine times higher than federal emissions standards. (U.S. Envir. Prot. Agency, Frequent Questions about Volkswagen Violations, available at https://www.epa.gov/vw/frequent-questions-about-volkswagen-violations)

B. Settlement Summary

Settlements were reached requiring Volkswagen to establish an Environmental Mitigation Trust ("Trust") totaling $2.925 billion. Affected states and tribes that become beneficiaries of the Trust will receive funds to undertake Eligible Mitigation Actions ("EMAs") that are intended to mitigate the excess NO_x emissions from the Volkswagen vehicles. Illinois is a beneficiary of the Trust and has an initial allocation of $108,679,676.98. The Agency has posted links to the settlements on its Volkswagen Settlement webpage (http://www.epa.illinois.gov/topics/air-quality/vw-settlement/index). Separate from the Trust, the Volkswagen Settlement includes a $10 billion vehicle recall and repair program and a $2 billion investment in zero emission vehicle ("ZEV") infrastructure and public education and access to ZEVs.

III. ILLINOIS AIR QUALITY - OZONE

The Volkswagen vehicles equipped with defeat devices emitted excess NO_x. NO_x is a precursor to ground level ozone, an air pollutant formed when NO_x and volatile organic compounds react in the presence of sunlight. NO_x emissions from mobile sources represent 74.8 percent of total NO_x emissions in Illinois, 87.6 percent of total NO_x emissions in the Chicago nonattainment area, and 69.1 percent of total NO_x emissions in the Metro-East nonattainment area (see Figure 1). As a result, reducing NO_x emissions from diesel engines is an important strategy in reducing overall NO_x emissions, reaching attainment of the ozone standard in nonattainment areas, and improving air quality in Illinois.

Figure 1 - NOx Emissions Contributions from Mobile and Stationary Sources – Statewide; Chicago Nonattainment Area; and Metro-East Nonattainment Area

Statewide NOx – Percent

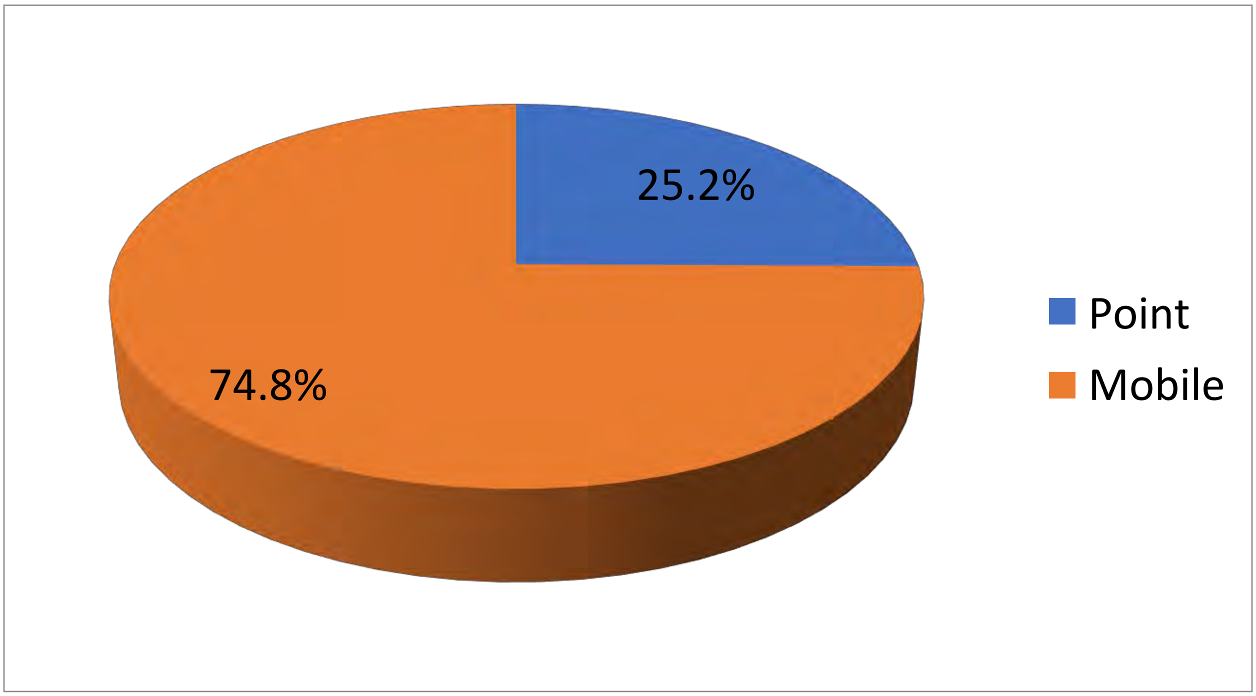
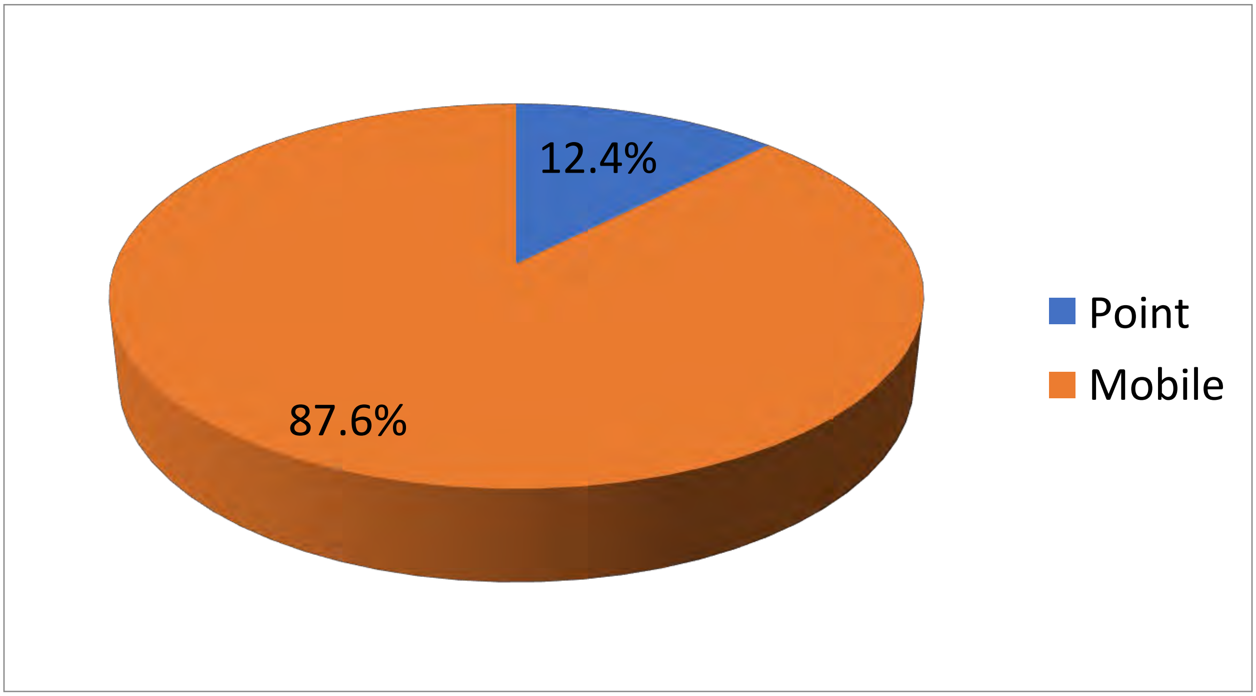
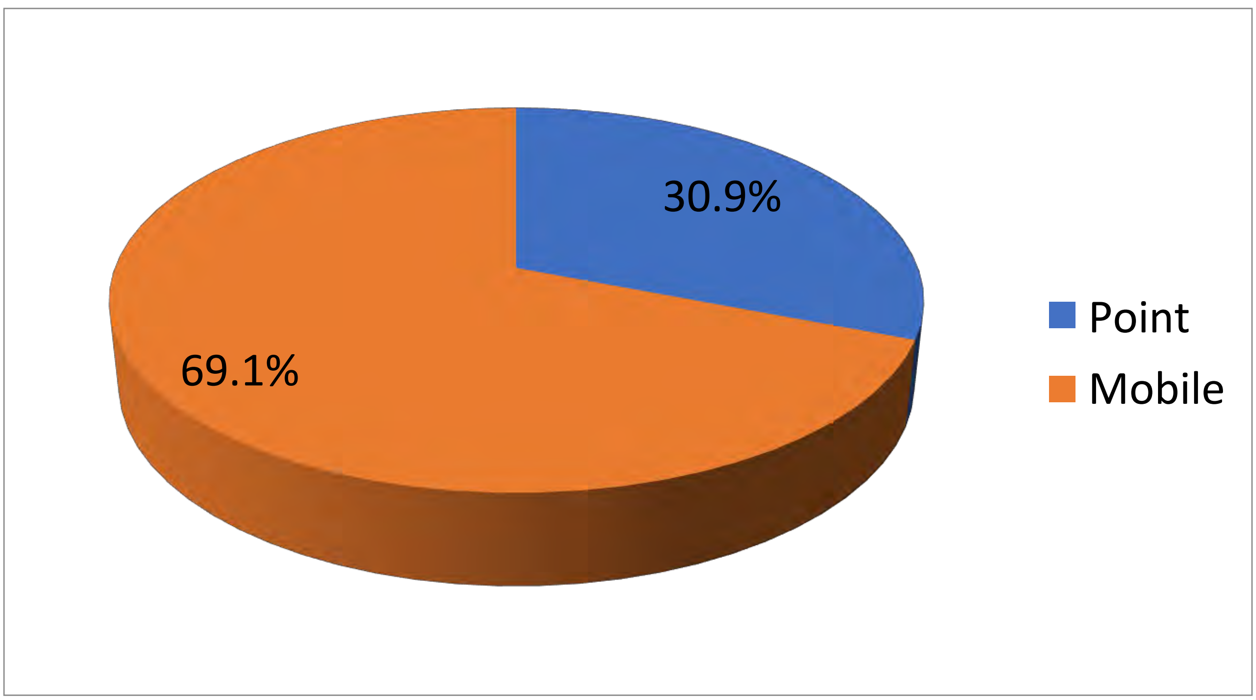


