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ATTAINMENT DEMONSTRATION FOR THE 1997 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD FOR THE CHICAGO NONATTAINMENT AREA

AQPSTR 08-07

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List of Acronyms

ADVMT	Average Daily Vehicle Miles Traveled
AER	Annual Emissions Report
ASWVMT	Average Summer Weekday Vehicle Miles Traveled
AIM	Architectural and Industrial Maintenance
AVER	All Vehicle Emission Rate
BART	Best Available Retrofit Technology
CAA	Clean Air Act of 1990
CAIR	Clean Air Interstate Rule
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CMAP	Chicago Metropolitan Agency for Planning
CPS	Combined Pollutant Strategy
EGAS	Economic Growth Assessment System
EGU	Electric Generating Unit
EPA	Environmental Protection Agency
EWGCOG	East-West Gateway Council of Governments
FAA	Federal Aviation Administration
FCCU	Fluidized Catalytic Cracking Unit
FMVCP	Federal Motor Vehicle Control Program
IDOT	Illinois Department of Transportation
I/M	Inspection/Maintenance
IPM	Integrated Planning Model
LADCO	Lake Michigan Air Directors Consortium
MMBTU	Million British Thermal Units
MACT	Maximum Achievable Control Technology
MON	Miscellaneous Organic NESHAP
MPS	Multi-Pollutant Strategy
NAA	Nonattainment Area

NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOx	Oxides of Nitrogen
NSPS	New Source Performance Standards
OBD	On-Board Diagnostics
OTB	On the Books
OTC	Ozone Transport Commission
PM2.5	Particulate Matter less than 2.5 microns in diameter
PM10	Particulate Matter less than 10 microns in diameter
PPMVD	Parts Per Million By Volume Dry
QA	Quality Assurance
QC	Quality Control
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RICE	Reciprocating Internal Combustion Engine
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RPO	Regional Planning Organization
RVP	Reid Vapor Pressure
SCC	Source Classification Code
SIP	State Implementation Plan
SO2	Sulfur Dioxide
TPD	Tons Per Day
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOM	Volatile Organic Material
WOE	Weight of Evidence

Executive Summary

On April 15, 2004, the United States Environmental Protection Agency (U.S. EPA) designated portions of the Chicago metropolitan area as nonattainment for the 8-hour ozone National Ambient Air Quality Standard (NAAQS). The Chicago nonattainment area (NAA) includes Cook, DuPage, Kane, Lake, McHenry and Will counties and Aux Sable and Goose Lake Townships in Grundy County and Oswego Township in Kendall County. This designation became effective on June 15, 2004. In the Lake Michigan region, portions of eastern Wisconsin, northwestern Indiana and western Michigan were also designated as nonattainment for the 8-hour ozone standard. As a result of the designation of these counties to nonattainment, the State of Illinois is required by the Clean Air Act (CAA) to develop a plan to attain the NAAQS by a specified deadline. For 8-hour ozone, the attainment plan was due by June 15, 2007 and attainment of the NAAQS is to be achieved by June 15, 2009.

As portions of the Lake Michigan area in neighboring states have also been designated as nonattainment, Illinois has worked closely with the U.S. EPA, and the states of Wisconsin, Indiana, Michigan and Ohio, through the Lake Michigan Air Director's Consortium (LADCO), to prepare this attainment demonstration. Under the direction of LADCO, the states have developed a photochemical model to simulate the formation and transport of ozone in the Midwest. After an extensive performance evaluation, the modeling system was used to evaluate whether the identified emissions reduction strategy was adequate to demonstrate attainment of the 8-hour ozone NAAQS by the attainment deadline.

The modeling indicates that the selected strategy will provide sufficient emission reductions to achieve attainment of the ozone standard at all but one location in the Lake Michigan region. This location, Holland, Michigan, is projected to achieve the 8-hour ozone standard by 2012 without the need for additional control measures beyond those identified in the selected strategy. A key element of the strategy, the Clean Air Interstate Rule (CAIR) which was promulgated by U.S. EPA on March 10, 2005, was vacated by the U.S. Court of Appeals for the D.C. Circuit on July 11, 2008. The emission reductions expected from this program are, therefore, uncertain. The modeling indicates, however, that the states' emission reduction strategy is still sufficient to

demonstrate attainment for the 8-hour ozone standard by 2009, except in Holland, MI, even without the emission reductions from CAIR.

The CAA and U.S. EPA's implementation rule for ozone specify other requirements for states to address in preparing attainment demonstrations. These include a demonstration of Reasonable Further Progress (RFP), Reasonably Available Control Technology (RACT), contingency measures that must be implemented if the nonattainment area fails to achieve the RFP reductions or fails to attain the NAAQS within the specified time frame, motor vehicle emissions budgets to address transportation conformity, and a demonstration that Illinois has the legal authority and is committing the resources needed to implement this attainment plan. These requirements are addressed in this document.

1.0 Attainment Demonstration

On April 15, 2004, the U.S. EPA designated portions of the lower Lake Michigan region, including the Chicago metropolitan area, as nonattainment for the 8-hour ozone NAAQS. These designations became effective on June 15, 2004. Six counties and three townships in northeastern Illinois were designated as a NAA, with a classification of moderate, for the 8-hour standard promulgated by the U.S. EPA in 1997. This area includes Cook, DuPage, Kane, Lake, McHenry and Will counties and Aux Sable and Goose Lake townships in Grundy County and Oswego Township in Kendall County.

The Illinois EPA and the air quality agencies from the states of Indiana, Michigan, Ohio, and Wisconsin worked cooperatively with LADCO to develop a photochemical model to simulate the formation and transport of ozone in the Midwest. The modeling system is used to evaluate emissions reduction strategies for inclusion in the states' attainment plans. A complete description of the modeling methodologies and results are contained in the document "Regional Air Quality Analyses for Ozone, PM2.5, and Regional Haze: Final Technical Support Document" (April 25, 2008), and the Supplement to this document dated September 12, 2008, both of which were prepared by LADCO and are included as Appendices A and B.

The modeling study included emissions, meteorological, and ozone simulations using a nested 36/12/4 km grid covering the central U.S. and centered on the Lake Michigan region. The air quality analyses were conducted using the CAMx model, with emissions and meteorology generated using EMS (and CONCEPT) and MM5, respectively.

As described in Section 3.7 of the LADCO Technical Support Document (TSD), model performance was assessed by comparing modeled and monitored concentrations with statistical measures recommended by U.S. EPA to assess the reasonableness of the results. The model performance evaluation focused on the magnitude, spatial pattern, and temporal variations of modeled and measured concentrations. The 2002 and 2005 baseline CAMx and CMAQ modeling databases were evaluated against monitored ozone data from the lower Lake Michigan and Detroit-Cleveland area in order to evaluate the fitness of the databases for use in the modeled

attainment test. In summary, model performance for ozone is generally acceptable and can be characterized as follows:

- Good agreement between modeled and monitored concentrations for higher concentration levels (> 60 ppb) – i.e., bias within 30%;

- Regional modeled concentrations appear to be underestimated in the 2002 base year, but show better agreement (with monitored data) in the 2005 base year due to model and inventory improvements;

- Day-to-day and hour-to-hour variation in and spatial patterns of modeled concentrations are consistent with monitored data;

- Model accurately simulates the change in monitored ozone concentrations due to reductions in precursor emissions.

After detailed performance testing of the 2002 and 2005 basecase simulations, the CAMx modeling system was exercised with a 2009 On-the-Books (OTB) emissions control scenario aimed at assessing the effects of future year emission control strategies on ozone in the Midwest. As described in Section 4.0 of the TSD, air quality modeling and other supplemental analyses performed to estimate future year ozone concentrations indicated that:

- Existing ("on the books") controls are expected to produce significant improvement in ozone air quality;

- With the exception of one monitoring station in Holland, MI, all sites in the Lake Michigan region are expected to meet the current 8-hour standard by the applicable attainment date;

- Attainment by the applicable attainment date is dependent on actual future year meteorology (e.g., if the weather conditions are consistent with [or less severe than] 2005, then attainment is likely).

As indicated in Section 4 of the TSD, all monitors in the Lake Michigan area are projected to achieve the 8-hour standard in 2009, except that located in Holland, Michigan. The projected concentration of 85.3 ppb, is well within the realm of the weight of evidence (WOE) test. In addition, the monitor is projected to attain the 85 ppb level by 2012 with no additional control measures.

2.0 Base Year(s) Emission Inventory

Multiple base year (2002 and 2005) inventories were developed to support the modeled attainment demonstration and SIP planning process. Though U.S. EPA guidance recommends 2002 for the base year, there is provision in the guidance for use of an alternative base year, and the LADCO Project Team opted to include a more recent year. The methods used to compile the base year inventories were essentially the same, and targeted ozone precursor emissions---CO, NOx, and VOM. Inventories were compiled for point, area, on-road mobile, nonroad, and biogenic emission sectors. Inventories were provided directly from the Illinois statewide database or generated from models (i.e. EGUs, on-road, nonroad, and biogenic). Throughout the inventory development process, LADCO and member states implemented quality assurance (QA) procedures and quality control (QC) checks to assure inventories of the highest quality. Procedures outlined in U.S. EPA's guidance documents pertaining to inventory quality assurance were followed by inventory development staff and have yielded complete, accurate and high quality inventories. Tabular data and graphical information of base year emissions are provided in Section 3.6 ("Model Inputs: Emissions") of the accompanying LADCO TSD. Within the narrative of the TSD (see page 51), it is noted that additional detail on the inventories can be found in the document entitled "Base K/Round 4 Strategy Modeling Emissions" (LADCO, May 16, 2006), as well as in the document entitled "Base M Strategy Modeling: Emissions (Revised)" (LADCO, February 27, 2008).

3.0 Emissions Control Measures

The modeling analysis described in this document indicates that control measures which have been promulgated at either the state or federal level, referred to as "on the books" controls, should be sufficient to allow the Lake Michigan region, with the exception of Holland, MI, to meet the 1997 8-hour ozone NAAQS by the required attainment date. The primary "on-the-books" emission reduction measures for demonstrating attainment of the ozone standard are described in this section.

The principle "on the books" emission reduction measures evaluated for this attainment demonstration are as follows:

1. **Title IV (Phases I and II) (*Clean Air Act of 1990, as amended*)**

2. **NOx SIP Call (*Federal Register: October 27, 1998, vol. 63, no.207 pp. 57355-57538*) (*35 Il. Adm. Code Part 217)***

The NOx SIP Call provided for a trading program and established a seasonal emissions cap based upon electrical generating units (EGUs) not exceeding 0.15 lb NOx per million British Thermal Units (MMBTU) heat input and non-EGU boilers and turbines reducing NOx emissions by 60 percent. The rule also required tightened emission limits on cement kilns (30 percent NOx reduction) and large stationary internal combustion engines (Illinois is requiring 82 percent NOx control efficiency). Illinois regulations that were promulgated to meet the requirements of the federal NOx SIP Call addressed the EGU and non-EGU (boilers, turbines, and combined cycle systems) NOx emissions within the federally proposed cap and allowance trading framework and also placed specific emission limits on cement kilns (after May 30, 2004). The NOx SIP Call was implemented on May 31, 2004. The limits for engines and turbines were appealed; however, a new implementation date of January 1, 2008 was established for reciprocating internal combustion engines (RICE).

3. **New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS)/Maximum Achievable Control Technology (MACT) Standards (*Clean Air Act of 1990, as amended*)**

A broad range of emission sectors are subject to federal New Source Performance Standards (NSPS) and NESHAP MACT standards with compliance requirements which take effect post-2002 and prior to the Chicago ozone attainment date. For MACT sources, these include, in part, the Combustion Turbine MACT and the 2-, 4-, 7-, and 10 year VOC MACT standards. Projected reductions in VOM and NOx in Illinois reflect U.S. EPA-estimated values.

4. **VOC Solvent Categories: Aerosol Coatings, Architectural and Industrial Maintenance (AIM) Coatings, Consumer Solvents (*Federal Register: March 24, 2008, vol.73, no.57, pp. 15421-15631*) (*Federal Register: September 11, 1998, vol.63, no.176, pp. 48848-48887*) (*Federal Register: September 11, 1998, vol.63, no.176, pp. 48819-48847*)**

Recent federal rulemakings have established or amended VOM content limits for aerosol coatings, AIM coatings, and household and institutional consumer products. These rulemakings are expected to result in "creditable reductions" of mass VOM emissions of 0.114 pounds per capita, 1.1 pounds per capita, and 0.9 pounds per capita, respectively.

5. **Portable Fuel Containers (*Federal Register: February 26, 2007, vol.72, no.37, pp. 8427-8570*)**

U.S. EPA's emission standard for portable fuel containers limits evaporation and permeation emissions to 0.3 grams of hydrocarbons per gallon per day. The standard will affect portable fuel container sales beginning in 2009.

6. **Vehicle Inspection & Maintenance Program (*Clean Air Act of 1990, as amended*)**

7. **Reformulated Gasoline (*Clean Air Act of 1990, as amended*)**

8. Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements (*Federal Register: February 10, 2000, vol. 65, no.28, pp. 6697-6870*)

Through a combination of tailpipe emission standards (fully phased in by 2007 and 2009) for new passenger cars, light trucks, and "medium-duty passenger vehicles" and requirements for much lower sulfur levels in gasoline (fully phased in by 2006), motor vehicle emissions of NOx, non-methane organic gases, and sulfur compounds will be reduced. Vehicle NOx emission levels will be reduced to an average of 0.07 grams per mile. Most gasoline producers were to meet a "corporate average gasoline sulfur standard of 120 ppm and a cap of 300 ppm beginning in 2004". This cap was reduced to 80 ppm and "most refineries must produce gasoline averaging no more than 30 ppm sulfur" by 2006. These requirements were met.

9. On-Highway Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements (*Federal Register: January 18, 2001, vol. 66, no. 12, pp. 5002-5193*)

Through a combination of tighter engine emission standards phased in beginning in 2007, and the required sale of ultra low sulfur diesel fuel (ULSD) in 2006, VOM and NOx emissions will be reduced. The sulfur content of on-road diesel fuel was reduced by 97 percent to 15 ppm beginning in June 2006. This will enable the use of advanced emissions control equipment on diesel vehicles. The program will result in vehicle NOx emissions levels that are 90 percent below year 2000 levels.

10. Federal Control Programs Incorporated into NONROAD Model (e.g., Nonroad Diesel Rule), plus Evaporative Large Spark Ignition and Recreational Vehicle Standards (*Federal Register: November 8, 2002, vol.67, no.217, pp. 68241-68447*)

11. Tier 4 Nonroad Diesel Engine Standards and Diesel Fuel Sulfur Content Restrictions *(Federal Register: June 29, 2004, vol. 69, no. 124, pp. 38957-39273)*

Through new emission standards and emission test procedures for nonroad diesel engines (phased in starting mid-2007), in combination with reductions in the sulfur content of nonroad diesel fuel (500 ppm cap starting June 2007; 15 ppm level by June 2010), nonroad engine emissions of NOx, non-methane hydrocarbons, fine particulate (PM2.5), and sulfur compounds will be reduced. The diesel fuel sulfur level of 15 ppm represents a 99 percent reduction from existing levels. Diesel engine particulate matter emissions will be reduced greater than 95 percent, and NOx emissions will be reduced more than 90 percent.

12. **Marine Compression-Ignition Engine Standards and Locomotive Engine Standards (*Federal Register: April 16, 1998, vol. 63, no. 73, pp. 18977-19084*) (*Federal Register: December 29, 1999, vol.64, no. 249, pp. 73299-73373*)**

13. **Consent Decrees---Dynegy Midwest Generation, Refineries (ConocoPhillips, CITGO, Exxon-Mobil, Marathon Ashland), Ethanol Plants (Archer Daniels Midland) (*Marathon Ashland Consent Decree, filed May 11, 2001, U.S. District Court for the Eastern District of Michigan*) (*CITGO Global Refinery Settlement, filed October 6, 2004, U.S. District Court for the Southern District in Texas*) (*ConocoPhillips Global Refinery Settlement, filed January 27, 2005, U.S. District Court for the Southern District in Texas*) (*ExxonMobil Consent Decree, filed October 11, 2005, U.S. District Court for the Northern District of Illinois*) (*USA v. IL Power Co., et. al. 3:99-cv-833 Consent Decree, March 2005, U.S. District Court for the Southern District of Illinois*) (*Archer Daniels Midland Consent Decree, filed April 9, 2003, U.S. District Court for the Central District of Illinois*)**

The timing of the Marathon Ashland Petroleum, LLC Consent Decree results in emission reductions that are more likely to be reflected in base year emission rates for the Robinson, Illinois refinery (and for the other affected refineries), than as new controls incorporated as part of future year attainment modeling. However, some requirements of the Consent Decree and/or emission reduction benefits may not be fully realized until the post-2005 base year timeframe. NOx emission reductions from the fluidized catalytic cracking unit (FCCU) at the Robinson

refinery will be achieved through catalyst additives, low NOx combustion promoter, and possibly selective non-catalytic reduction. For refinery heaters and boilers, control technology is required that will reduce NOx emissions to "0.040 lbs/ mmBTU or lower".

The CITGO consent decree requires installation of a wet gas scrubber for SO_2 and PM control on the FCCU, and imposes an SO_2 emission limit of "25 parts per million by volume dry (ppmvd) at 0% O_2 on a 365-day rolling average basis and 50 ppmvd at 0% O_2 on a 7-day rolling average basis." PM emissions are limited to "0.5 pounds . . . per 1000 pounds of coke burned on a 3-hour average basis." Compliance with these emission limits was required by December 31, 2007. By that same date, and for purposes of achieving NOx emission reductions, CITGO was to convert the FCCU to "full burn operation, or accept and agree to comply with concentration based emission limits of 20 ppmvd on a 365-day rolling average and 40 ppmvd on a 7-day rolling average basis, both at 0% oxygen." The installation of low NOx burners "to achieve 0.060 lb / mmBTU high heating value of NOx in the FCCU carbon monoxide (CO) boiler" during combustion of auxiliary fuel was also required by December 31, 2007. The settlement agreement includes a requirement for installation of one or more tail gas units to control emissions from Claus trains (119A and B at the Lemont Refinery) no later than December 31, 2008. The requirements for pollutant reductions extend to many of the refinery emission sources, including provisions to minimize acid gas flaring and tail gas flaring incidents.

The ConocoPhillips settlement provides for near-term installation (no later than December 31, 2009) of Low-NOx Burners and Ultra Low-NOx Burners on combustion units at its "Distilling West" operations. Other NOx emission reduction requirements are set forth in the consent decree, as are provisions for CO, SO2, and particulate matter reductions.

The ExxonMobil settlement provides for installation and operation of a wet gas scrubber for SO2 control and Selective Catalytic Reduction (SCR) for NOx control on the Joliet refinery fluid catalytic cracking unit (FCCU). Compliance with SO_2 emission limits of "25 ppmvd at 0% O_2 on a 365-day rolling average basis and 50 ppmvd at 0% O_2 on a 7-day rolling average basis" on the FCCU are to be met by December 31, 2008. By the entry date of the consent decree, the FCCU must also meet "an emission limit of 1.0 pound of PM per thousand pounds of coke burned."

SO2 and NOx reductions will also come from other emission sources (e.g., FCCU catalyst regenerators, combustion units, etc.).

The settlement reached with Dynegy Midwest Generation for alleged violations at the Baldwin Generating Station included the requirements to "commence operation of the SCRs installed at Baldwin Unit 1, Unit 2 . . . so as to achieve and maintain a 30-day rolling average emission rate from each such unit of not greater than 0.100 lb/mmBTU NOx and "maintain a 30-day rolling average emission rate of not greater than 0.120 lb/mmBTU NOx at Baldwin Unit 3." Low NOx burners and Overfire Air Technology are required on Dynegy Midwest Generation's Wood River Units #4 and #5.

The settlement reached with Archer Daniels Midland Company (ADM) for alleged violations at its grain and oil-seed processing facilities targets emission reductions from dryers, carbon furnaces, fermentation units, boilers, and ethanol loadout systems. Optimization of existing pollution control equipment (e.g., scrubbers), installation of new equipment (i.e., SNCR, RTOs, and RCOs), and permanent shutdown of some emission sources are identified for meeting the required pollutant reductions. For its Decatur, Illinois facility, ADM must achieve 95% VOM control (or a concentration limit of 10 ppmvd) and 90% SO2 control (or a concentration limit of 20 ppmvd) on the Gluten Feed/Fiber Dryers, Gluten Meal Dryers, and Carbon Furnaces. At both the Decatur and Peoria facilities, ADM must achieve 95% VOM control (or a concentration limit of 20 ppmvd) on yeast propagators and ethanol fermenters and 95% control on non-dedicated ethanol loadouts. ADM had to achieve a minimum of one-third of the estimated VOM emission reductions by December 31, 2005. By December 31, 2012, 100% of the required VOM reductions must be met. Coal-fired boilers (#1, 2, and 3) at the ADM Peoria facility, had to comply (in aggregate) with an SO2 emission limit of 421 tons per rolling 30-day period by March 31, 2007, and a limit of 3400 tons per rolling 12-month period by March 31, 2008. Coal-fired boilers (#1 and 2) at the Quincy, Illinois facility must comply with a NOx emissions limit of 0.43 lb/mmBTU. Other pollution reduction requirements for these and other ADM emission sources are also provided for in the Consent Decree.

14. Illinois (Nonattainment Area) NOx RACT

Illinois' NOx RACT requirement has not yet been adopted by the Illinois Pollution Control Board and will not be implemented until 2010. Emission reductions from this requirement will therefore not contribute to attainment by the 2009 attainment deadline, but will help to maintain attainment beginning in 2010. This requirement will also contribute to attainment in Holland, MI by 2012.

4.0 Reasonable Further Progress (RFP)

Since the Chicago region is classified as a moderate nonattainment area for the 8-hour ozone standard, a 15 percent net reduction in VOM emissions from 2002 levels is required by 2008 in order to meet the RFP requirements. The Illinois EPA has not relied on NOx substitution to meet its 15 percent RFP reduction, relying solely on VOM emission reductions.

Reductions in VOM emissions are primarily achieved through implementation of the following control programs:

- Federal commercial and consumer solvent regulation
- Federal architectural and industrial maintenance coatings regulation
- Motor vehicle fleet turnover and implementation of the Federal Tier 2 motor vehicle fuels and emissions standards

Appendix D of this document contains Illinois EPA's full RFP demonstration. As shown in Appendix D, "on-the-books" control measures, including those listed above, will result in a 20.0 percent reduction in VOM emissions from 2002 emissions levels by the year 2008. In addition, continuing reductions in 2009 and 2010 are estimated to result in year 2010 VOM emissions at 23.85 percent below 2002 levels. These emission reductions easily achieve the 15% RFP target for the Chicago nonattainment area.

5.0 Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM)

Pursuant to Sections 172, 182(b) and (f) of the CAA, RACT is required for all existing major sources of the applicable criteria pollutant and its precursors (VOM and NOx) located in NAAs. U.S. EPA defines RACT as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological feasibility and economic reasonableness (70 *FR* 71612; November 29, 2005). The major source threshold for moderate NAAs is defined as 100 tpy. A source generally consists of several units that emit pollutants. The sum of emissions from all units at the source determines if a unit is major and thus subject to RACT requirements.

RACT is not a new requirement under the CAA. Illinois previously addressed RACT requirements in the Chicago area in developing attainment plans for the 1-hour ozone standard. The RACT requirement for NOx was previously waived under the 1-hour ozone standard, and Illinois must adopt new regulations to implement NOx RACT in the NAA. However, Illinois has previously adopted RACT requirements for VOM emissions in the NAA. (See 35 Ill. Adm. Code Part 219) The Illinois EPA has evaluated the previously adopted regulations to determine if the RACT requirement is still being met for 8-hour ozone.

Sections 172, 182(b)(2), and 182(f) of the CAA require implementation of RACT for sources that are subject to Control Techniques Guidelines (CTGs) that are promulgated by U.S. EPA. The U.S. EPA has issued CTGs defining RACT for those categories of sources that emit the greatest amounts of VOM emissions. Emissions sources covered by CTGs are referred to as CTG sources. Table E-1 in Appendix E presents the CTG source categories, CTG reference documents, and the applicable Illinois rules promulgated in response to the CTGs. Illinois EPA will soon be proposing regulations to implement the CTG categories issued in 2006 by the U.S. EPA. Table E-2 in Appendix E presents CTG source categories where no sources located in the ozone NAA within that category were found. Based on this review, Illinois EPA has adopted applicable rules, will soon conduct rulemaking, addressing all CTG categories adopted by U.S. EPA through 2006 for which there are existing sources in the Chicago NAA.

Non-CTG sources are defined as major VOM sources which are not subject to CTGs, but for which RACT is required. All major sources of ozone precursors located in the ozone NAA that are not subject to individual RACT rules are subject to a generic RACT rule. These rules apply to non-CTG sources that have the potential to emit 100 tons or more per year of VOM. Thus, Illinois has met the obligation to implement RACT on non-CTG VOM sources in the NAA.

It should be noted that other regulatory requirements also affect VOM emission sources within the Chicago ozone NAA. These include Maximum Achievable Control Technology (MACT), federal New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (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 U.S. EPA's RACT requirements for VOM sources in the NAA. As mentioned previously, however, the RACT requirement for NOx was previously waived under the 1-hour ozone NAAQS, so Illinois must adopt new regulations to implement NOx RACT in the NAA. With respect to the 8-hour ozone NAAQS, Illinois will not pursue the NO_x waiver. Illinois therefore intends to submit a SIP revision to implement NO_x RACT requirements per Sections 182(b)(2) and 182(f) of the CAA once these requirements have been adopted by the Illinois Pollution Control Board.

Section 172(c)(1) of the CAA also requires states to demonstrate that all control measures necessary to demonstrate attainment are being adopted as expeditiously as practicable. U.S. EPA interprets Section 172(c)(1) as a requirement that states incorporate all reasonably available control measures (RACM) that would advance a region's attainment date into their SIP.

In practice, this is a negative test showing that there are no other measures that will advance the attainment date for one year or more. U.S. EPA guidance provides a narrow definition of RACM. The guidance states that measures which can be implemented and produce sufficient benefits to advance the attainment date are RACM. The guidance states that cost can be a factor

in determining whether a measure is reasonable. U.S. EPA guidance notes that measures that are not enforceable are not RACM.

The Illinois EPA has engaged in a number of exercises reviewing potential controls. There have been a number of SIP revisions that were made going as far back as 1982. After the 1990 Clean Air Act Amendments, Illinois addressed obligations involving the 1-hour ozone standard by preparing a 15 Percent Rate-Of-Progress Plan. Based on a review of a comprehensive list of emission controls, several controls were implemented that resulted in emission reductions of ozone precursors. In reviewing these options, the state considered technical feasibility, costs, and the time it would take to implement the reductions. Strategies that met these criteria were implemented. It was determined that other strategies did not meet these criteria, and these were not implemented.

During the development of this plan revision, LADCO, the Illinois EPA, and the other LADCO states prepared “white papers” listing emission control options for consideration by stakeholders. The “white papers” were comprehensive, and were assembled based on similar reviews being conducted by other planning efforts, for example in Texas and Northeast states. Staff reviewed the “white papers” and presented them for discussion among stakeholders. During these discussions, no measures that have not already been implemented were identified that met the criteria of being reasonable to install and expediting attainment. This conclusion is not surprising given the long history of ozone planning in the Lake Michigan region. Therefore, the Illinois EPA has concluded that all measures that were reasonably available and would expedite attainment have already been implemented.

6.0 Contingency Measures

Section 172 (c)(9) of the CAA require states with ozone nonattainment areas classified as moderate and above to adopt contingency measures by June 15, 2007. Such measures must provide for the implementation of specific emission control measures if the NAA fails to achieve required RFP reductions or fails to attain the NAAQS within the time-frames specified under the CAA. The CAA requires that contingency measures take effect without further action by the state or by the U.S. EPA upon failure by the state to meet RFP requirements or attainment of the NAAQS by the required deadline.

The General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990 (57 Fed. Reg. 13507, April 16, 1992) states that the contingency measures, in total, must generally be able to provide for 3 percent reductions from the 2002 baseline emissions. A 3 percent reduction in VOM emissions equates to 22.58 tons per day and a 3 percent reduction in NOx emissions equates to 32.58 tons per day. While all contingency measures must be fully adopted rules or measures, states can use measures in two different ways. A state can choose to implement contingency measures before the June 15, 2008 RFP milestone deadline. Alternatively, a state may decide not to implement a contingency measure until an area has actually failed to achieve an RFP or attainment milestone. In the latter situation, the contingency measure emission reduction must be achieved within one year following identification of a milestone failure.

To satisfy the requirements for contingency measures needed for the RFP plan and the attainment plan, Illinois is relying on a mix of federal and state measures, some of which were required under the CAA and some of which were state-specific measures. All measures relied upon in the plan have been adopted and will be implemented in Illinois within the 2002-2012 timeframe.

Pursuant to U.S. EPA's guidance document "Guidance on the Post-1996 Rate-of-Progress Plan and the Attainment Demonstration" (EPA-452/R-93-015), NOx reductions within 200 kilometers and VOM within 100 kilometers may be used to demonstrate RFP. Although Illinois is not

relying on NOx reductions within the NAA to demonstrate RFP, it is appropriate to consider these reductions as contingency measures.

Illinois is relying on one or more of the following federal and state measures to satisfy the requirement for contingency measures:

- Tier 2 Motor Vehicle Emissions Standards
- Heavy-duty diesel engine standards
- Multi-Pollutant Strategy contained in Illinois' Clean Air Mercury Rule
- Consent Decrees on Petroleum Refineries
- Portable Fuel Containers

The Illinois EPA has quantified the expected emission reductions from the contingency measures listed above. Tables 6-1 and 6-2 summarize Illinois EPA's estimates of the expected VOM and NOx reductions from these programs. As mentioned above, contingency measures, in total, must generally be able to provide for 3 percent reductions from the 2002 baseline emissions. A 3 percent reduction in VOM emissions equates to 22.58 tons per day and a 3 percent reduction in NOx emissions equates to 32.58 tons per day. Clearly, the listed measures will provide sufficient emission reductions within the NAA to satisfy this requirement. More importantly, these measures will help to ensure that the area, once it has attained the 8-hour ozone NAAQS, will continue to do so in subsequent years.

Table 6-1: Estimated VOM Reductions (TPD) from Contingency Measures

	2010	**2011**	**2012**
Tier 2	7.75	7.75	7.75
Heavy-duty diesel	0.04	0.04	0.04
Consumer Products/AIM	33.56	33.56	33.56
Portable Fuel Containers	2.95	5.11	7.06
Total	**44.30**	**46.46**	**48.41**

Table 6-2: Estimated NOx Reductions (TPD) from Contingency Measures

	2010	**2011**	**2012**
Tier 2	9.97	9.97	9.97
Heavy-duty diesel	10.67	10.67	10.67
IL Multi-Pollutant Strategy	0	53.15	50.41
Consent Decrees on Refineries	0.11	0.30	4.78
Total	**20.75**	**74.09**	**75.83**

7.0 Transportation Conformity

The purpose of this document is to describe and establish the Chicago nonattainment area motor vehicle emissions budgets associated with the 8-hour ozone attainment demonstration State Implementation Plans (SIP). For the 8-hour ozone standard, average summer weekday motor vehicle emissions budgets are being proposed for the projected attainment year 2009 and for the precursor pollutants volatile organic material ("VOM") and oxides of nitrogen ("NOx"). These 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 motor vehicle VMT and fleet mix provided by the Chicago Metropolitan Agency for Planning (CMAP) and which was supplied to LADCO for use in the attainment demonstration photochemical modeling analysis.

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)).
LADCO along with the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin, have developed a strategy to demonstrate attainment of the 8-hour ozone standard in the lower Lake Michigan area in the year 2009. This plan incorporates base year emissions from all source categories (i.e., point, area, on-road, off-road), projections of emissions growth, and the inclusion of emissions reduction strategies. Transportation network data (e.g., road links, traffic volumes and speeds) and assumptions (e.g., fleet mix, VMT mix) were provided to LADCO by the CMAP for use in the modeling.

The motor vehicle emissions budgets established and described herein were developed consistent with the methodology and control strategy assumptions used in the 8-hour ozone Attainment Demonstrations. They rely on the motor vehicle emissions control measures incorporated into the attainment demonstration. The effects of these controls are incorporated into the emissions factors produced by the U.S. EPA's MOBILE6 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.

Using the above VMT and control program assumptions and methodology, following are the year 8-hour ozone motor vehicle emissions budgets for the Chicago NAA for use in determining transportation conformity.

Table 7.1:

Proposed Chicago NAA Year 2009 Motor Vehicle Emissions Budgets	
Pollutant	**2009**
VOM	106.92
NOx	261.02

Complete detail on the derivation of the motor vehicle emissions budgets, including discussion of the MOBILE6 model inputs and assumptions is included in Appendix D

8.0 Legal Authority and Resource Commitments

As set forth in earlier SIP revisions, the Illinois EPA has the necessary legal authority to implement the Attainment Demonstration that is being submitted. In brief, the legal authority for the State of Illinois to carry out its implementation plan is established in the Environmental Protection Act (Act) [415 ILCS 5/1 et seq]. The Act is a comprehensive piece of legislation designed to place the control and enforcement of every type of environmental problem under one body of law.