Figure 1 - Continued

Chicago Nonattainment Area NOx – Percent

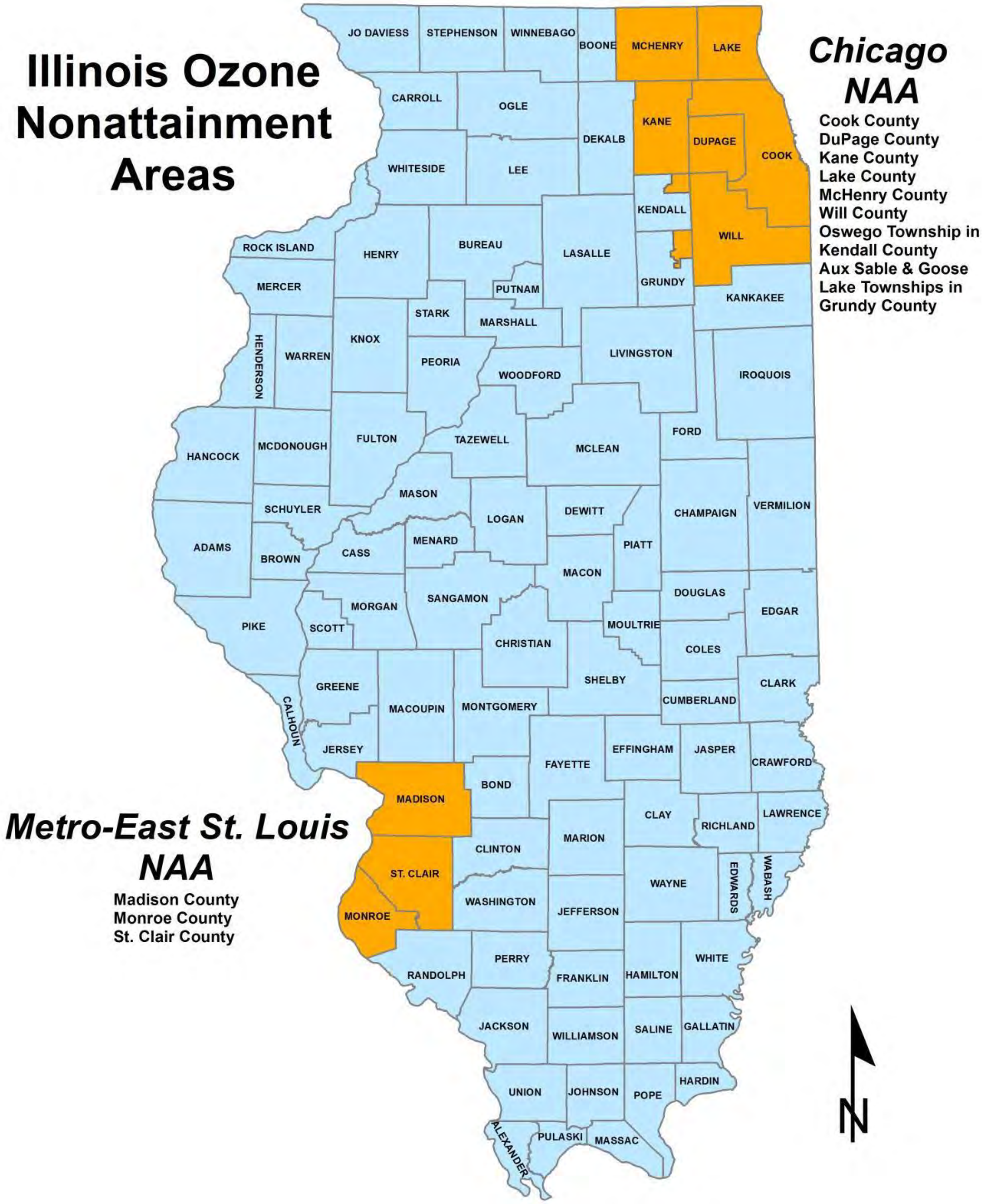


Metro-East Nonattainment Area NOx - Percent



Two areas in Illinois are currently designated nonattainment for the 2008 ozone National Ambient Air Quality Standard ("NAAQS") of 75 parts per billion—the Chicago area (Cook, DuPage, Kane, Lake, McHenry, Will and portions of Kendall and Grundy counties) and the Metro-East area (Madison, Monroe and St. Clair Counties). In May 2017, the Agency requested that U.S. EPA re-designate the Metro-East nonattainment area to attainment based on air quality analyses demonstrating that the area is meeting the standard. The Agency anticipates that U.S. EPA's approval of such request is forthcoming. The Chicago nonattainment area, on the other hand, is not currently eligible for re-designation. As a "moderate" ozone nonattainment area, it is required to attain the federal standard by July 20, 2018. Figure 2 provides a map of Illinois identifying the 2008 ozone designations by county.

Figure 2 - Illinois 2008 Ozone Designations by County



DRAFT

IV. ILLINOIS' BENEFICIARY MITIGATION PLAN

A. Beneficiary Mitigation Plan Requirements

Pursuant to Section 4.1 of the Trust Agreement, the BMP must include the following:

- Illinois' overall goals for use of the Trust funds;
- The categories of EMAs Illinois anticipates will be appropriate to achieve those goals, and a preliminary assessment of the percentages of funds anticipated to be used for each type of EMA;
- A description of how Illinois will consider the potential beneficial impact of the selected EMAs on air quality in areas that bear a disproportionate share of the air pollution burden;
- A general description of the expected ranges of emission benefits Illinois estimates will be realized by implementation of the EMAs; and
- The process for seeking and considering public input on Illinois' BMP.

Under the Trust Agreement, states have the discretion to adjust their goals and specific spending plans. For that reason, the BMP is a living document. The Agency will provide updates of the BMP (if any) to the Trustee and post the updated versions on its Volkswagen Settlement webpage. The BMP is not a request for projects. As such, it does not include details regarding applications for funding or the project selection process.

The Trust Agreement provides that the following categories of EMAs are eligible to receive funding from the Trust:

1. Class 8 Local Freight Trucks and Port Drayage Trucks;
2. Class 4-8 School, Shuttle, or Transit Buses;
3. Freight Switchers;

4. Ferries/Tugs;
5. Ocean Going Vessels Shorepower;
6. Class 4-7 Local Freight Trucks;
7. Airport Ground Support Equipment;
8. Forklifts and Port Cargo Handling Equipment;
9. Light Duty ZEV Supply Equipment; and
10. Non-Federal Voluntary Matches Under the Diesel Emission Reduction Act ("DERA").

Eligible vehicles and equipment may either be repowered with a newer, cleaner diesel, alternate fuel, or electric engine, or replaced entirely with a new diesel, alternate fuel, or electric vehicle. Funding for government owned eligible vehicles and equipment may be up to 100 percent, while funding for non-government owned vehicles and equipment ranges from up to 25 percent to up to 75 percent, depending on whether it is repowered or replaced and whether the repower or replacement is newer diesel, alternate fuel, or electric.

For Option 9 above, Illinois may use up to 15 percent of its allocation on the costs necessary for, and directly connected to, the acquisition, installation, operation, and maintenance of new light duty ZEV supply equipment. This 15 percent allotment is further subject to the funding limitations set forth in the Trust Agreement. Separately, funding for electric vehicle charging infrastructure may be provided on a project-specific basis within individual EMAs.

The Trust Agreement provides that beneficiaries may use up to 15 percent of Trust funds for actual administrative expenditures associated with implementing EMAs. Administrative expenditures may include costs for personnel, fringe benefits, travel, supplies, contractual services and goods, construction, and other costs.

B. Illinois' Overall Goals for Use of the Funds

Illinois will use the Trust funds to support projects that will:

- Reduce NO_x emissions in areas where the affected Volkswagen vehicles are registered while taking into consideration areas that bear a disproportionate share of the air pollution burden, including environmental justice areas;
- Maximize emission reductions; and
- Maximize and leverage funding.

Illinois intends on prioritizing areas of the State for funding as discussed below in Section IV(E). Illinois will prioritize and select projects that are the most cost-effective and that yield the largest amount of NO_x emission reductions, utilizing U.S. EPA's Diesel Emissions Quantifier ("DEQ") tool, the Alternative Fuel Life-Cycle Environmental and Economic Transportation ("AFLEET") tool and/or other appropriate methodologies, though Illinois may consider other criteria in selecting projects. The Agency intends on having a minimum of 3 application funding periods. More information regarding the application process will be provided on the Agency's Volkswagen Settlement webpage as it becomes available (http://www.epa.illinois.gov/topics/air-quality/vw-settlement/index).