Pursuant to Section 4(l) of the Act, the Illinois EPA is designated as the air pollution agency for the State for all purposes of the CAA, including developing SIPs and proposing regulations. In accordance with and by the authority granted by the Act, the Illinois EPA will continue providing adequate funding and personnel to implement the provision of this plan for meeting the air quality standards.

The Illinois Pollution Control Board (Board) has been designated under the Act as the agency responsible for adoption of emission control regulations and has the authority necessary to adopt the type of regulations for the control of VOM emissions from consumer products and architectural and industrial maintenance coatings included in this plan (Section 5 of the Act).

The Illinois EPA is empowered to enforce the Act and applicable regulations promulgated there under (Title VIII of the Act). The Illinois EPA is directed to investigate alleged violations upon the request of the Board or upon receipt of information alleging a violation and may make such other investigations as it shall deem advisable. If such an investigation discloses that a violation may exist, the Illinois EPA shall bring an enforcement action against the violator before the Board in accordance with the Act and applicable State rules.

The Board's orders may be enforced by the Illinois EPA or the State's Attorney of the county in which the violation occurred or by the Attorney General of Illinois (Sections 33(d) and 42 of the Act). Injunctive relief is specifically authorized under Section 43 and 45(b) of the Act. In addition, violation of the Act, or of regulations adopted pursuant to the Act, or knowingly submitting any false information is a criminal misdemeanor (Section 44 of the Act). Section 44

of the Act also provides that it is the duty of every State and local law enforcement officer to enforce the Act and regulations and authorizes the issuance of citations for that purpose.

Appendix A

Regional Air Quality Analyses for Ozone, PM2.5, and Regional Haze:

Final Technical Support Document

Prepared by the
Lake Michigan Air Directors Consortium

April 25, 2008

Appendix B

Regional Air Quality Analyses for Ozone, PM2.5, and Regional Haze:

Final Technical Support Document (Supplement)

Prepared by the
Lake Michigan Air Directors Consortium

September 25, 2008

Appendix C

2002 and 2005 Emissions Inventory for the Chicago Nonattainment Area

Table C-1: 2002 Chicago NAA Emissions

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Point Sources							
External Fuel Combustion							
Electric Generation							
Coal	3,083.61	11.69	28,133.10	3,185.28	1,453.85	61,715.46	25.90
Distillate Oil	3.06	0.40	43.18	0.90		63.56	0.11
Natural Gas	1,084.49	20.43	2,100.20	35.49	18.61	441.22	11.89
Residual Oil	5.67	0.42	52.44	197.91	197.91	3,656.70	24.90
Industrial							
Coal	235.06		3,667.05	390.21	325.44	10,067.09	11.18
Distillate Oil	6.32	3.79	28.55	0.89		52.74	0.24
Natural Gas	1,739.43	51.45	2,869.34	136.84	134.08	40.15	157.76
Residual Oil	5.95	0.54	63.44	9.72		166.96	0.45
Other	294.71		790.95	40.18		119.81	17.17
Commercial/Institutional							
Coal	15.24		32.22			63.04	0.10
Distillate Oil	2.88	0.43	10.09	0.78		22.71	0.21
Natural Gas	538.58	5.41	1,056.69	54.10	54.10	3.78	39.49
Residual Oil	4.82	0.60	53.68	3.60	0.53	38.20	0.88
Space Heating							
Distillate Oil	0.01	0.01	0.08	10.68		37.60	
Natural Gas	32.45	1.67	65.48	2.31	0.07	3.13	2.72
Other	0.06		0.40	0.01			
Internal Fuel Combustion							
Electric Generation							
Distillate Oil	113.69	0.40	426.89	19.22		20.90	13.20
Landfill Gas	347.59		248.65	3.61	2.49	13.23	19.93
Natural Gas	512.38	7.43	687.38	34.84	1.15	9.76	28.41
Industrial							
Diesel	0.10	0.09	0.47	0.00		0.04	1.75
Distillate Oil	6.86	0.10	39.10	3.37	0.50	16.66	1.49
Natural Gas	218.35	1.06	946.02	44.73	19.05	1.44	76.59
Other	1.31		12.64	0.03		1.89	0.22

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Commercial/Institutional							
Distillate Oil	3.28	0.04	12.91	0.51		0.96	0.18
Landfill Gas	208.35		171.54	16.10	16.10	11.96	15.49
Natural Gas	91.68	0.55	170.81	3.36	3.07	0.42	11.41
Other	2.42		0.01				0.29
Engine Testing							
Diesel	20.95		109.23	5.17	0.22	3.38	10.15
Distillate Oil	0.12		0.88			0.00	0.01
Landfill Gas	183.54		78.57	10.04		3.08	6.00
Other	300.13		5.23	0.50		0.60	34.07
Off-highway Engines	0.51		0.03				0.02
Industrial Processes							
Chemical Manufacturing							
Adhesives							4.70
Fixed Roof Tanks				0.00		0.55	2.91
Floating Roof Tanks						0.20	2.62
Ink				3.57			174.83
Nitric Acid			0.04				
Paint				13.23			226.14
Pharmaceuticals	0.12		0.16	4.14		0.06	113.10
Phthalic Anhydride	98.63		90.24	6.52		674.22	210.50
Plastics	0.47		0.57	32.22		1.25	235.87
Sulfuric Acid			0.05	0.37		1.88	0.04
Synthetic Organic Fiber				0.88			0.46
Synthetic Rubber				0.69			32.31
Varnish				0.25			47.30
Other	608.08	0.11	173.77	372.69		6,927.57	1,885.08
Fuel Combustion	26.79	0.83	61.32	13.03		1.71	7.16
Fugitives			25.76	1.63		1.59	96.37
Food/Agriculture							
Bakeries	4.90	0.00	23.39	6.89		0.00	861.12
Beer			0.20	3.01			0.13
Candy			0.69	6.61			25.64

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Feed Manufacturing				2.87			
Grain Elevators	0.24		1.03	94.70			0.03
Milling	4.01		2.26	186.03		69.03	145.42
Smokehouses	1.90		1.30	2.81		1.33	7.19
Starch Manufacturing	12.89		15.32	60.69		10.88	33.75
Vegetable Oil				25.90		1.42	225.00
Other	8.78	0.00	29.17	170.90		421.39	361.13
Fuel Combustion	29.20	1.48	37.95	3.92		0.20	3.22
Fugitives							0.20
Primary Metal Production							
By-product Coke	1,149.62	0.00	758.38	119.49		135.93	26.40
Ferroalloy							8.99
Iron	0.08		0.43	33.30			0.70
Steel	5,960.65		214.54	97.57	38.54	133.31	78.12
Other			1.65	1.71			12.93
Fuel Combustion	15.20	0.15	45.48	2.43		0.15	0.74
Secondary Metal Production							
Aluminum	32.79	0.02	30.94	73.16	0.40	0.03	30.55
Copper	1.40	0.01	2.30	41.44		1.31	5.00
Gray Iron	1.42		0.85	11.38			18.28
Heat Treating	20.42		22.70				22.37
Lead	2.37		3.07	1.25		1.51	0.02
Lead Battery				10.98			0.08
Nickel				0.00			
Steel	925.46		22.86	130.22		31.40	40.90
Zinc	66.31		67.39	24.23		0.06	1.95
Other	5.82	0.01	14.26	9.62		5.69	117.11
Fuel Combustion	92.09	2.54	118.60	18.08	0.08	2.70	8.37
Fugitives	11.83		7.88	13.67			6.23
Mineral Products							
Asphalt Manufacturing	849.22		130.58	83.23		29.19	123.60
Asphalt Roofing	69.15		9.00	48.69		58.12	80.51
Brick				0.12			0.07

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Bulk Materials			0.00	301.00			0.03
Cement Manufacturing				84.97			
Coal Mining				0.02			
Concrete Manufacturing				1,106.70			19.76
Glass Manufacturing	23.35		1,051.49	200.65	147.47	361.50	4.74
Mining				39.49			
Sand/Gravel	1.44		3.30	155.51		0.00	0.00
Stone Quarrying				445.75			0.24
Surface Mining				41.12			
Other	608.20		1,652.77	282.92		2,173.10	305.99
Fuel Combustion	4.31	1.75	5.25	0.38		0.06	0.27
Fugitives				3.25			35.81
Petroleum Industry							
Cooling Towers				11.18			139.98
Desulfurization	192.86		15.55			249.32	7.44
FCCU	951.45		2,825.63	446.78	333.36	20,249.10	2.25
Flares	2.66		1.78			143.29	1.52
Process Heaters	625.74	27.23	1,946.58	80.22		123.84	176.24
Waste Water						118.60	130.35
Other	193.40		813.50	29.60		3,406.47	28.62
Fugitives	2,180.35		26.96	28.98		9,392.44	94.81
Paper and Wood Products							
Plywood							0.12
Pulpboard				1.57			8.96
Woodworking				3.04			1.58
Other				29.57			58.45
Fuel Combustion	2.04	0.07	2.44	0.18		0.01	0.44
Fugitives				0.26			1.56
Rubber and Plastic Products							
Plastic Foam				0.59			330.56
Plastic Products	1.15		3.63	12.05		0.00	397.44
Tire Manufacturing							12.63
Other	1.28		0.29	8.46		0.00	80.25
Fuel Combustion	1.41	0.04	1.88	0.13		0.01	3.17

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Fabricated Metal Products							
Drum Reclamation	0.14		0.44	2.66			2.65
Plating	0.50	0.07	2.60	0.13		2.70	4.00
Welding				0.38			0.59
Other	35.91	0.11	114.64	45.67	1.94	4.61	476.04
Fuel Combustion	38.22	1.15	52.20	4.97		0.32	27.14
Fugitives	0.10		0.10	0.34		0.10	5.60
Oil and Gas Production							
Fuel Combustion			3.42				0.06
Fugitives	0.00		0.00			0.00	0.11
Miscellaneous Machinery	0.55		2.09	1.97		0.43	20.85
Electrical Equipment	1.71	0.01	2.45	0.07		1.45	103.65
Transportation Equipment							4.01
Health Services							
Crematories	8.68						
Sterilizers							32.33
Leather and Leather Products				0.30		3.80	29.65
Textile Products			0.91	2.01			2.18
Process Cooling				244.76			11.26
In-Process Fuel Use							
Coal				79.90			0.08
Distillate Oil	10.46		216.53	0.94	0.94	11.03	4.30
Landfill Gas							0.43
Natural Gas	298.47	0.08	394.06	2.80		0.71	44.14
Residual Oil							1.74
Other	4.63		42.83	2.67		0.31	0.38
Miscellaneous Manufacturing							
Miscellaneous Manufacturing	18.49	0.11	1.81	26.83		0.05	156.01
Fuel Combustion	123.21	0.11	43.03	10.80		90.46	8.57
Organic Solvent Emissions							
Organic Solvent Use							
Cold Cleaning			0.10				130.71
Degreasing							250.35

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Dry Cleaning							203.13
Fugitives			2.48	2.48			43.90
Surface Coating Operations							
Adhesives	6.34		40.68	0.99		0.10	236.42
Aircraft			0.10				10.81
Automobiles	5.28	0.04	1.98	0.11	0.11	0.00	541.31
Fabric							2.73
Flatwood Products							53.88
Glass							0.73
Large Appliances							19.80
Magnet Wire							0.05
Metal Cans			0.01	2.59			206.10
Metal Coils	0.76		2.09	0.04		0.00	274.61
Metal Furniture	0.68		2.16	0.74			85.45
Miscellaneous Metal Parts	0.19		0.74	4.62	0.13	0.00	386.41
Ovens	49.85	0.92	478.47	9.62	2.65	18.46	29.86
Paper	0.34	0.00	0.61	0.05		0.00	1,043.61
Plastic Parts				1.04			250.43
Steel Drums			1.83	1.73		1.78	296.44
Thinning Solvents							110.48
Wood Furniture	0.06		0.07	0.29			190.18
Other	1.26		8.91	11.13		0.25	1,529.82
Fuel Combustion	91.06	0.20	38.23	0.01		0.40	1.54
Fugitives				10.12			30.08
Petroleum Product Storage							
Fixed Roof Tanks	2.46		2.64	18.62		31.67	427.69
Floating Roof Tanks							532.06
Variable Vapor Space Tanks							44.81
Fugitives							77.01
Bulk Terminals/Plants							
Fixed Roof Tanks	1.07	0.01	4.23			0.03	68.16
Floating Roof Tanks			1.79				177.24
Losses	2.47		0.28				84.14
Variable Vapor Space Tanks							20.09

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Printing/Publishing							
Cleanup			0.76				200.90
Dryers	1.48		3.64	0.06		0.00	141.13
Flexographic	1.21		1.62			0.10	934.92
Letterpress			0.72	1.66			203.84
Lithographic			2.22	2.83			1,134.52
Rotogravure			0.36			0.00	487.98
Screen Printing							59.93
Thinning Solvents			0.06				64.99
Other							24.32
Fugitives	0.20		0.20	0.25			26.80
Petroleum Marketing/Transport							
Stage I							2.65
Stage II							2.83
Tank Cars	0.57		1.57			0.18	71.83
Transportation							20.38
Fugitives			0.11			0.36	34.06
Organic Chemical Storage							
Fixed Roof Tanks							319.24
Floating Roof Tanks				0.20			20.44
Pressure Tanks							9.63
Organic Chemical Transport	0.06			0.06		1.08	15.23
Organic Solvent Evaporation							
Evaporation	0.10		0.10				146.78
Other	0.03		0.18	4.58		39.71	552.76
Fuel Combustion	188.34		122.09	5.55		17.33	28.92
Solid Waste Disposal							
Government							
Incineration	5.59			4.13			5.24
Landfills	381.78		196.09	11.82		29.85	183.55
Sewage Treatment	0.07		0.13			1.73	10.86
Other			0.03			0.33	0.43
Fuel Combustion	0.00		0.05			0.17	

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Commercial/Institutional							
Incineration	164.85		18.59	32.34		5.47	4.21
Other	0.11		0.02				9.44
Fuel Combustion	2.47		0.04			0.11	0.03
Industrial							
Incineration	41.09		43.17	22.68		0.24	7.72
Landfills	278.51		39.49	2.74	1.32	19.41	5.39
TSDFs				0.22			3.70
Other	0.47		0.47	7.49		0.27	42.93
Fuel Combustion	0.43		8.62			1.44	2.38
Site Remediation							
Air Stripping							69.27
Soil Venting	7.55		3.54			2.31	314.39
Other	1.08		1.10	0.45		1.98	90.23
Point Source Total	**25,632.13**	**143.70**	**54,049.62**	**9,847.66**	**2,756.61**	**121,597.92**	**21,190.70**
Area Sources							
Agriculture							
Fertilizer		953.61					
Pesticide							2,500.00
Tilling				14,527.02	2,905.37		
Aircraft Refueling							264.41
Architectural Coating							10,707.15
Asphalt Paving							2,016.27
Automobile Refinishing							2,214.42
Commercial Cooking	851.39			2,206.26	2,046.39		316.99
Construction							
Nonresidential				10,720.06	2,144.01		
Residential				2,678.49	535.70		
Roads				54,805.17	10,961.04		
Consumer Solvent Use							29,919.08
Dry Cleaning							1,389.41
Forest Fires	17.07	0.08	0.37	1.66	1.42	0.10	0.80

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Fuel Combustion – Commercial/Institutional							
Natural Gas	5,901.60	31.64	6,823.13	533.51	522.37	41.85	376.81
Distillate Oil	125.53	19.94	606.51	60.19	54.59	1,001.46	8.51
Residual Oil	0.30	0.05	3.01	0.36	0.32	9.89	0.06
Kerosene	2.79	0.43	31.03	4.02	2.62	86.89	0.62
LPG	28.11		207.21	13.42	13.42		4.45
Fuel Combustion – Industrial							
Natural Gas	6,607.35	243.12	7,688.54	489.77	489.69	15.63	389.95
Distillate Oil	95.30	14.84	385.27	18.87	5.00	772.53	3.81
Residual Oil	0.19	0.03	2.32	0.31	0.21	6.54	0.01
Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel Combustion – Residential							
Natural Gas	6,366.42		14,961.12	302.40	302.40	95.50	875.38
Distillate Oil	11.47		41.33	2.48	1.90	97.79	1.62
Kerosene	5.77		20.94	1.31	1.00	49.48	0.85
LPG	68.41		277.97	3.65	3.65		10.69
Coal	2,401.80		79.48	54.16	33.18	189.53	87.33
Wood							
Fireplaces	3,993.71		87.67	600.83	600.83	13.32	5,558.05
Wood Stoves	3,873.87		47.01	520.11	520.11	6.98	871.81
Gasoline Marketing							
Stage I							1,137.34
Stage II							1,875.16
Tank Truck Leaks							294.16
Storage Tank Breathing							61.88
Graphic Arts							2,861.52
Incineration	3,508.72		1,053.37	1,696.11	1,154.80	902.18	685.26
Industrial Surface Coating							9,125.61
Marine Vessel Loading and Transport							227.76
Open Burning							
Prescribed Burning	90.99	0.41	1.95	8.85	7.59	0.54	4.28
Residential Household Waste	3.93		0.28	1.76	1.61	0.05	1.38
Yard Waste	3.54			0.78	0.78		0.66

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Pavement Markings							281.38
Portable Fuel Containers							
Commercial							622.43
Residential							5,531.68
Solvent Cleaning							7,004.53
Structure Fires	281.20		6.56	50.61	46.06		51.55
Waste Water Treatment							
POTWs		2,444.63					1273.91
Industrial							531.22
Area Source Totals	**34,239.48**	**3,708.77**	**32,325.06**	**89,302.14**	**22,356.04**	**3,290.25**	**89,090.21**
On-road Mobile Sources							
HDDV	17,892.62	136.74	85,647.46	2,430.56	2,125.44	1,744.01	3,347.59
HDGV	40,433.16	95.39	10,637.08	209.86	152.41	155.19	3,151.72
LDDT	118.38	0.75	147.08	17.80	15.17	15.33	65.74
LDDV	83.00	0.35	72.37	12.03	10.49	4.14	33.11
LDGT12	328,567.73	2,011.28	24,530.60	544.47	273.25	730.19	15,641.34
LDGT34	124,062.84	679.62	10,512.92	191.18	97.03	325.47	7,086.73
LDGV	463,060.62	3,058.44	35,472.76	799.97	388.64	870.34	29,507.13
MC	5,000.78	4.39	599.46	14.55	8.15	5.38	766.62
On-road Mobile Source Totals	**979,219.14**	**5,986.95**	**167,619.73**	**4,220.42**	**3,070.58**	**3,850.04**	**59,599.97**
Off-road Mobile Sources							
Agricultural Equipment							
2-stroke	5.20	0.00	0.00	0.12	0.11	0.00	2.84
4-stroke	839.07	0.00	18.15	0.05	0.05	0.12	29.01
Diesel	796.00	0.79	1,377.00	160.67	147.83	23.24	166.23
Aircraft							
APUs	256.31		160.72			24.50	14.57
Air Taxi	453.90		291.52	53.62	52.33	26.44	70.06
Commercial	5,873.49		8,559.78	216.65	211.45	546.45	981.88
General Aviation	5,205.80		661.62	97.63	95.29	66.98	359.38
Military	29.38		14.72	1.23	1.20	0.74	7.48

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Airport Ground Support Equipment							
2-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-stroke	561.01	0.01	31.18	0.22	0.19	0.17	23.74
Diesel	260.55	0.34	560.84	41.32	38.02	10.35	47.69
Commercial Equipment							
2-stroke	1,705.15	0.08	5.16	41.91	38.52	0.62	896.20
4-stroke	130,587.56	3.60	2,427.18	42.53	39.14	42.79	4,257.12
Diesel	1,748.94	1.51	2,587.53	325.50	299.51	47.44	469.38
Construction Equipment							
2-stroke	1,714.07	0.05	12.64	46.47	42.72	0.55	758.49
4-stroke	12,656.71	0.15	166.19	3.27	2.96	3.68	354.77
Diesel	9,493.90	11.38	17,595.54	1,487.60	1,368.60	336.04	1,951.28
Construction and Mining Equipment							
2-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-stroke	271.67	0.00	67.95	0.21	0.16	0.00	18.27
Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Equipment							
2-stroke	20.76	0.00	0.06	0.52	0.47	0.00	10.77
4-stroke	55,880.72	0.51	9,978.15	48.99	45.09	6.91	3,086.85
Diesel	1,779.47	2.88	3,973.90	348.69	320.75	85.40	421.71
Lawn and Garden Equipment							
2-stroke	25,220.54	1.15	107.14	595.73	548.00	8.81	13,254.47
4-stroke	267,876.86	7.23	3,206.95	81.30	74.88	86.62	8,981.43
Diesel	818.57	0.86	1,464.35	156.06	143.51	27.54	242.07
Locomotives	3,284.45	13.73	29,991.82	822.68	756.86	1,978.53	1,310.91
Logging Equipment							
2-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Marine Vessels							
Commercial	379.27	1.16	2,111.37	58.02	53.38	261.50	48.99
Recreational							
2-stroke	20,707.90		214.60	544.85	501.26	21.80	10,409.05
4-stroke	23,509.80		789.70	9.20	8.46	27.85	2,199.45
Diesel	129.75		799.65	21.95	20.20	96.50	30.35
Railroad Equipment							
2-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-stroke	162.56	0.00	2.27	0.03	0.03	0.03	4.31
Diesel	81.42	0.03	94.75	14.12	12.97	1.49	18.86
Recreational Equipment							
2-stroke	2,500.17	0.19	14.78	4.09	3.77	1.37	2,455.13
4-stroke	13,338.73	0.64	124.27	4.07	3.72	7.96	384.62
Diesel	20.11	0.00	14.76	3.14	2.86	0.21	4.94
Underground Mining Equipment							
2-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4-stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-road Mobile Source Totals	**588,169.79**	**46.29**	**87,426.24**	**5,232.44**	**4,834.30**	**3,742.62**	**53,272.30**
Animal Husbandry							
Beef Cattle		282.71					
Chickens		172.08					
Dairy Cattle		248.16					
Goats		1.79					
Hogs		461.86					
Horses		243.98					
Sheep		4.88					
Turkeys		0.08					
Animal Husbandry Totals		**1,415.55**					

Table C-1: 2002 Chicago NAA Emissions (continued)

Category	CO (tpy)	NH3 (tpy)	NOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	SO2 (tpy)	VOM (tpy)
Biogenic Sources	**4,188.44**		**1,682.52**				**38,667.67**
Totals							
Point Source	**25,632.13**	**143.70**	**54,049.62**	**9,847.66**	**2,756.61**	**121,597.92**	**21,190.70**
Area Source	**34,239.48**	**3,708.77**	**32,325.06**	**89,302.14**	**22,356.04**	**3,290.25**	**89,090.21**
On-road Mobile	**979,219.14**	**5,986.95**	**167,619.73**	**4,220.42**	**3,070.58**	**3,850.04**	**59,599.97**
Off-road Mobile	**588,169.79**	**46.29**	**87,426.24**	**5,232.44**	**4,834.30**	**3,742.62**	**53,272.30**
Animal Husbandry		**1,415.55**					
Biogenic	**4,188.44**		**1,682.52**				**38,667.67**
Total	**1,631,448.97**	**11,301.27**	**343,103.17**	**108,602.66**	**33,017.54**	**132,480.84**	**261,820.84**

Table C-2: 2005 Chicago NAA Emissions

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Point Sources						
External Fuel Combustion						
Electric Generation						
Coal	10.73	3,264.12	82.78	24,989.81	0.09	23.31
Distillate Oil	3.44	16.85	16.52	77.52	0.14	0.73
Natural Gas	4.53	53.03	29.77	85.07	0.96	5.81
Residual Oil	0.31	0.37	2.56	3.10	0.01	0.02
Other	0.00	2.69	0.00	9.07	0.00	0.38
Industrial						
Coal	0.52	170.53	9.76	2,607.15	0.03	9.94
Distillate Oil	0.06	10.91	0.21	40.01	0.00	2.93
Natural Gas	5.82	1,731.47	7.66	2,616.55	0.40	128.72
Residual Oil	0.01	1.49	0.00	15.94	0.00	0.08
Other	0.36	119.28	1.90	617.38	0.04	13.86
Commercial/Institutional						
Coal	0.00	10.22	0.00	21.62	0.00	0.07
Distillate Oil	0.07	4.26	0.22	16.25	0.00	0.25
Natural Gas	2.39	769.36	3.12	1,138.81	0.16	53.54
Residual Oil	0.00	0.63	0.01	6.91	0.00	0.10
Other	0.06	8.02	0.04	9.54	0.00	0.52
Space Heating						
Distillate Oil	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.05	32.33	0.08	36.55	0.01	2.42
Internal Fuel Combustion						
Electric Generation						
Distillate Oil	1.23	21.18	7.64	119.37	0.20	4.36
Landfill Gas	2.94	938.19	1.71	666.23	0.18	64.65
Natural Gas	4.90	463.28	6.56	841.46	0.35	48.07
Industrial						
Diesel	0.01	0.57	0.04	2.51	0.00	0.04
Distillate Oil	1.55	35.71	3.50	122.61	0.17	5.47
Natural Gas	2.03	435.36	4.66	915.72	0.48	84.52
Other	0.22	20.34	4.33	42.46	0.04	7.74

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Commercial/Institutional						
Distillate Oil	0.54	30.11	2.61	105.42	0.23	21.81
Landfill Gas	0.33	72.75	0.06	40.46	0.01	5.68
Natural Gas	0.78	135.11	1.02	152.47	0.18	32.68
Engine Testing						
Diesel	0.19	32.87	2.00	336.99	0.05	12.22
Distillate Oil	0.06	0.80	0.03	0.00	0.00	0.00
Other	1.18	331.42	0.03	11.11	0.13	37.87
Off-highway Engines						
Industrial Processes						
Chemical Manufacturing						
Adhesives					0.02	8.48
Fixed Roof Tanks					0.02	6.22
Floating Roof Tanks					0.01	1.74
Ink					0.43	116.83
Nitric Acid			0.00	0.00		
Paint					1.04	256.34
Pharmaceuticals	0.00	0.57	0.00	0.68	0.48	39.08
Phthalic Anhydride	0.37	123.36	0.25	88.62	0.51	176.34
Plastics	0.03	4.22	0.04	5.11	0.82	213.58
Pressure Tanks					0.00	0.29
Sulfuric Acid			0.00	0.23		
Synthetic Organic Fiber					0.00	0.19
Synthetic Rubber					0.03	19.27
Varnish					0.22	71.91
Other	8.02	1,556.23	1.19	338.21	5.49	1,417.97
Fuel Combustion	0.13	31.47	0.54	80.89	0.01	4.11
Fugitives	0.01	2.00	0.01	2.42	0.36	119.34
Food/Agriculture						
Bakeries	0.04	14.72	0.09	28.57	3.14	728.98
Beer					0.01	2.68
Candy			0.00	0.70	0.48	103.40

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Milling	0.08	15.86	0.04	8.43	0.77	129.69
Smokehouses	0.03	7.98	0.02	6.28	0.05	13.12
Starch Manufacturing	0.06	18.76	0.05	22.35	0.63	238.83
Vegetable Oil	0.01	2.06	0.05	16.80	0.05	26.15
Other	0.05	12.31	0.09	26.95	1.25	317.46
Fuel Combustion	0.24	62.68	0.46	121.95	0.03	6.03
Fugitives					0.02	0.09
Primary Metal Production						
By-product Coke	0.00	0.00	0.00	0.00	0.00	0.00
Copper					0.00	0.00
Ferroalloy			0.00	1.05	0.02	0.04
Iron			0.01	0.01	0.01	0.03
Steel	22.48	6,944.70	0.22	41.84	0.09	17.90
Other					0.13	22.58
Fuel Combustion	0.18	45.73	0.30	72.90	0.01	4.68
Secondary Metal Production						
Aluminum	0.15	54.04	0.11	39.02	0.26	45.15
Copper	0.01	3.58	0.02	4.69	0.02	3.53
Gray Iron	0.03	7.85	0.01	3.21	0.16	26.32
Heat Treating	0.02	2.94	0.05	6.87	0.07	15.80
Lead	0.02	7.37	0.01	8.90	0.00	1.46
Lead Battery	0.00	0.00			0.00	0.78
Steel	3.86	1,080.07	0.06	68.12	0.14	38.19
Zinc	0.21	66.57	0.22	68.46	0.04	13.58
Other	0.04	11.49	0.06	16.37	0.36	94.08
Fuel Combustion	0.73	174.75	0.91	233.21	0.05	18.94
Fugitives					0.03	10.09
Mineral Products						
Asphalt Manufacturing	5.16	920.47	1.42	237.14	1.35	336.24
Asphalt Roofing	0.24	55.06	0.03	7.12	0.15	36.14
Brick			0.00	0.00	0.00	0.00
Bulk Materials					0.00	0.00
Concrete Manufacturing					0.04	12.85

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Glass Manufacturing	0.08	30.65	2.12	767.84	0.09	31.62
Sand/Gravel			0.01	0.36		
Stone Quarrying					0.01	1.91
Other	1.48	423.96	2.75	786.62	0.17	103.06
Fuel Combustion	0.17	56.20	0.20	63.23	0.01	4.32
Fugitives	0.00	0.36			0.01	2.88
Petroleum Industry						
Cooling Towers					0.05	17.58
Desulfurization	1.34	479.84	0.09	28.93	0.03	9.72
FCCU	2.06	729.76	8.40	2,999.51	0.01	3.70
Flares	0.01	2.92	0.00	0.53	0.00	0.22
Process Heaters	1.46	412.39	4.50	1,561.18	0.24	75.63
Waste Water			0.00	1.12	0.17	73.54
Other	0.45	164.29	1.11	548.65	0.21	94.56
Fugitives	6.01	2,164.05	0.10	35.31	0.55	221.07
Paper and Wood Products						
Pulpboard					0.07	15.80
Woodworking					0.01	1.02
Other	0.00	0.27	0.00	0.02	0.28	61.07
Fuel Combustion	0.02	5.63	0.02	6.70	0.00	0.37
Fugitives					0.00	1.22
Rubber and Plastic Products						
Plastic Foam					1.89	830.96
Plastic Products	0.00	1.20	0.03	3.13	1.51	426.55
Tire Manufacturing					0.05	0.46
Other	0.00	0.01	0.00	1.14	0.30	63.82
Fuel Combustion	0.03	6.93	0.02	9.56	0.00	0.49
Fabricated Metal Products						
Drum Reclamation	0.00	0.00	0.00	0.86	0.02	6.02
Plating			0.00	3.21	0.02	4.90
Welding					0.00	0.72
Other	0.13	45.48	0.18	59.81	2.07	447.26

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion	0.27	81.28	0.33	100.68	0.06	11.89
Fugitives					0.02	4.42
Oil and Gas Production						
Crude Oil					0.01	0.03
Natural Gas					0.00	0.01
Fuel Combustion	0.00	1.30	0.17	8.02	0.00	0.00
Fugitives	0.00	0.00	0.00	0.00		
Miscellaneous Machinery	0.04	4.75	0.02	2.66	0.12	10.34
Electrical Equipment	0.00	0.41	0.01	0.64	0.36	83.66
Transportation Equipment					0.01	1.40
Health Services						
Crematories	0.29	54.57				
Sterilizers					0.07	17.77
Leather and Leather Products					0.19	45.92
Textile Products			0.00	0.27	0.01	1.69
Process Cooling					0.10	13.37
In-Process Fuel Use						
Coal	0.02	1.41	0.06	0.00	0.01	0.00
Distillate Oil	0.03	7.16	0.72	204.17	0.02	4.36
Landfill Gas					0.00	0.00
Natural Gas	0.96	303.97	0.75	238.42	0.15	45.40
Other	0.00	1.46	0.19	50.36	0.00	0.07
Miscellaneous Manufacturing						
Miscellaneous Manufacturing	0.04	11.38	0.01	2.85	0.55	135.12
Fuel Combustion	0.60	156.44	0.09	25.45	0.03	7.16
Organic Solvent Emissions						
Organic Solvent Use						
Cold Cleaning					0.27	58.65
Degreasing					1.10	272.07
Dry Cleaning					0.91	182.82
Fugitives					0.06	17.40
Surface Coating Operations						
Adhesives			0.00	0.84	0.68	146.90
Aircraft			0.00	0.67	0.02	7.97