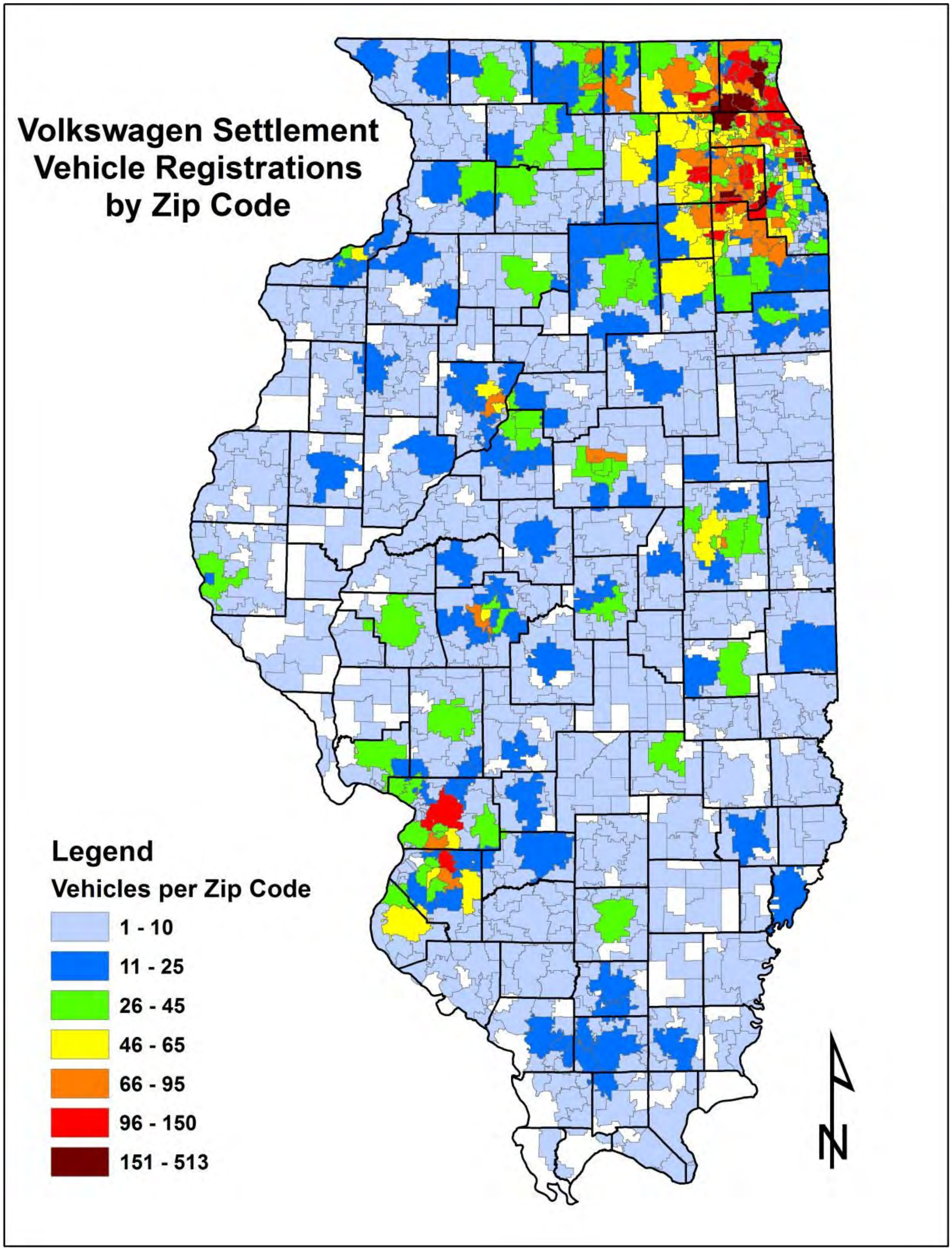
To spread out the Trust funds as much as possible, Illinois will require the following cost shares. For non-government applicants, Illinois will require a cost share of at least 50 percent, or a higher cost share where specified by the Trust Agreement or DERA (where the DERA option is utilized). For government applicants, Illinois will require a cost share of at least 25 percent, or a higher cost share where specified by DERA (where the DERA option is utilized). Federal agencies will be treated as non-government applicants consistent with the definition of "government" in the Trust Agreement.

Given the $2 billion ZEV investment component of the Volkswagen Settlement that provides for electric charging infrastructure, of which Illinois and Chicago have been identified to receive priority funding, the purpose of the Trust Agreement and Illinois' corresponding goal to reduce emissions of NO_x, Illinois proposes to fund electric charging infrastructure within individual EMAs where charging infrastructure is needed. This approach supplements the ZEV investment component of the Volkswagen Settlement further promoting electric vehicle infrastructure and ensures against stranded electric vehicles or infrastructure.

C. Volkswagen Vehicles in Illinois

There are approximately 23,600 affected Volkswagen vehicles registered throughout Illinois. Figure 3 identifies affected Volkswagen vehicle registrations in Illinois by zip code. Approximately 69.5 percent of the affected Volkswagen vehicles are registered in the Chicago nonattainment area (Cook, DuPage, Kane, Lake, McHenry, Will and portions of Kendall and Grundy counties). Approximately 32 percent are registered in Cook County alone with the highest concentration of affected Volkswagen vehicles per square mile located in and just north of the Chicago Loop. Approximately 5.4 percent of the affected Volkswagen vehicles are registered in the Metro-East nonattainment area (Madison, Monroe and St. Clair counties). The remaining affected Volkswagen vehicles are spread throughout the State in the ozone attainment area. The Illinois ozone attainment counties with 1 percent or greater affected Volkswagen vehicle registrations are Champaign, DeKalb, LaSalle, McLean, Peoria, Sangamon, and Winnebago.

Figure 3 - Volkswagen Settlement Vehicle Registrations by Zip Code



D. Categories of Eligible Mitigation Actions and Projected Allocations of Trust Funds

Illinois has categorized the types of EMAs it will consider funding into the following four groups by project type: 1) on-road projects; 2) all-electric school bus projects; 3) non-road projects; and 4) administrative expenditures. The types of EMAs Illinois will consider funding as well as overall funding amounts Illinois intends on allocating for each group are provided below. These groups, EMAs, and funding allocations may be revised based on market demand or changes to Illinois' goals.

For all projects provided below, Illinois proposes utilizing the Trust funds to reimburse non-government applicants at the maximum levels specified in the Trust Agreement, except that Illinois proposes requiring a cost share of at least 50 percent for non-government applicants, or a greater cost share where specified by the Trust Agreement or DERA (where the DERA option is utilized). Illinois proposes reimbursing government applicants up to a maximum of 75 percent of the costs for approved projects resulting in a required cost share of at least 25 percent, or a greater cost share where specified by DERA (where the DERA option is utilized).

Illinois will fund electric charging infrastructure on an individual project basis where it is not available onsite or nearby. Illinois will require project applicants to demonstrate whether adequate charging infrastructure will be available for any all-electric projects.

1. <u>On-Road Projects</u>: Up to 20 percent (or up to approximately $21,735,935)

This group includes projects listed under the following EMAs:

- Class 8 Local Freight Trucks and Port Drayage Trucks;
- Class 4-8 School Buses, Shuttle Buses, and Transit Buses; and
- Class 4-7 Local Freight Trucks.