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Automobiles	0.02	4.69	0.03	7.33	2.45	577.99
Fabric					0.02	1.53
Flatwood Products					0.09	33.35
Glass					0.00	0.95
Magnet Wire					0.03	4.43
Metal Cans	0.00	0.04	0.01	0.45	0.65	254.45
Metal Coils	0.01	1.28	0.01	1.52	1.06	179.59
Metal Furniture					0.45	89.04
Miscellaneous Metal Parts			0.00	0.08	1.37	343.55
Ovens	0.26	57.68	1.36	271.28	0.06	9.34
Paper			0.00	0.00	0.49	96.75
Plastic Parts					0.41	90.92
Steel Drums					0.58	147.50
Thinning Solvents					0.65	150.90
Wood Furniture					0.79	159.69
Other	0.01	2.29	0.13	30.90	6.33	1,428.81
Fuel Combustion	0.16	40.68	0.19	53.50	0.02	2.64
Fugitives					0.21	45.07
Petroleum Product Storage						
Fixed Roof Tanks	0.03	7.85			1.15	327.52
Floating Roof Tanks					1.59	533.95
Variable Vapor Space Tanks					0.11	29.17
Fugitives					0.04	14.48
Bulk Terminals/Plants						
Fixed Roof Tanks					0.20	48.74
Floating Roof Tanks					0.41	185.02
Losses	0.00	0.14	0.03	10.43	0.19	81.17
Variable Vapor Space Tanks					0.00	0.21
Printing/Publishing						
Cleanup					0.55	120.51
Dryers	0.01	5.44	0.02	5.87	0.55	139.41
Flexographic	0.00	0.20	0.01	1.64	2.45	499.45

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Letterpress			0.01	0.63	0.45	117.15
Lithographic			0.01	0.58	3.98	971.53
Rotogravure	0.01	0.80	0.02	3.64	1.43	416.37
Screen Printing			0.00	0.00	0.36	85.79
Thinning Solvents			0.00	0.29	0.16	46.69
Other					0.09	30.65
Fugitives	0.00	0.20	0.00	0.20	0.27	82.60
Petroleum Marketing/Transport						
Stage I					0.01	0.84
Stage II					0.04	8.65
Tank Cars	0.00	1.07	0.01	2.81	0.24	55.31
Transportation					0.28	101.00
Fugitives					0.17	54.78
Organic Chemical Storage						
Fixed Roof Tanks					0.77	186.33
Floating Roof Tanks					0.09	31.80
Pressure Tanks					0.03	4.51
Organic Chemical Transport	0.00	0.00	0.00	0.00	0.44	25.33
Organic Solvent Evaporation						
Evaporation	0.00	0.17	0.00	0.09	0.11	25.48
Other	0.00	1.05	0.01	1.25	0.93	294.58
Fuel Combustion	0.08	16.03	0.03	10.86	0.02	0.24
Solid Waste Disposal						
Government						
Incineration	0.00	0.00				
Landfills	1.54	394.16	0.55	179.21	0.20	75.13
Sewage Treatment	0.01	2.93	0.01	3.55	0.04	7.79
Other					0.00	0.00
Fuel Combustion	0.00	0.03	0.00	0.23		
Commercial/Institutional						
Incineration	0.11	22.85	0.03	11.25	0.02	10.49
Other	0.00	0.48	0.00	0.10	0.00	0.52
Fuel Combustion	0.05	10.22	0.00	1.11	0.01	2.60

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Industrial						
Incineration	0.03	11.11	0.07	14.40	0.01	4.40
Landfills	0.36	123.37	0.10	19.92	0.45	35.11
TSDFs			0.00	0.00	0.01	2.88
Other	0.00	1.01	0.00	1.01	0.06	21.52
Site Remediation						
Air Stripping					0.17	21.41
Soil Venting					0.75	127.47
Other	0.01	3.30			0.05	15.56
Point Source Total	**104.75**	**25,797.21**	**219.61**	**45,352.02**	**69.70**	**17,313.83**
Area Sources						
Agricultural Pesticide Application					5.38	1,289.75
Aircraft Refueling					0.80	291.19
Architectural Coating					43.05	12,040.96
Asphalt Paving					6.90	1,074.43
Automobile Refinishing					7.19	1,868.07
Commercial Cooking	2.60	946.32			0.97	352.34
Consumer Solvent Use					83.44	30,341.74
Dry Cleaning					8.25	2,196.65
Forest Fires	0.14	24.63	0.00	0.53	0.01	1.16
Fuel Combustion – Commercial/Institutional						
Natural Gas	5.13	5,459.92	5.84	6,276.99	0.34	354.33
Distillate Oil	0.02	59.19	0.18	288.32	0.01	4.07
Residual Oil	0.01	3.65	0.00	1.31	0.00	0.87
Kerosene	0.00	4.02	0.05	44.27	0.00	0.91
LPG	0.03	27.66	0.25	203.78	0.01	4.37
Fuel Combustion – Industrial						
Natural Gas	9.61	5,182.95	10.86	5,614.54	0.61	324.05
Distillate Oil	0.19	95.79	0.74	384.92	0.01	1.56
Residual Oil	0.04	17.35	0.46	191.26	0.00	0.97
Coal	0.00	0.00	0.00	0.00	0.00	0.00

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Fuel Combustion – Residential						
Natural Gas	4.98	5,991.66	11.71	14,080.40	0.69	823.85
Distillate Oil	0.01	8.95	0.03	32.22	0.00	1.25
Kerosene	0.00	4.75	0.01	17.21	0.00	0.69
LPG	0.05	64.39	0.22	261.60	0.01	10.06
Coal	0.00	2,260.41	0.00	74.80	0.00	82.20
Wood						
Fireplaces	0.00	3,644.82	0.00	79.69	0.00	5,097.28
Wood Stoves	0.00	3,552.71	0.00	43.11	0.00	799.53
Outdoor Wood Boiler	0.00	281.63	0.00	3.41	0.00	64.62
Gasoline Marketing						
Stage I					3.15	1,106.11
Stage II					11.73	3,796.32
Tank Truck Leaks					0.16	55.27
Storage Tank Breathing					0.67	236.85
Graphic Arts					11.32	2,960.63
Incineration	9.91	3,625.78	2.91	1,068.23	1.94	700.21
Industrial Surface Coating					35.63	9,254.51
Marine Vessel Loading and Transport					0.78	242.11
Open Burning						
Prescribed Burning	0.00	113.41	0.00	2.43	0.00	5.34
Residential Household Waste	0.01	2.64	0.00	0.19	0.00	0.93
Yard Waste	0.00	1.18			0.00	0.22
Pavement Markings					2.04	307.62
Portable Fuel Containers						
Commercial					2.52	629.31
Residential					22.37	5,592.69
Solvent Cleaning					20.44	6,435.71
Structure Fires	0.55	215.80	0.01	5.04	0.10	39.56
Waste Water Treatment						
POTWs					3.04	1,163.80
Industrial					1.00	417.09
Area Source Totals	**33.30**	**31,589.61**	**33.28**	**28,674.23**	**274.53**	**89,971.15**

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
On-road Mobile Sources						
HDDV	36.22	12,373.31	146.42	51,048.76	6.41	2,153.46
HDGV	58.90	21,328.81	20.95	7,077.12	5.38	1,795.55
LDDT	0.34	113.75	0.43	141.67	0.20	66.13
LDDV	0.18	57.62	0.14	44.74	0.06	19.57
LDGT12	638.65	313,976.21	62.29	23,596.09	41.19	14,361.03
LDGT34	254.02	119,299.50	29.32	11,325.48	17.69	6,432.40
LDGV	771.41	369,261.48	68.93	24,966.71	65.12	21,454.58
MC	14.08	4,910.93	1.36	572.05	2.33	750.42
On-road Mobile Source Totals	**1,773.79**	**841,321.61**	**329.84**	**118,772.62**	**138.37**	**47,033.14**
Off-road Mobile Sources						
Agricultural Equipment						
2-stroke	0.02	3.13	0.00	0.02	0.01	1.31
4-stroke	3.59	558.59	0.08	14.37	0.14	22.84
Diesel	4.11	646.45	7.55	1,187.89	0.83	130.55
Aircraft						
APUs	0.80	282.45	0.51	177.11	0.04	16.06
Air Taxi	1.78	636.72	1.28	452.11	0.28	97.89
Commercial	15.23	5,331.40	21.48	7,576.27	2.51	882.73
General Aviation	14.57	4,720.03	1.93	685.49	1.05	350.33
Military	0.05	16.76	0.02	8.44	0.01	4.27
Airport Ground Support Equipment						
2-stroke						
4-stroke	1.04	375.13	0.07	26.70	0.04	16.31
Diesel	0.68	250.95	1.56	572.90	0.12	45.24
Commercial Equipment						
2-stroke	3.96	1,247.64	0.03	10.19	1.17	366.36
4-stroke	499.20	153,094.62	6.46	2,311.29	17.31	5,340.66
Diesel	5.20	1,641.24	8.56	2,700.07	1.38	434.89
Construction Equipment						
2-stroke	6.50	1,734.85	0.04	11.72	2.28	608.83
4-stroke	53.37	13,902.91	0.55	173.43	1.45	392.28
Diesel	36.16	9,649.71	69.31	18,495.24	7.53	2,010.25

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Construction and Mining Equipment						
2-stroke						
4-stroke	1.22	324.53	0.26	68.89	0.07	19.00
Diesel						
Industrial Equipment						
2-stroke	0.04	10.84	0.00	0.09	0.01	2.50
4-stroke	183.91	48,052.93	31.65	8,374.54	9.36	2,469.64
Diesel	6.33	1,742.23	13.99	3,839.11	1.38	380.42
Lawn and Garden Equipment						
2-stroke	77.24	19,506.28	0.49	108.54	32.76	8,669.53
4-stroke	1459.12	272,400.74	12.50	2,575.16	54.14	10,790.45
Diesel	2.48	410.21	5.04	837.43	0.67	111.42
Locomotives	9.22	3,369.53	84.31	30,769.79	3.68	1,345.30
Logging Equipment						
2-stroke	0.04	13.37	0.00	0.09	0.02	4.99
4-stroke	0.10	32.05	0.00	0.33	0.00	1.11
Diesel	0.01	3.51	0.04	11.14	0.00	0.80
Marine Vessels						
Commercial	1.89	386.10	10.49	2,149.37	0.24	49.87
Recreational						
2-stroke	12.64	3,955.97	0.25	79.12	7.80	2,313.02
4-stroke	11.93	3,737.30	0.73	234.81	1.26	318.62
Diesel	0.12	37.36	0.75	235.46	0.03	8.82
Railroad Equipment						
2-stroke						
4-stroke	0.33	95.07	0.00	1.07	0.01	2.45
Diesel	0.12	36.37	0.16	46.08	0.03	8.66
Recreational Equipment						
2-stroke	12.42	3,994.26	0.07	23.39	11.43	3,307.55
4-stroke	60.94	15,534.18	0.48	136.39	2.91	739.82
Diesel	0.10	26.99	0.09	24.03	0.03	7.21

Table C-2: 2005 Chicago NAA Emissions (continued)

Category	CO (tpd)	CO (tpy)	NOx (tpd)	NOx (tpy)	VOM (tpd)	VOM (tpy)
Underground Mining Equipment						
2-stroke						
4-stroke						
Diesel	0.00	0.00	0.00	0.00	0.00	0.00
Off-road Mobile Source Totals	**2,486.50**	**567,762.40**	**280.74**	**83,918.08**	**161.99**	**41,271.98**
Totals						
Point Source	**104.75**	**25,797.21**	**219.61**	**45,352.02**	**69.70**	**17,313.83**
Area Source	**33.30**	**31,589.61**	**33.28**	**28,674.23**	**274.53**	**89,971.15**
On-road Mobile	**1,773.79**	**841,321.61**	**329.84**	**118,772.62**	**138.37**	**47,033.14**
Off-road Mobile	**2,486.50**	**567,762.40**	**280.74**	**83,918.08**	**161.99**	**41,271.98**
Total	**4,398.35**	**1,466,470.83**	**863.46**	**276,716.95**	**644.60**	**195,590.09**

Appendix D

Reasonable Further Progress Demonstration

DRAFT

Chicago Nonattainment Area
8-Hour Ozone and Annual PM2.5
Reasonable Further Progress Demonstration

AQPSTR 08-06

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

November 2008

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List of Acronyms

AIM	Architectural and Industrial Maintenance
CAIR	Clean Air Interstate Rule
CFR	Code of Federal Regulations
CMAP	Chicago Metropolitan Agency for Planning
CO	Carbon Monoxide
EGAS	Economic Growth Analysis System
EGU	Electric Generating Unit
ERMS	Emissions Reduction Market System
FAA	Federal Aviation Administration
FMVCP	Federal Motor Vehicle Control Program
IDTO	Illinois Department of Transportation
IPM	Implementation Planning Model
LADCO	Lake Michigan Air Directors Consortium
MACT	Maximum Achievable Control Technology
MON	Miscellaneous Organic NESHAP
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOx	Oxides of Nitrogen
OTC	Ozone Transport Commission
PM	Particulate Matter
PM2.5	Particulate Matter < 2.5 microns
RICE	Reciprocating Internal Combustion Engine
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RVP	Reid Vapor Pressure
SCC	Source Classification Code
SIP	State Implementation Plan
U.S. EPA	US Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOM	Volatile Organic Material

Executive Summary

The Chicago nonattainment area (NAA) is comprised of Cook, DuPage, Kane, Lake, McHenry and Will Counties plus Oswego Township in Kendall County and Aux Sable and Goose Lake Townships in Grundy County. This area was previously classified a severe nonattainment area for the 1-hour ozone national ambient air quality standard (NAAQS) and is currently classified as a moderate nonattainment area for the 8-hour ozone standard. A 15 percent net reduction in VOM emissions from 2002 to 2008 is required to meet the Reasonable Further Progress (RFP) requirements. This document will demonstrate that projecting emissions and incorporated the discussed controls will result in a 20.0 percent reduction in VOM emissions in year 2002 emissions in the year 2008. In addition, continuing reductions in 2009 and 2010 are estimated to result in year 2010 VOM emissions at 23.85 percent below 2002 levels.

To meet the required RFP reductions, Illinois EPA is allowed to use reductions in NOx and VOM emissions. Substitution of reductions in NOx emissions for VOM reductions is allowed under U.S. EPA's NOx Substitution Guidance (December, 1993). However, Illinois EPA has chosen not to use NOx substitution to meet its 15 percent RFP reduction, relying solely on VOM emission reductions. Reductions in VOM emissions are primarily achieved through implementation of the following control programs:

- Federal commercial and consumer solvent regulation
- Federal architectural and industrial maintenance coatings regulation
- Motor vehicle fleet turnover and implementation of the Federal Tier 2 motor vehicle fuels and emissions standards

Demonstrating attainment by April 2010 for PM2.5 alleviates the need for RFP. The emission values used in the attainment demonstration show an overall reduction in emissions by the attainment date.

1.0 Introduction

The Chicago NAA area is comprised of Cook, DuPage, Kane, Lake, McHenry and Will Counties plus Oswego Township in Kendall County and Aux Sable and Goose Lake Townships in Grundy County. This area was previously a "Severe" NAA for the 1-hour ozone NAAQS and is currently designated as a "Moderate" NAA for the 8-hour ozone NAAQS. If an area with the same boundary as an area for which U.S. EPA approved a 15% ROP plan for the 1-hour ozone NAAQS, that area is considered to have met the RFP obligation under subpart 2 of the Clean Air Act Amendments (40 CFR 51.910(a)(1)(ii)). For the 8-hour ozone NAAQS, such areas are required to submit a RFP plan under the general nonattainment provisions in §172(c)(2) of the Clean Air Act subpart 1.

The Chicago NAA is required to attain the 8-hour ozone standard by 2010. Because this date is more than 5 years beyond the date of designation, the Illinois EPA must implement a plan to provide for a 15 percent reduction in emissions of volatile organic material (VOM) and/or nitrogen oxides (NOx) from the baseline year within six years after the baseline year. The baseline year for the area is 2002 which makes the target year 2008. The purpose of this document is to demonstrate that VOM emissions in the Chicago 8-hour ozone NAA will decrease more than 15 percent from the 2002 base year through 2008. Between 2002 and 2008, VOM emissions are expected to decrease 19.80 percent.

The remainder of this document describes the methods used to demonstrate the required reductions in emissions. This includes the development of the base year inventory, future year inventories, calculation of the target emissions levels, and discussion of the emission control measures to be implemented to achieve the required reduction.

2.0 Emission Inventories

In order to determine the level of emissions reductions which must be achieved to meet the required RFP emission reduction, a 2002 base year inventory must first be compiled. The 15 percent reduction requirement is then calculated using the U.S. EPA-required methodology. The 2002 inventory is then projected, using emissions source category-specific growth factors, to 2008. The selected emissions control measures are then evaluated and incorporated into the 2008 inventory and the resulting total emissions compared to the base year to determine whether those emissions reductions satisfy the RFP requirement.

2.1 2002 Base Year Inventory

The Illinois EPA submitted the Chicago NAA 2002 base year inventory to U.S. EPA on June 1, 2005. This inventory was prepared consistent with U.S. EPA criteria and guidance documents and represents emissions estimates for ozone precursors (NOx and VOM) on a typical ozone season weekday during the peak ozone season (June, July, August) in 2002. More detailed information about the compilation of the inventory can be found in the document Illinois Base Year Ozone Inventory for 2002 (APQSTR06-03).