Illinois expects to request up to 20 percent (or up to approximately $21,735,935) of the Volkswagen Trust funds allocated to Illinois for on-road projects in Illinois. These on-road projects include replacements or repowers with new diesel, alternate fuel, or electric vehicles and engines. To promote electric vehicle infrastructure, meet the purpose of the Trust Agreement and Illinois' goal to reduce and maximize NO_x reductions, and ensure against stranded electric vehicles or infrastructure, Illinois proposes to fund electric charging infrastructure within this group of projects where charging infrastructure is needed (Supplement to $2B ZEV portion of the Volkswagen Settlement). All-electric school bus projects are separately funded in Section IV(D)(2) below.

2. <u>All-Electric School Bus Projects</u>: Up to 10 percent (or up to approximately $10,867,968)

Illinois expects to request up to 10 percent (or up to approximately $10,867,968) of the Volkswagen Trust funds allocated to Illinois to replace diesel school buses with all-electric school buses. To promote electric vehicle infrastructure, meet the purpose of the Trust Agreement and Illinois' goal to reduce and maximize NO_x reductions, and ensure against stranded electric vehicles or infrastructure, Illinois proposes to fund electric charging infrastructure within this group of projects where charging infrastructure is needed. (Supplement to $2B ZEV portion of the Volkswagen Settlement)

3. <u>Off-Road Projects</u>: Up to 65 percent (or up to approximately $70,641,789)

This group includes projects listed under the following EMAs:

- Freight Switcher Locomotives;
- Ferries/Tugs; and
- Locomotives under the DERA Option.

Illinois expects to request up to 65 percent of the Volkswagen Trust funds allocated to Illinois for off-road or non-road projects. Off-road or non-road projects, especially those involving locomotives, often result in the greatest amount of emission reductions and can be the most cost-effective projects. Off-road or non-road projects include replacements or repowers with new diesel, alternate fuel, or electric vehicles and engines. To promote electric vehicle infrastructure, meet the purpose of the Trust Agreement and Illinois' goal to reduce and maximize NO_x reductions, and ensure against stranded electric vehicles or infrastructure, Illinois proposes to fund electric charging infrastructure within this group of projects where charging infrastructure is needed.

4. Administrative Expenditures: Up to 5 percent (or up to approximately $5,433,984)

While beneficiaries may request up to 15 percent of their Volkswagen Trust allocation for administrative expenditures, as authorized in Appendix D-2 of the Trust Agreement, Illinois expects to request up to 5 percent (or up to approximately $5,433,984) of its allocation. Administrative expenditures may include personnel costs, fringe benefit costs, supply costs, contractual costs, and other eligible costs.

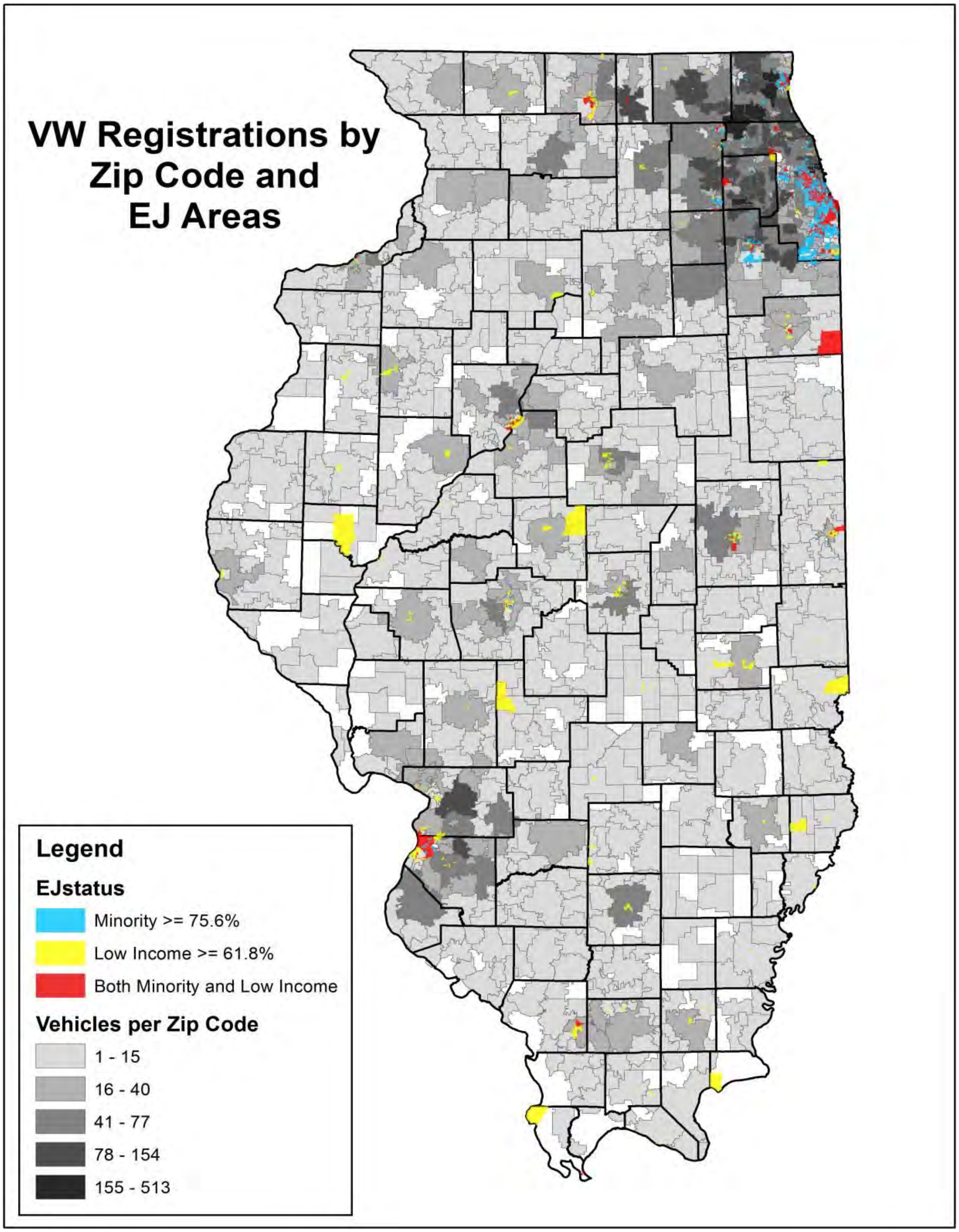
E. Potential Beneficial Impact

Illinois intends on prioritizing areas of the State for EMA funding and anticipates funding EMAs in each of the priority areas. Priority areas were based on the following considerations, although Illinois may consider other factors:

- Counties having the greatest number of subject Volkswagen vehicle registrations;
- Counties designated nonattainment for ozone; and
- Areas that bear a disproportionate share of the air pollution burden, including environmental justice areas.