Table 2-1 summarizes the emissions in the area. As biogenic emissions would have been subtracted later in determining the adjusted base year emissions inventory, biogenic emissions have not been included.

2.2 Projected Inventories for 2008, 2009 and 2010

Growth or decline in industrial activity, population, fuel consumption, vehicle miles traveled, etc., directly affects the generation of emissions. The expected growth in VOM emissions for point, area and mobile sources must be accounted for in determining the emissions budget. Therefore, an additional amount of emissions reductions may need be obtained to compensate for the additional emissions attributable to growth. The following sections describe the methodology used to project the base year inventory to 2008, 2009 and 2010.

Table 2-1: Base Year VOM Emissions for 2002 (tons/day)

County	Point Sources	Area Sources	On-road Mobile Sources	Off-road Mobile Sources	Total
Cook	46.76	167.35	97.00	113.97	**425.08**
DuPage	5.10	30.33	24.20	27.73	**87.36**
Grundy Twps	3.39	0.64	0.61	0.42	**5.06**
Kane	5.99	15.32	10.13	9.64	**41.07**
Kendall Twps	0.31	1.40	0.74	0.46	**2.91**
Lake	4.23	25.74	16.53	60.07	**106.57**
McHenry	2.34	11.91	6.27	7.60	**28.12**
Will	8.80	20.64	13.15	13.88	**56.47**
Total	**76.92**	**273.33**	**168.63**	**233.77**	**752.65**

The primary method of projecting point and area source emissions to a future year was to use growth factors. Growth factors relate a future year's emissions to a previous year's emissions by use of a multiplication factor. For example, if the growth factor is 1.05, this represents a five percent growth rate between the two years. As part of its inventory and modeling activities, LADCO contracted with E. H. Pechan & Associates to develop growth factors for point and area sources in the 5-state Midwest Regional Planning Organization to support future year control strategy analyses for ozone, PM2.5 and regional haze. The factors that were developed were specific to each state and were based primarily on factors/data from the U.S. EPA's Economic Growth Assessment System model, EGAS 5.0. The base year for these growth factors was 2002. Factors for the years 2003-2018 were included.

2.2.1 Point Source Emissions

Source category-specific growth factors supplied by LADCO from the application of the EGAS model were used to future year emissions for all point sources.

In addition, there are approximately 60 construction permits for ethanol and biodiesel plants statewide. The large increase in the number of these types of facilities is most likely not reflected in the growth factors supplied by LADCO. These plants are not included in the 2002 base year inventory but have the potential to begin operation in 2008-2010. The locations of these new plants were plotted and two were identified as being located in the Chicago NAA. These sources included in the projected inventory are:

- Ford Heights Ethanol LLC – Ford Heights
- Rochelle Ethanol LLC - Joliet

The emissions from these sources were calculated by using the allowable emission rates and anticipated operating hours identified in the permit and permit application. The sources were assumed to begin operation in 2008. The emissions increase associated with these sources is projected to be 0.355 tons VOM/day. Table 2-2 contains the projected point source VOM emissions for the years 2008, 2009 2010.

Table 2-2: Projected Point Source VOM Emissions (tons/day)

County	2008	2009	2010
Cook	52.33	53.23	54.16
DuPage	5.49	5.55	5.61
Grundy Twps	3.57	3.59	3.61
Kane	6.49	6.59	6.68
Kendall Twps	0.33	0.33	0.33
Lake	4.61	4.69	4.77
McHenry	2.52	2.55	2.57
Will	9.70	9.82	9.96
Total	**85.03**	**86.35**	**87.69**

2.2.2 Area Source Emissions

Area source emissions were projected to future years using EGAS-based category specific growth factors provided to LADCO. The following table contains Chicago NAA projected area source emissions by county for 2008, 2009 and 2010.

Table 2-3: Projected Area Source VOM Emissions (tons/day)

County	2008	2009	2010
Cook	167.17	167.45	167.73
DuPage	30.42	30.51	30.60
Grundy Twps	0.66	0.67	0.67
Kane	16.05	16.21	16.36
Kendall Twps	1.43	1.44	1.45
Lake	26.35	26.49	26.63
McHenry	12.52	12.64	12.76
Will	22.09	22.36	22.64
Total	**276.70**	**277.78**	**278.83**

2.2.3 On-road Mobile Source Emissions

U.S. EPA's MOBILE6 model was used to calculate emission factors for future years. Input files used in the model were similar to those described in Illinois Base Year Ozone Inventory for 2002 (APQSTR06-03). Parameters that were known/estimated for 2008 (e.g., fleet mix) were used. Since no temperatures are available for 2008 and beyond, the climatological averages (minimum and maximum) were used. VMT for the area was grown using a 1.27 percent per year growth rate. Emission factors output by the MOBILE model were then multiplied by the projected VMT to obtain emissions.

On-road mobile source emissions were not calculated for 2010. The complexity of the MOBILE model and the amount of data needed/returned precludes running the model for every year of

interest. The next year the model was run after 2009 was for 2012. Emissions for 2010 were estimated by interpolation between 2009 and 2012.

The Bureau of Air's Division of Mobile Source Programs has worked with IDOT and CMAP to develop the motor vehicle emissions estimates for 2008 and 2009. These emissions were calculated in the same manner as described above, but with updated data from CMAP for VMT fractions. The 2010 value was obtained by extrapolating the 2008-2009 values. The calculated values for the budget for 2008, 2009 and 2010 will be used in place of the projected values. RFP will not be affected.

Table 2-4: Projected On-road Mobile Source VOM Emissions (tons/day)

County	2008	2009	2010
Cook	64.32	61.12	55.24
DuPage	16.07	15.34	13.80
Grundy Twps	0.28	0.25	0.24
Kane	6.78	6.59	5.87
Kendall Twps	0.39	0.38	0.33
Lake	11.09	10.79	9.53
McHenry	4.21	4.16	3.65
Will	8.69	8.29	7.52
Total	**111.83**	**106.92**	**96.18**

The year 2008 motor vehicle VOM emissions estimates are not being proposed as motor vehicle emissions budgets for the purpose of conducting transportation conformity. Since the year 2008 will have already ended by the time this SIP is submitted and because the 2009 motor vehicle emissions estimates are being proposed as budgets, there is no need to finalize the 2008 emissions estimates as motor vehicle emissions budgets.

2.2.4 Off-road Mobile Source Emissions

U.S. EPA's NONROAD model was used to calculate emissions for 2008. Inputs used for the model were similar to those described in Illinois Base Year Ozone Inventory for 2002

(APQSTR06-03). Parameters that were known/estimated for 2008 (e.g., fuel RVP) were used. Since no temperatures are available for 2008 and beyond, the climatological averages (minimum, maximum and average) were used.

The NONROAD model does not calculate emissions for marine vessels, locomotives and aircraft. Projected emissions for marine vessels and locomotives were calculated using the growth factors from LADCO.

Aircraft emissions were also calculated using growth factors from LADCO. However, preference was given to data from the FAA showing the growth of landings and take-offs at airports with control towers. Emissions from the expansion of O'Hare airport were calculated using the change in landings and take-offs presented in O'Hare Modernization Final Environmental Impact Statement Section 4(f) and Section 6(f) Evaluation: General Conformity Determination, July 2005. The worst-case scenario was used. The addition of a third Chicago area airport near Peotone was also included in the future year inventory.

Table 2-5: Projected Off-road Mobile Source VOM Emissions for 2008 (tons/day)

County	2008	2009	2010
Cook	65.45	62.72	60.96
DuPage	19.65	18.60	17.99
Grundy Twps	0.69	0.66	0.64
Kane	9.91	9.37	9.04
Kendall Twps	1.11	1.08	1.05
Lake	19.96	19.01	18.39
McHenry	6.48	6.16	5.93
Will	11.25	14.13	13.80
Total	**134.51**	**131.73**	**127.80**

2.2.5 Projected Inventories

The following tables contain county-specific projected VOM emissions for 2008, 2009 and 2010.

Table 2-6: Total Projected VOM Emissions for 2008 (tons/day)

County	Point Sources	Area Sources	On-road Mobile Sources	Off-road Mobile Sources	Total
Cook	52.33	167.17	64.32	65.45	**349.27**
DuPage	5.49	30.42	16.07	19.65	**71.63**
Grundy Twps	3.57	0.66	0.28	0.69	**5.2**
Kane	6.49	16.05	6.78	9.91	**39.23**
Kendall Twps	0.33	1.43	0.39	1.11	**3.26**
Lake	4.61	26.35	11.09	19.96	**62.01**
McHenry	2.52	12.52	4.21	6.48	**25.73**
Will	9.7	22.09	8.69	11.25	**51.73**
Total	**85.04**	**276.69**	**111.83**	**134.5**	**608.06**

Table 2-7: Total Projected VOM Emissions for 2009 (tons/day)

County	Point Sources	Area Sources	On-road Mobile Sources	Off-road Mobile Sources	Total
Cook	53.23	167.45	61.12	62.72	**344.52**
DuPage	5.55	30.51	15.34	18.60	**70.00**
Grundy Twps	3.59	0.67	0.25	0.66	**5.17**
Kane	6.59	16.21	6.59	9.37	**38.76**
Kendall Twps	0.33	1.44	0.38	1.08	**3.23**
Lake	4.69	26.49	10.79	19.01	**60.98**
McHenry	2.55	12.64	4.16	6.16	**25.51**
Will	9.82	22.36	8.29	14.13	**54.60**
Total	**86.35**	**277.78**	**106.92**	**131.73**	**602.78**

Table 2-8: Total Projected VOM Emissions for 2010 (tons/day)

County	Point Sources	Area Sources	On-road Mobile Sources	Off-road Mobile Sources	Total
Cook	54.16	167.73	55.24	60.96	**338.09**
DuPage	5.61	30.6	13.8	17.99	**68.00**
Grundy Twps	3.61	0.67	0.24	0.64	**5.16**
Kane	6.68	16.36	5.87	9.04	**37.95**
Kendall Twps	0.33	1.45	0.33	1.05	**3.16**
Lake	4.77	26.63	9.53	18.39	**59.32**
McHenry	2.57	12.76	3.65	5.93	**24.91**
Will	9.96	22.64	7.52	13.8	**53.92**
Total	**87.69**	**278.84**	**96.18**	**127.80**	**590.51**

3.0 Calculation of 15 Percent RFP Target Value

This section details the methodology used to calculate the required amount of reductions required to meet an overall reduction of 15 percent. The steps to calculate this value are as follows.

- Step 1. Establish the emissions for the baseline year
- Step 2. Identify any adjustments (non-creditable reductions such as from the pre-1990 federal motor vehicle control program (FMVCP))
- Step 3. Calculate the adjusted baseline (Step 1 – Step 2)
- Step 4. Calculate mandated reductions (Step 3 x 0.15)
- Step 5. Calculate total required reductions (Step 4 + Step 2)
- Step 6. Identify the target emissions for the future year (Step 1 – Step 5)

The result in Step 6 is the level of emissions that must be achieved to meet the 15 percent reduction. If the future year emissions are greater than the target emissions level, the 15 percent reduction has not been met. The value in Step 3 can be used in combination with the future year emissions to calculate the actual reduction. Following is the calculation of the RFP VOM target level in tons per day (tpd).

- Step 1. Total 2002 Chicago NAA baseline emissions from Table 2-1: 752.65
- Step 2. Non-creditable reductions from the FMVCP: 13.46
- Step 3. Adjusted baseline: 752.65 – 13.46 = 739.19
- Step 4. Required reduction: 739.19 x 0.15 = 110.88
- Step 5. Total required reductions: 110.88 + 13.46 = 124.34
- Step 6. 2008 target emissions level: 752.65 – 124.34 = 628.31 tpd

Therefore, Chicago NAA 2008 VOM emissions must be equal to or less than 628.31 tons per day in order to demonstrate that the area has achieved the required RFP reduction.

4.0 15 Percent Reasonable Further Progress (RFP)

This section delineates the additional (real) reductions not already accounted for in the projected inventory to determine compliance with RFP. These reductions can include items such as shutdowns of sources, implementation of new regulations, applicable consent decrees, etc. Illinois EPA has carefully checked its emission reduction assumptions and analyses to make sure no double counting of source reductions has taken place.

4.1 Point Sources

4.1.1 Source Shutdowns

No source shutdowns from the point source inventory are being included to meet the 15 percent reduction. All sources operating in 2002 were assumed to be operating in 2008.

4.1.2 MACT Sources

Reductions in VOM emissions due to implementation of additional MACT regulations after 2002 are not included in the future year inventory.

4.1.3 ERMS Sources

The ERMS rule sets a cap on VOM emissions from certain sources in the Chicago nonattainment area. This cap is a limit on the growth of emissions. Allotments from sources no longer operating in future years can be traded to other operating sources to offset their emissions.

The projected emissions from the ERMS sources for 2008, 2009 and 2010 were reviewed in order to establish whether or not those emissions had increased above the cap set by the ERMS rule. For all three years, the projected emissions did not exceed the cap and therefore no reductions were claimed for RFP.

4.2 Area Sources

4.2.1 Consumer and Commercial Products

Consumer and commercial products are currently regulated by the U.S. EPA under 40 CFR 59 Subpart D, promulgated on September 11, 1998. This national rule currently limits the VOM content of 24 product categories. These 24 categories are included in six larger categories: personal, household, automotive aftermarket, adhesive, pesticide and miscellaneous products.

A revision to this rule is expected to be promulgated in 2009. Even though the rule will not be in place in 2008, manufacturers will be modifying their formulations prior to the applicability date. U.S. EPA has published a memo ("Emission Reduction Credit for Three Federal Rules for Categories of Consumer and Commercial Products under Section 183(e) of the Clean Air Act") which identifies the amount of credit states can take in 2008 for purposes of RFP.

For Consumer and Commercial Products, a 29 percent reduction is expected by the new rule. The guidance memo allows states to claim 75 percent of that reduction for calendar year 2008. Illinois EPA is using a 50 percent reduction rather than a 75 percent reduction. This results in a reduction of 11.64 tons/day of VOM in 2008. The remaining 50 percent reduction is claimed in 2009.

4.2.2 Architectural and Industrial Maintenance Coatings

Architectural and industrial maintenance coatings are currently regulated by the U.S. EPA under 40 CFR 59 Subpart D, promulgated September 11, 1998. A revision to this rule is expected to be promulgated in 2009. Even though the rule will not be in place in 2008, manufacturers will be modifying their formulations prior to the applicability date. U.S. EPA has published a memo ("Emission Reduction Credit for Three Federal Rules for Categories of Consumer and Commercial Products under Section 183(e) of the Clean Air Act") which identifies the amount of credit states can take in 2008 for purposes of RFP.

For Architectural and Industrial Maintenance Coatings, a 31 percent reduction is expected by the new rule. The guidance memo allows states to claim 75 percent of that reduction for calendar

year 2008. Illinois EPA is using a 50 percent reduction rather than a 75 percent reduction. This results in a reduction of 5.14 tons/day of VOM in 2008. The remaining 50 percent reduction is claimed in 2009.

4.3 Demonstration of RFP and Progress Towards Attainment

The following table identifies the adjustments made to the projected inventories to obtain expected emissions in 2008, 2009 and 2010.

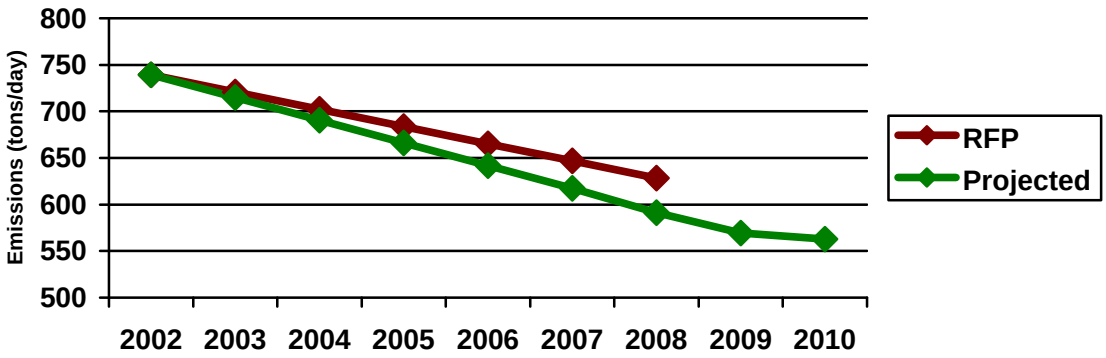
Table 4-1: Demonstration of RFP in Nonattainment Area

(tons per day)

Category	2002 VOM	2008 VOM	2009 VOM	2010 VOM
Point	76.92	85.04	86.35	87.69
Shutdowns		0.00	0.00	0.00
MACT		0.00	0.00	0.00
ERMS sources		0.00	0.00	0.00
Area	273.33	276.69	277.78	278.84
Consumer Solvent		-11.64	-23.28	-23.28
AIM Coatings		-5.14	-10.28	-10.28
On-road Mobile	168.63	111.83	106.92	96.18
FMVCP	-13.46			
Off-road Mobile	233.77	134.50	131.73	127.80
Total	**739.19**	**591.28**	**569.22**	**556.95**
Percent Reduction from 2002		**20.00**	**22.99**	**24.65**
Percent Reduction from previous year			**3.73**	**2.16**

The total reduction for the NAA for purposes of RFP (2002-2008) is 20.00 percent. This value meets the requirement of a 15 percent reduction for RFP.