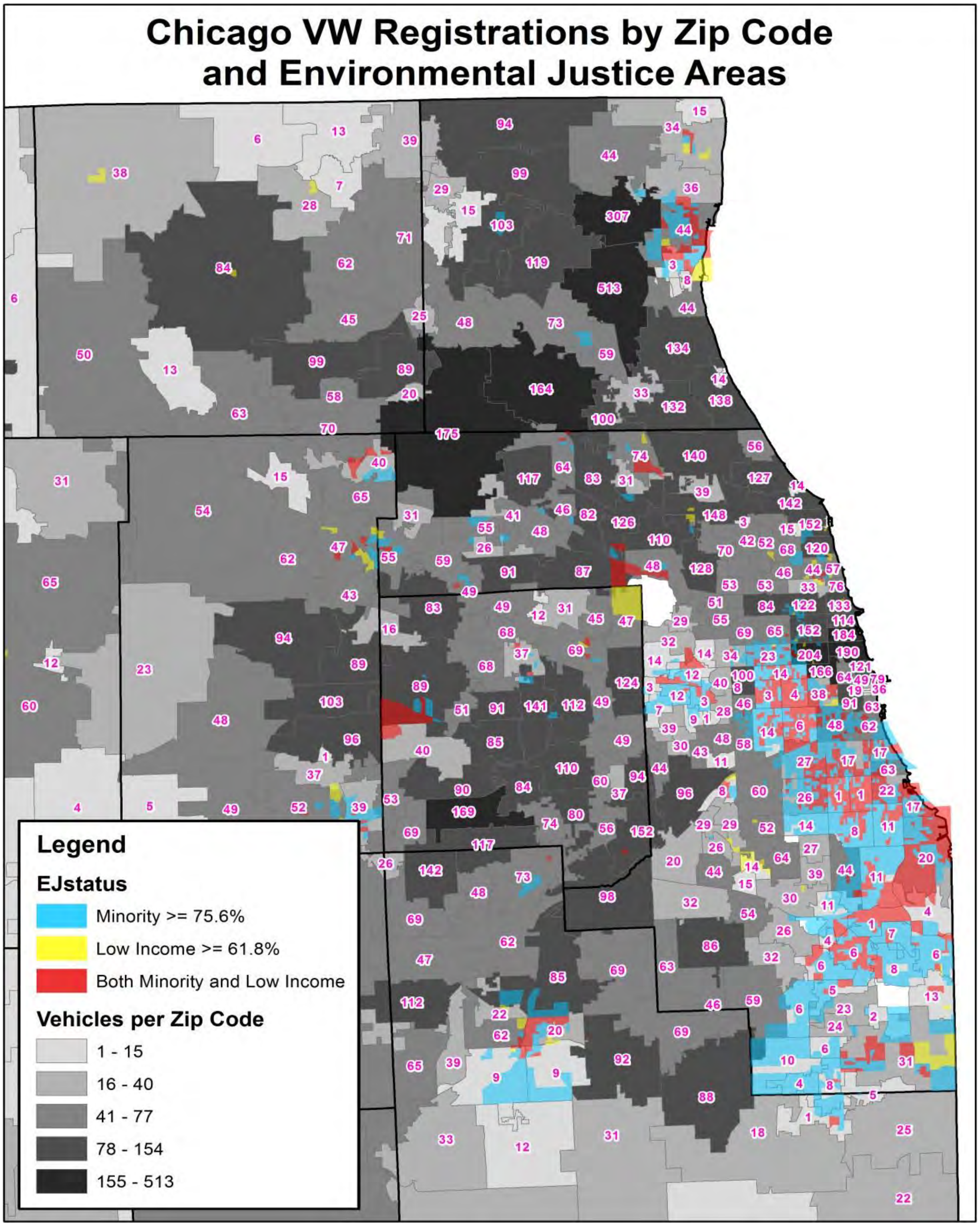
The greatest percentage of affected Volkswagen vehicles in Illinois are registered in the Chicago area. Approximately 69.5 percent of the affected Volkswagen vehicles are registered in the Chicago ozone nonattainment area (Cook, DuPage, Kane, Lake, McHenry, Will and portions of Kendall and Grundy counties). Approximately 32 percent are registered in Cook County alone with the highest concentration of affected Volkswagen vehicles per square mile located in and just north of the Chicago Loop. The Chicago ozone nonattainment area has a higher nonattainment classification than the only other nonattainment area in Illinois – the Metro-East nonattainment area. Further, based on the Agency's environmental justice public participation policy and mapping tool, approximately 69.8 percent, the highest percentage, of environmental justice block groups in the State are in Cook County. This means that approximately 69.8 percent of the environmental justice population in the State live in Cook County. Approximately 79.3 percent of environmental justice block groups in the State are in the Chicago ozone nonattainment area. This means that approximately 79.3 percent of the environmental justice population in the State live in Chicago ozone nonattainment area. Figure 4 contains a map of Volkswagen vehicle registrations by zip code versus environmental justice areas in Illinois. Figure 5 contains a map of Volkswagen vehicle registrations by zip code versus environmental justice areas in Chicago. This confluence of factors provides evidence that the Chicago nonattainment area bears a disproportionate share of the air pollution burden in Illinois. As a result of these factors and Illinois' goals for use of the Volkswagen Trust funds, Illinois intends on establishing the Chicago nonattainment area as Priority 1 for funding.