Figure 4-1: Chicago NAA VOM Emissions for RFP



The attainment date for the Chicago NAA is June 15, 2010. Guidance from U.S. EPA Region 5 has indicated to Illinois EPA that for years after 2008, progress (reductions) towards attainment in 2010 should be shown. There is no specific reduction target, only progress towards attainment. As can be seen in Table 4-1, the additional reduction in VOM emissions from 2008 to 2010 is an additional 28.44 tons/day of VOM or an additional 4.80 percent reduction.

5.0 Reasonable Further Progress for PM2.5

The same Chicago area that is nonattainment for ozone is also nonattainment for PM2.5 with the attainment date being April 5, 2010. The RFP requirements for PM2.5 are addressed in 40 CFR 60 Section 51.1009. In short, that section indicates that if a State submits an attainment demonstration and implementation plan showing it will attain the PM NAAQS by the attainment date, the State is not required to submit a separate RFP plan.

40 CFR 60 Section 51.1002 states that NOx, PM2.5 and SO2 emissions must be included in the attainment demonstration. The pollutants of ammonia and VOM may be included if the State shows that sources of those emissions contribute significantly to PM2.5 contributions. Illinois EPA will be using the pollutants of NOx, PM2.5 and SO2.

The methods used to compile the 2002 base year inventory and projected inventories for PM were identical to the methods described in Section 2 of this document. Illinois EPA conducted a full ozone season and annual inventory for the 2002 base year concurrently to account for needing a PM inventory.

Unlike the demonstration of RFP for ozone, there is no specific reduction mandated for PM2.5. A successful demonstration of attainment using the projected inventory values is sufficient to show progress. The following figures show the emission rates of the pollutants of interest. A combined total of all three pollutants is also given. Emissions of PM2.5 and SO2 show slight increases over time. The SO2 emissions are primarily from combustion sources. A large portion of PM2.5 emissions are from fugitive sources that are typically out of the State's ability to control (reduce) emissions. These are sources such as agricultural tilling, road construction and other construction. When these emissions are subtracted from the overall PM2.5 inventory, there is a slight reduction in PM2.5 emissions.

Figure 5-1: Chicago NAA Projected NOx Emissions

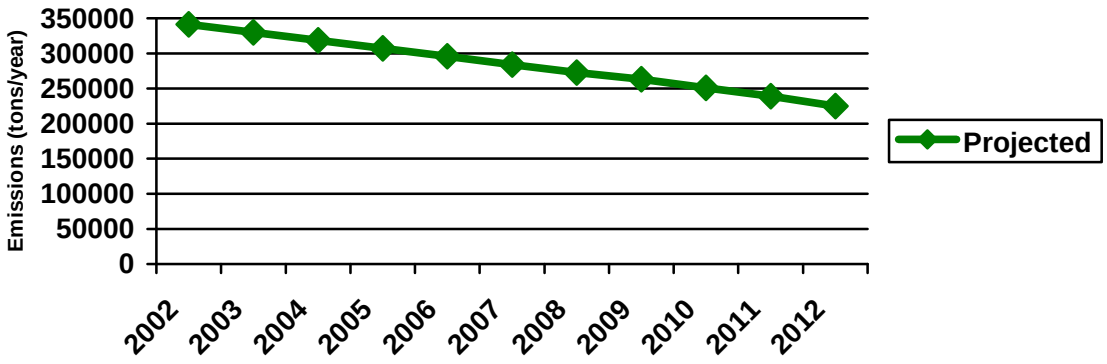


Figure 5-2: Chicago NAA Projected PM2.5 Emissions

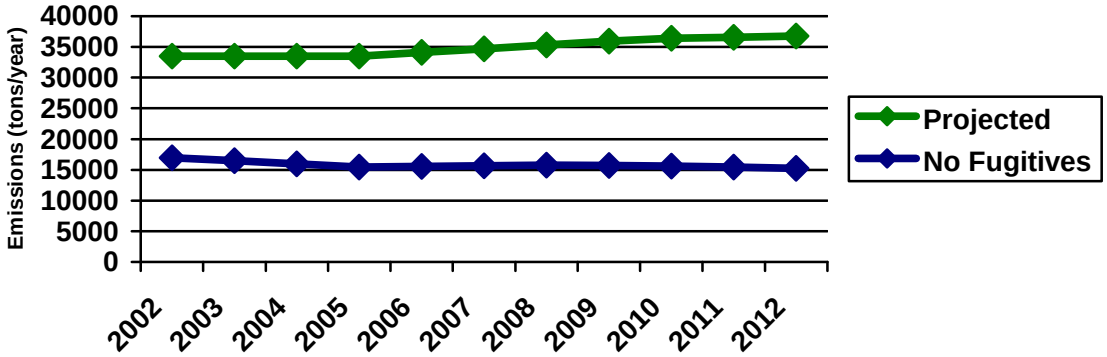


Figure 5-3: Chicago NAA Projected SO2 Emissions

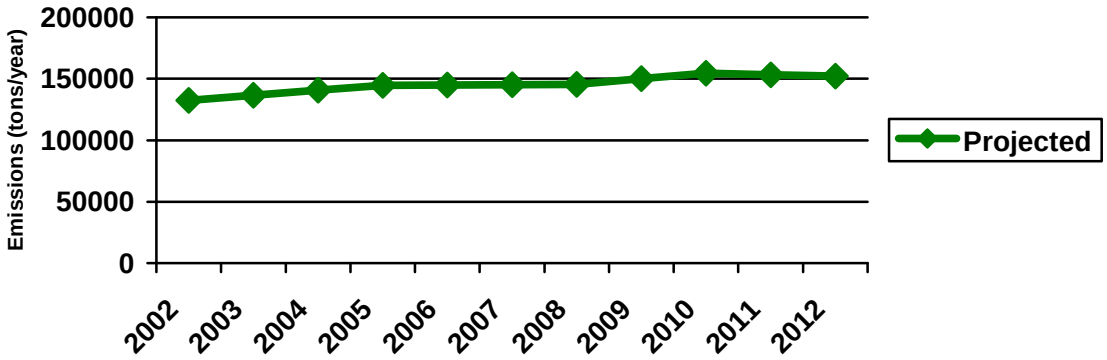
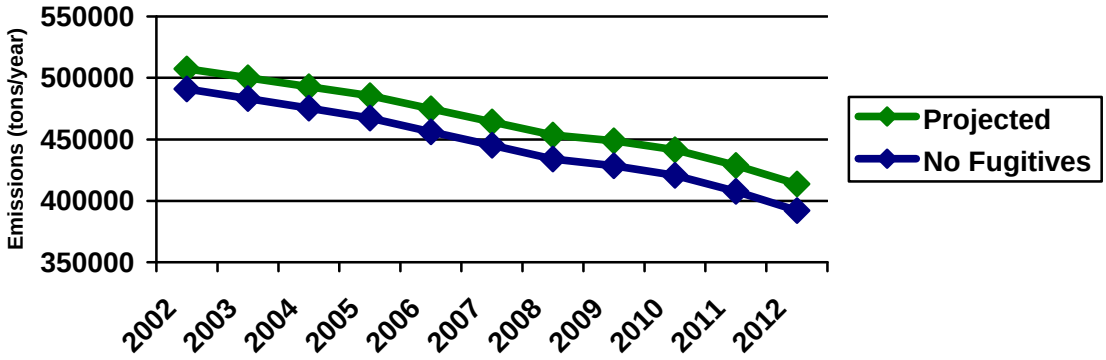


Figure 5-4: Chicago NAA Projected Total Emissions



6.0 Conclusion

Based upon the 2002 base year inventory and best estimates for the 2008 inventory based on expected control measures, the NAA met the requirement of 15 percent reduction rate for RFP. This required reduction was met through a 19.80 percent reduction in VOM emissions. Additionally, continued progress towards attainment in June 2010 is shown by an additional 5.89 percent reduction in VOM emissions from 2008 to 2010.

Demonstrating attainment by April 2010 for PM2.5 alleviates the need for RFP. The emission values used in the attainment demonstration show an overall reduction in emissions by the attainment date.

Appendix E

Summary of VOM RACT Implementation in the Chicago Nonattainment Area

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rule.

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Coatings and Solvents					
Graphic Arts	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts – Rotogravure and Flexography (EPA-450/2-78-033, 12/78, NTIS PB 292-490). Flexible Package Printing (EPA 453/R-06-003, Sept. 2006)	Applies to graphic arts operations that use the flexographic and rotogravure printing processes as applied to both publication and packaging printing.	35 Ill. Admn. Code, Part 218, Subpart H: Printing and Publishing, (Sections 218.401-218.404) In the process of development.	August 16, 1991 In the process of development.	September 27, 1993
	Offset Lithographic Printing (EPA-453 R-94-054). Offset Lithographic Printing and Letterpress Printing (EPA 453/R-06-002, Sept. 2006)	Applies to graphic arts operations that use the offset lithographic printing process.	35 Ill. Admn. Code, Part 218, Subpart H: Printing and Publishing (Sections 218.405-218.411) In the process of development.	August 16, 1991 In the process of development.	May 15, 2006
Metal Furniture, Surface Coating of	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume III: Surface Coating of Metal Furniture (EPA-450/277-032, 12/77, NTIS PB-278-257)	Applies to surface coating of metal furniture by metal furniture manufacturers.	35 Ill. Admn. Code, Part 218, Subpart F: Coating Operations, Section 218.204(g)	August 16, 1991	May 15, 2006

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Coatings and Solvents					
Metal Parts and Products, Surface Coating of Miscellaneous	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VI: Surface Coating of Miscellaneous Metal Parts and Products (EPA-450/2-78-015, 6/78, NTIS PB-286-157).	Applies to industries that are not covered by specific CTG documents (Specific CTGs have been published for can, coil, automobile and light duty truck, metal furniture, magnet wire, and large appliances).	35 Ill. Admin. Code, Part 218, Subpart F: Coating Operations, Section 218.204(j)	August 16, 1991	May 15, 2006
Solvent Metal Cleaning	Control of Volatile Organic Emissions from Solvent Metal Cleaning (EPA-450/2-77-022, 11/77, NTIS PB-274-557).	Applies to cold cleaners, open top vapor degreasers, and conveyorized degreasers which use volatile solvents to clean metal parts	35 Ill. Admin. Code, Part 218, Subpart E: Solvent Cleaning, Sections 218.181-1218.84	August 16, 1991	September 27, 1993
Industrial Cleaning Solvents	Control Techniques Guidelines: Industrial Cleaning Solvents (EPA 453/R-06-001)	Applies to industrial cleaning solvents in cleaning operations associated with manufacturing, repair, and service operations.	In the process of development.	In the process of development.	
Wood Furniture Manufacturing	Control of VOM Emissions from Wood Furniture Manufacturing Operations (EPA-453/R-96-007, 4/96, NTIS PB-96-178-769).	Applies to any facility that finishes wood furniture, or performs cleaning or wash off associated with wood furniture finishing operations.	35 Ill. Admin. Code, Part 218, Subpart F: Coating Operations, Section 218.204(l)	August 16, 1991	May 15, 2006
Flat Wood Paneling, Surface Coating of	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VII: Factory Surface of Flat Wood Paneling (EPA-450/2-78-032, 6/78, NTIS PB 286-199). Control Techniques guidelines for Flat Wood Paneling coatings (EPA 453/R-06-004, Sept. 2006)	Applies to interior paneling made of wood products. Applies to coatings operation at manufacturing flat wood paneling interior and exterior.	In the process of development of regulations.	In the process of development of regulations	

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Coatings and Solvents					
AutoTransport—Business Machine Plastic Coatings	AutoTransport—Business Machine Plastic (EPA 453 R-94-017).	Applies to surface coating of plastics used in motor vehicles and business machines.	35 Ill. Admin. Code, Part 218, Subpart F: Coating Operations, Section 218.204(n)	August 16, 1991	May 15, 2006
Cans, Coils, Paper, Fabrics, Automobiles, and Light Duty Trucks, Surface Coating of	Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks (EPA-450/2-77-008, 5/77, NTIS PB-272-445).	Applies to surface coatings for protection and decoration of cans, coils, paper, fabrics, automobiles, and light duty trucks.	35 Ill. Admin. Code, Part 218, Subpart F: Coating Operations, Sections 218.204(a), (b), (c), (d), and (e)	August 16, 1991	May 15, 2006

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Coatings and Solvents					
Ink and Paint Manufacturing	Control of VOM from Ink and Paint Manufacturing (EPA 453 3-92-013).	Applies to products of the paint manufacturing industry, including architectural coatings, product coating for original equipment manufacturers, and special-purpose coatings. Also applies to ink manufacturing, including letterpress inks, lithographic and offset inks, gravure inks, and flexographic inks.	35 Ill. Admin. Code, Part 218, Subpart AA: Paint and Ink Manufacturing, Sections 218.620 through 218.637	August 16, 1991	September 27, 1993
Large Appliances, Surface Coating of	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume V: Surface Coating of Large Appliances (EPA-450/2-77-034, NTIS PB-278-259).	Applies to the coating of large appliances, such as doors, cases, lids, panels, and interior support parts of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dish washers, trash compactors, air conditioners, and similar products.	35 Ill. Admin. Code, Section 218.204(h)	August 16, 1991	May 15, 2006

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Coatings and Solvents					
Magnet Wire, Surface Coating for Insulation of	Control of Volatile Organic Emissions from Existing Stationary Sources, Volume IV: Surface Coating of Insulation of Magnet Wire (EPA- 450/2-77-033, 12/77, NTIS PB-278-258), CTG.	Applies to wire coating curing ovens.	35 Ill. Admin. Code, Section 218.204(i)	August 16, 1991	May 15, 2006
Petroleum					
Bulk Gasoline Plants	Control of Volatile Organic Emissions from Bulk Gasoline Plants (EPA-450/2-77-035, 12/77, NTIS PB-276-722), CTG.	Applies to bulk plants with daily throughputs of 76,000 liters (20,077 gal.) gasoline or less.	35 Ill. Admin. Code, Part 218, Subpart Y: Gasoline Distribution, Section 218.581	August 16, 1991	September 27, 1993
External Floating Roof Tanks, Petroleum Liquid Storage in	Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks (EPA-450-2/78-047, 12/78, NTIS PB-290-579), CTG.	Applies to external floating roof tanks larger than 150,000 liters (~40,000 gal. Or 950 bbls.) storing petroleum liquids.	35 Ill. Admin. Code, Part 218, Subpart B: Organic Emissions from Storage and Loading Operations, Section 218.122	August 16, 1991	September 27, 1993

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Petroleum					
External Floating Roof Tanks, Petroleum Liquid Storage in	Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks (EPA 453 R-94-00).	Applies to storage tanks in all industries, but primarily in the petroleum refineries, pipelines, chemical plants, liquid terminals.	35 Ill. Admin. Code, Section 218.124	August 16, 1991	September 27, 1993
Fixed Roof Tanks, Storage of Petroleum Liquids in	Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed Roof Tanks (EPA-450/2-77-036, 12/77, NTIS PB-276-749) Organic Liquid Storage (EPA 453 R-94-00).	Applies to storage vessels with capacities greater than 150,000 liters containing petroleum liquids with a true vapor pressure greater than 10.5 KPa. Exempts fixed roof tanks with capacities less than 1,600,000 liters used to store produced crude or condensate prior to lease custody transfer.	35 Ill. Admin. Code, Section 218.121 35 Ill. Admin. Code, Section 218.119	August 16, 1991 August 16, 1991	November 15, 1994 November 15, 1994
Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds	Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds (EPA-450/2-77-025, 10/77, NTIS PB-275 662).	Applies to non-condensables from vacuum producing systems, wastewater separators, and all pressurized process units.	35 Ill. Admin. Code, Part 218, Subpart R: Petroleum Refining and Related Industries; Asphalt Materials, Sections 218.442-218.444	August 16, 1991	September 27, 1993