Figure 4 - Volkswagen Vehicle Registrations by Zip Code versus Environmental Justice Areas - Illinois



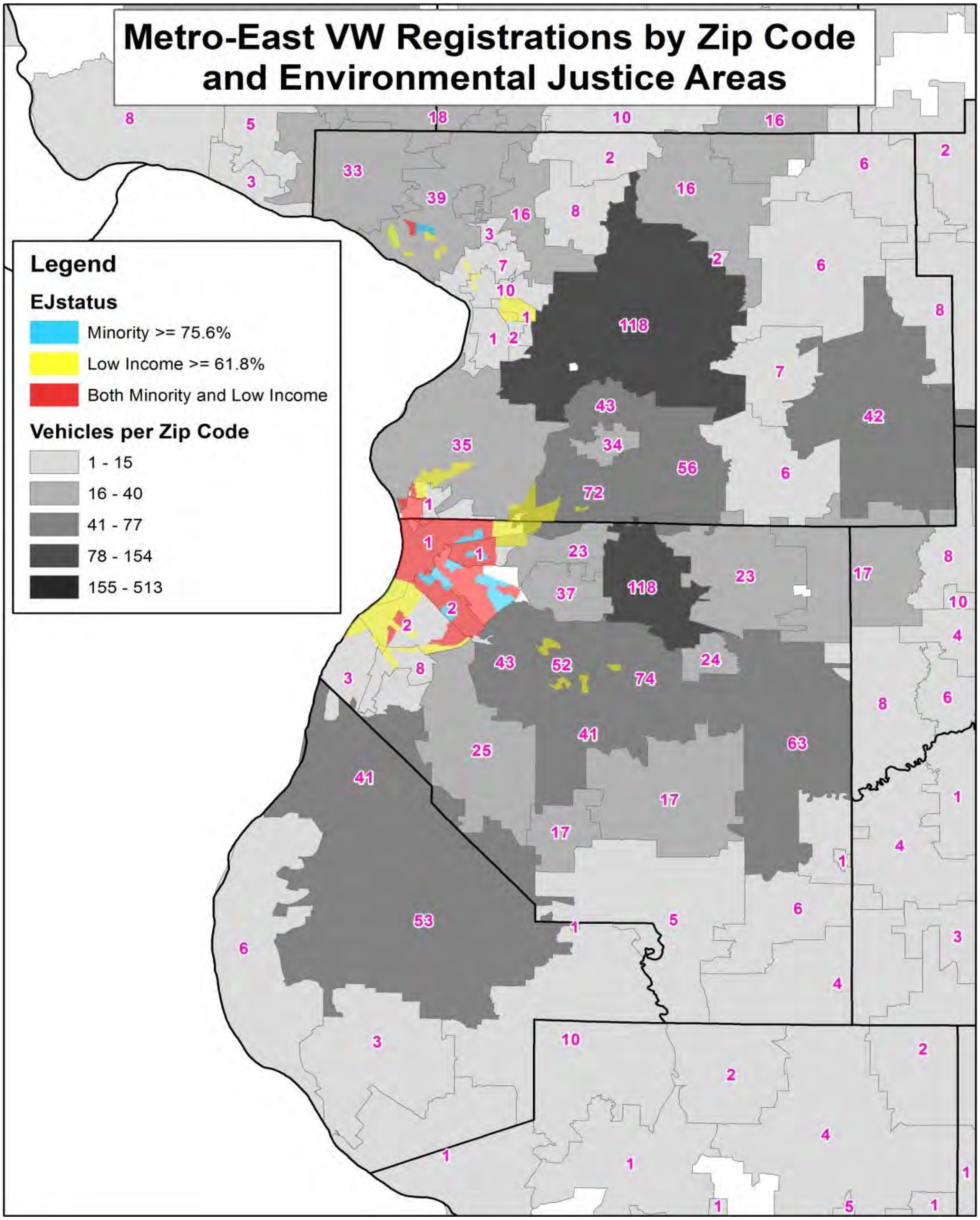
DRAFT

Figure 5 - Volkswagen Vehicle Registrations by Zip Code versus Environmental Justice Areas – Chicago Area



Approximately 5.4 percent of affected Volkswagen vehicles are registered in the Metro-East ozone nonattainment area. Approximately 2.9 percent, the second highest percentage outside the Chicago ozone nonattainment area, of environmental justice block groups in the State are in St. Clair County, part of the Metro-East ozone nonattainment area. This means that approximately 2.9 percent of the environmental justice population in the State live in St. Clair County. Approximately 4.1 percent of environmental justice block groups in the State are in the Metro-East ozone nonattainment area. This means that approximately 4.1 percent of the environmental justice population in the State live in the Metro-East ozone nonattainment area. Figure 6 contains a map of Volkswagen vehicle registrations by zip code versus environmental justice areas in the Metro-East nonattainment area. While not as significant as the Chicago nonattainment area, these facts provide evidence that the Metro-East nonattainment area bears a disproportionate share of the air pollution burden as compared to the attainment area of Illinois. Based on these facts and Illinois' goals for use of the Volkswagen Trust funds, Illinois intends on establishing the Metro-East nonattainment area as Priority 2 for funding.

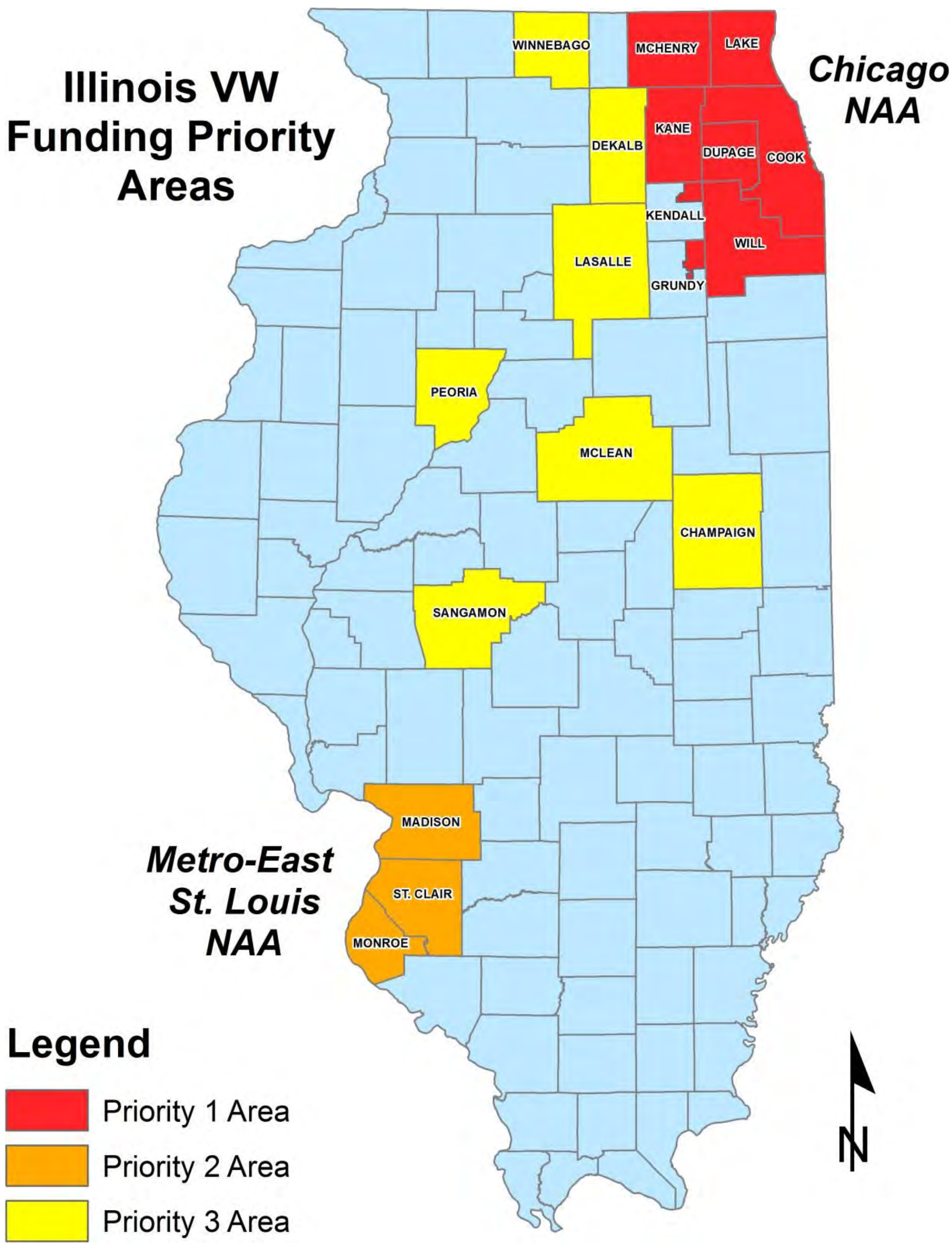
Figure 6 - Volkswagen Vehicle Registrations by Zip Code versus Environmental Justice Areas – Metro-East Nonattainment Area



DRAFT

The remaining affected Volkswagen vehicles registered in Illinois are spread throughout the State in the ozone attainment area. The vast majority of ozone attainment counties each have less than 1 percent of affected Volkswagen vehicles. The Illinois ozone attainment counties with 1 percent or greater affected Volkswagen vehicles registered are Champaign, DeKalb, LaSalle, McLean, Peoria, Sangamon, and Winnebago. Combined, these attainment counties have 10.1 percent of affected Volkswagen vehicles. Therefore, Illinois intends on establishing these counties as Priority 3 for funding. Figure 7 contains a map of Illinois' Volkswagen funding priority areas.

Figure 7 – Illinois Volkswagen Funding Priority Areas Map



F. Expected Ranges of Emissions Benefits

The Agency developed estimates of the expected ranges of emissions benefits to be realized by implementation of EMAs based on the proposed maximum percentage allocations of funds for the overall two categories of projects (on-road, including all-electric school bus projects, and off-road) identified in this draft BMP, a representative sample of EMAs from each category and utilizing the DEQ, AFLEET, and Agency calculations. The Agency developed cost estimates based on independent research and costs of similar projects funded by the Agency in the past under its Illinois Green Fleets Grant Program. Actual emission reductions realized by EMAs will be dependent on the types of projects ultimately selected for funding and final funding percent allocations contained in the final BMP, which may also be revised as goals or market demands change.

1. On-Road Projects. The Agency analyzed a sample of EMAs that included replacing Class 4-8 trucks, transit and school buses with new clean diesel, natural gas, propane, electric, and hydrogen versions. The estimated total annual emission reductions from this category is approximately 100 tons of NO_x per year.

2. Off-Road Projects. The Agency analyzed a sample of EMAs that included repowering or replacing switcher locomotives, tug boats, and passenger locomotives. The estimated total annual emission reductions from this category is approximately 1,700 tons of NO_x per year.

The Agency estimates that utilizing the Volkswagen Trust allocation provided to Illinois as proposed in this draft BMP may result in annual emission reductions of approximately 1,800 tons of NO_x. Actual emission reductions will be dependent on the types of projects ultimately selected for funding and final funding percent allocations.

G. Public Input

The Trust Agreement requires the BMP to include an explanation of the process by which Illinois will seek and consider public input on its BMP. Over the past year, the Agency has communicated and met with numerous interested stakeholders regarding administration of Volkswagen Trust funds in Illinois. This includes environmental, consumer and other advocacy groups, schools, school districts and universities, transit agencies, regional planning organizations, municipalities, counties, other State agencies, trade groups, utilities, vehicle suppliers, consulting groups, manufacturers, other private businesses, and individuals.

To reach and inform a broad range of the public and potential applicants, and to make public participation easy and convenient, the Agency has established a Volkswagen Settlement webpage (http://www.epa.illinois.gov/topics/air-quality/vw-settlement/index), set up a survey and e-mail to solicit input, and will be promoting these tools through social media, direct e-mail notification, speaking events and a press release. The Agency will post information and updates to the Volkswagen Settlement webpage.

The Agency is making the draft BMP available for public input. The BMP is available on the Volkswagen Settlement webpage. **The Agency will accept public input on this draft BMP through ~~April 13, 2018~~ April 20, 2018**. Public input should be provided in writing and submitted to the Agency electronically at epa.vwsettlement@illinois.gov. In addition, the Agency will continue

to communicate and meet with any and all interested stakeholders throughout this public input period. In addition to solicitation of public input on this draft BMP, the Agency is seeking public input regarding administration of Volkswagen Trust funds through a Volkswagen Survey. The survey can be found on the Agency's Volkswagen Settlement webpage. **To be considered, the Volkswagen Survey must be completed no later than ~~April 13, 2018~~**

April 20, 2018. The Agency will maintain a listserv of interested stakeholders and will provide notification to this group as updates become available.

Any questions about the draft BMP, inclusion on the listserv, submission of public input, or the Volkswagen Survey should be directed to Brad Frost at brad.frost@illlinois.gov or by calling 217-782-7027. Once finalized, the BMP will be posted to the Agency's Volkswagen Settlement webpage and submitted to the Trustee. Any revisions to the final BMP will be posted to the Agency's Volkswagen Settlement webpage and submitted to the Trustee. The Agency will provide additional information and updates regarding the BMP and its administration of Volkswagen Trust funds on its Volkswagen Settlement webpage as more information and updates become available.

V. CONCLUSION

This draft BMP has been developed in accordance with the terms of the Trust Agreement. This draft BMP is not a solicitation for projects. As such, it does not include detail on the application or project selection process. Such information will be available on the Agency's Volkswagen Settlement webpage after the final BMP has been submitted to the Trustee. As part of periodic evaluations, Illinois may revise the final BMP as necessary to reflect major changes in market demand, the State's goals, or available funds in future years.