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Petroleum					
Gasoline Dispensing Stage II Vapor Recovery	Stage II Gasoline Dispensing Facilities (EPA 450 3-91-022a).	Applies to gasoline dispensing into motor vehicles at gasoline dispensing facilities.	35 Ill. Admin. Code, Part 218, Subpart Y: Gasoline Distribution, Section 586	August 16, 1991	September 27, 1993
Gasoline Service Stations	Design Criteria for Stage I Vapor Control Systems – Gasoline Service Stations, (11/75), CTG.	Applies to filling of gasoline storage tanks from gasoline tanker trucks.	35 Ill. Admin. Code, Part 218, Subpart Y: Gasoline Distribution, Section 218.584	August 16, 1991	September 27, 1993
Organic Liquid Storage	Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks (EPA 453 R-94-001).	Applies to storage tanks in all industries, but primarily in the petroleum refineries, pipelines, chemical plants, and liquid terminals.	35 Ill. Admin. Code, Part 218, Subpart B: Organic Emissions from Storage and Loading Operations, Section 218.120: Control Requirements for Storage Containers of VOL	August 16, 1991	November 15, 1994

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Petroleum					
Tank Trucks, Gasoline Loading Terminals	Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals (EPA-450/2-77-026, 12/77, NTIS PB-275-060); 10/77.	Applies to tank truck terminals with daily throughputs greater than 76,000 liters (20,077 gal.).	35 Ill. Admin. Code, Part 218, Subpart Y: Gasoline Distribution, Section 218.582: Bulk Gasoline Terminals	August 16, 1991	September 27, 1993
Tank Trucks, Gasoline, and Vapor Collection Systems	Control of VOM Leaks from Gasoline Tank Trucks and Vapor Collection Systems (EPA-450/2-78-051, 12/78, NTIS PB-290-568).	Applies to gasoline tank trucks that are equipped with vapor collection systems and the vapor collection systems at bulk terminals, bulk plants and service stations.	35 Ill. Admin. Code, Section 218.584:Gasoline Delivery Vessels	August 16, 1991	September 27, 1993
Stationary Source NO_x					
Electric Utility Boilers	NO_x Utility Boilers (EPA 453 R- 94-023).	Applies to electric utility boilers.	35 Ill. Admin. Code, Part 217, Subpart V: Electric Power Generation	April 14, 1972	April 17, 2001

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Stationary Source NO_x					
Industrial Commercial Boilers	Industrial Commercial Boilers (EPA 453 R-94-022).	Applies to boilers used in industrial, commercial, and institutional facilities.	35 Ill. Admin. Code, Part 217, Subpart U: NO_x Control and Trading Program for Specified NO_x Generating Units. Subpart D to meet RACT in the process of adopting.	N/A: Applies only to large sources that are greater than 250 mm BTU/hour, but for sources smaller than 250 mm BTU, the RACT Proposal in the development process Subpart D to meet RACT in the process of adopting.	N/A: Applies only to large sources that are greater than 250 mm BTU/hour, but for sources smaller than 250 mm BTU, the RACT Proposal in the development process
Stationary Gas Turbines	Stationary Gas Turbines (EPA 453 R-93-007).	Applies to stationary gas turbines.	35 Ill. Admin. Code, Part 217, Subpart U: NO_x Control and Trading Program for Specified NO_x Generating Units Subpart Q to meet RACT in the process of adopting.	N/A: This rule applies only to large sources that are greater than 250 mm BTU/hour, but for sources smaller than 250 mm BTU, the RACT Proposal in the development process Subpart Q to meet RACT in the process of adopting.	N/A: This rule applies only to large sources that are greater than 250 mm BTU/hour, but for sources smaller than 250 mm BTU, the RACT Proposal in the development process

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Stationary Source NOx					
Stationary Reciprocating Internal Combustion Engines	Stationary Reciprocating IC Engines (EPA 453 R-93-032).	Applies to stationary reciprocating internal combustion engines.	35 Ill. Admin. Code, proposed Part 217, Subpart Q: Stationary Reciprocating Internal Combustion Engines and Turbines	In the process of adopting by Illinois Pollution Control Board.	In the process of adopting by Illinois Pollution Control Board.
Cement Manufacturing	Cement Manufacturing (EPA 453 R-94-004).	Applies to the kilns used in cement manufacturing.	35 Ill. Admin. Code, Part 217, Subpart T: Cement Kilns to satisfy NOx SIP Call. Subpart G to meet RACT for cement and lime kilns is in the process of adopting by the Board.	March 15, 2001 Subpart G to meet RACT for cement and lime kilns is in the process of adopting by the Board.	March 15, 2001
Glass Manufacturing	Glass Manufacturing (EPA 453 R-94-037).	Applies to glass manufacturing processes.	Subpart F of Part 217. Currently in the process of adopting by the Board.	Subpart F of Part 217. Currently in the process of adopting by the Board.	
Iron and Steel	Iron and Steel Mills (EPA 453 R-94-065).	Applies to iron and steel manufacturing processes.	Subpart H of Part 217. Currently in the process of adopting by the Board.	Currently in the process of adopting by the Board.	

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Stationary Source NOx					
Nitric and Adipic Acid Manufacturing Plants	Nitric and Adipic Acid Manufacturing Plants (EPA 450 3-91-026).	Applies to nitric and adipic acid manufacturing operations.	35 Ill. Admin. Code, Part 217, Subpart O, Section 217.381: Nitric Acid Manufacturing Processes	April 13, 1972	April 17, 2001
Other					
Cutback Asphalt	Control of VOM from Use of Cutback Asphalt (EPA-450/2- 77-037, NTIS PB 278-185).	Applies to use of cutback asphalt used for roadway paving.	35 Ill. Admin. Code, Part 218, Subpart X, Section 218.563: Cutback Asphalt	August 16, 1991	May 15, 2006
Large Petroleum Dry Cleaners	Control of VOM Emissions from Large Petroleum Dry Cleaners (EPA-450/3-82-009, 9/82, NTIS PB-83-124-875).	Applies to petroleum solvent dry cleaning facilities that consume 123,000 liters or more of petroleum solvent per year.	35 Ill. Admin. Code, Part 218, Subpart Z: Dry Cleaners, Section 218.607: Standards for Petroleum Solvent Dry Cleaners	August 16, 1991	(repealed)

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Other					
Perchloroethylene Dry Cleaning Systems	Control of Volatile Organic Emissions from Perchloroethylene Dry Cleaning Systems (EPA-450/2-78-050, 12/78, NTIS PB-290-13).	Applies to all dry cleaning systems that use perchlorethylene.	35 Ill. Admin. Code, Subtitle B, Chapter Section 218.601: Perchloroethylene Dry Cleaners	August 16, 1991	(repealed)
Synthetic Organic Chemical Manufacturing	Control of VOM Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry (EPA-450/3-84-015, 12/84, NTIS PB-85-164 275). Control of VOM Emissions from Reactor Processes and Distillation Operations in SOCMI (EPA-450/4-91-031, 11/15/93, NTIS PB-92-180-009).	Applies to synthetic organic chemical manufacturing operations.	35 Ill. Admin. Code, Part 218, Subpart Q: Leaks from Synthetic Organic Chemical and Polymer Manufacturing Plant	August 16, 1991	October 28, 1996

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Other					
Air Oxidation Processes in SOCMI	Air Oxidation Processes in SOCMI (EPA 450 3-84-015 VOM).	Applies to air oxidation processes used in the synthetic organic chemical manufacturing industry.	35 Ill. Admin. Code, 218, Subpart V: Air Oxidation Processes	August 16, 1991	November 15, 1994
Batch Processes	Batch Processes (EPA 453 R-93 017).	Applies to processes used in producing plastic materials and resins, pharmaceuticals, gum and wood chemicals, cyclic crudes and intermediates, industrial organic chemicals, and agricultural chemicals.	35 Ill. Admin. Code, Part 218, Subpart V: Batch Operations and Air Oxidation Processes	August 16, 1991	May 22, 1995
Commercial Bakeries	Bakery Oven Emissions (EPA 453 R-92-017).	Applies to commercial bakery operations.	35 Ill. Admin. Code, Part 218, Subpart FF: Bakery Ovens	August 16, 1991	(repealed)

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Other					
Pharmaceutical Products	Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products (EPA-450/2-78-029, 1278, NTIS PB-290-580).	Applies to facilities and operations that synthesize pharmaceutical products.	35 Ill. Admin. Code, Part 218, Subpart T: Pharmaceutical Manufacturing	August 16, 1991	September 27,1993
Pneumatic Rubber Tires, Manufacture of	Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires (EPA-450/2-78-030, 12/78, NTIS PB-290-557).	Applies to manufacturing processes; undertread cementing, tread-end cementing, bead dipping, and green tire spraying.	35 Ill. Admin. CodePart 218, Subpart S: Rubber and Miscellaneous Plastic Products, Section 218.461	September 27, 1993	October 21, 1993

Table E-1: Source Categories, CTG/ACT List, and Applicable Illinois Rules, cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Illinois Rule	Original Effective Date	Date Last Amended
Other					
Polyester Resin	Control of VOM Emissions from Manufacture of High Density Polyethylene, Polypropylene, and Polystyrene Resins (EPA-450/3-83-008, 11/83, NTIS PB-84-134-600). Control of VOM Emissions from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment (EPA-450/3-83-006, 3/84, NTIS PB-84-189-372). Polystyrene Foam Manufacturing (EPA 450 3-90-020).	Applies to the manufacturing of high-density polyethylene, polypropylene, and polystyrene. Applies to emissions from equipment used in synthetic organic chemical polymers and resins. Applies to polystyrene foam manufacturing.	35 Ill. Admin. CodePart 218, Subpart BB: Polystyrene Plants	September 27, 1993	October 21, 1993
Synthetic Organic Chemical and Polymer Manufacturing Equipment, Equipment Leaks from	Control of VOM Fugitive Emissions from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment (EPA-450/3-83-006, 3/84, NTIS PB-84-189-372).	Applies to leaks of process fluids (gaseous or liquid) from plant equipment such as pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, and cooling towers.	35 Ill. Admin. CodePart 218, Subpart Q, Section 218.428: Open Ended Valves	August 16, 1991	September 27, 1993

Table E-2 – Source Categories and CTG/ACT List for Which There Are No Applicable Illinois Rules

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Chicago Sources?
Coatings and Solvents			
Automobile Refinishing	Automobile Refinishing (EPA 450 3-88-009).	Applies to automobile refinishing operations which do not involve an auto body shop.	No
Shipbuilding	Shipbuilding and Ship Repair Operations (Surface Coating) (61 FR 44050, 8/27/96).	Applies to coatings and solvents used for building or maintaining metal marine or fresh-water metal hulled vessel used for military or commercial operations, including self-propelled vessels and those towed by other craft (barges). This definition includes, but is not limited to, all military vessels, commercial cargo and passenger (cruise) ships, ferries, barges, tankers, container ships, patrol and pilot boats, and dredges.	No
	Surface Coating Operations at Shipbuilding and Ship Repair Facilities (EPA-453/R-94-032, 4/94, NTIS PB-94-181-864).	Applies to any marine or fresh-water metal hulled vessel used for military or commercial operations, including self-propelled vessels and those towed by other craft. This definition includes, but is not limited to, all military vessels, commercial cargo and passenger ships, ferries, barges, tankers, container ships, patrol and pilot boats, and dredges. Pleasure craft, such as recreational boats and yachts, are not included.	No

Table E-2 – Source Categories and CTG/ACT List for Which There Are No Applicable Illinois Rules – cont'd

CTG Source Category	CTG/ACT Reference Document	CTG/ACT Applicability	Chicago Sources?
Petroleum			
Natural Gas/Gasoline Processing Plants, Equipment Leaks from	Control of VOM Equipment Leaks from Natural Gas/Gasoline Processing Plants (EPA-450/2-83-007, 12/83, NTIS PB-84-161-520), CTG	Applies to facilities engaged in the separation of natural gas liquids from field gas and/or fraction of the liquids into natural gas products, such as ethane, propane, butane and natural gasoline. It is not applicable to compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units and field gas gathering systems unless they are located at a gas plant.	No
Other			
Agricultural Pesticides	Control of VOM from the Application of Agricultural Pesticides (EPA 453R-92-011).	Applies to pesticides used for agricultural purposes.	No
Fuel Switching	Fuel Switching to Meet RACT for NO_x (EPA Memorandum, July 30, 1993).	Applies to switching to a cleaner burning fuel during ozone season.	No
Plywood Veneer Dryers	Control Techniques for Organic Emissions from Plywood Veneer Dryers (EPA 450 3-83-012 VOM).	Applies to softwood plywood manufacturing operations.	No

APPENDIX F

TRANSPORTATION CONFORMITY

Transportation Conformity

This section describes the development of the Chicago nonattainment area motor vehicle emissions budgets associated with the 8-hour ozone attainment demonstration State Implementation Plans (SIP). An average summer weekday motor vehicle emissions budget is being proposed for the year 2009 for the precursor pollutants volatile organic material ("VOM") and oxides of nitrogen ("NOx"). These 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 motor vehicle VMT and fleet mix provided by the Chicago Metropolitan Agency for Planning and which was supplied to the Lake Michigan Air Directors Consortium ("LADCO") for use in the attainment demonstration photochemical modeling analysis.

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 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 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 ("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 ("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 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).

This State Implementation Plan 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 will be held at 9:00 AM, on December 16, 2008 in Room 9-031 of the James R. Thompson Center in downtown Chicago. Notification of this hearing was printed in the Chicago Sun Times on November 15, 2008. Comments on the proposed attainment demonstration and motor vehicle emissions budgets will be accepted for 30 days after the public hearing. A "Responsiveness Summary" which addresses the written comments received will be prepared and included in the final submission

In compliance with adequacy criterion #2, interagency consultation meetings were held with members of the Chicago Metropolitan Agency for Planning (CMAP) Tier 2 Consultation Team on July 2, 2008. At this meeting, the IEPA representative discussed the requirements for the attainment demonstration as they relate to transportation conformity and explained the derivation of the proposed motor vehicle emissions budgets. Compliance with the remaining adequacy criteria is contained within the narrative of the attainment demonstration document and this transportation conformity section.

The 8-Hour Ozone Attainment Demonstration

The Lake Michigan Air Director's Consortium along with the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin, have developed a strategy to demonstrate attainment of achieve the 8-hour ozone NAAQS in the lower Lake Michigan area in the year 2009. This plan incorporates base year emissions from all source categories (i.e., point, area, on-road, off-road), projections of emissions growth, and the inclusion of emissions reduction strategies. Transportation network data (e.g., road links, traffic volumes and speeds) and assumptions (e.g., fleet mix, VMT mix) were provided to LADCO by the CMAP for use in the modeling.

The motor vehicle emissions budgets established and described herein were developed consistent with the methodology and control strategy assumptions used in the 8-hour ozone Attainment Demonstrations as well as the 8-hour ozone Reasonable Further Progress plan (RFP). The effects of these controls are incorporated into the emissions factors produced by the USEPA's MOBILE6 model. Following is a discussion of the inputs and assumptions incorporated into the development of the motor vehicle emissions budgets.

The RFP plan described in Section 5.0 incorporates county-level base year 2002 average daily vehicle miles traveled (ADVMT) levels from the Illinois Department of Transportation (IDOT). The 2002 ADVMT total for the 6-county-3-township Chicago NAA was approximately 160.8 million miles. This total was projected to the attainment year 2009 using an area-wide vehicle miles traveled (VMT) growth rate of 1.27 percent per year, determined through consultation between the Illinois EPA, CMAP, and LADCO. The projected 2009 ADVMT level for the Chicago NAA was 175.7 million miles. To account for ozone season weekday traffic, the average daily VMT estimates

were multiplied by Chicago-area-specific Average-Daily-to-Average Summer Weekday conversion factors supplied by IDOT. The forecast 2009 average summer weekday VMT (ASWVMT) level used to establish the motor vehicle emissions budgets for the Chicago NAA was 195.5 million miles, or a little more than 11% greater than the forecast 2009 ADVMT. This level is consistent with the VMT level used in the attainment demonstration, and since it results in a lower, more conservative VMT level. The Illinois EPA believes that basing the motor vehicle emissions on this lower total demonstrates consistency with the attainment demonstration. An ASWVMT level of approximately 193.1 million miles was used in the development of the 2008 RFP plan. Following is a summary of the information and MOBILE6 model assumptions used included in the development of the draft motor vehicle emissions budgets.

Year: VMT estimates and motor vehicle emissions factors were developed representative of summer 2008 for the RFP demonstration, and for 2009 for the modeled attainment demonstration.

Typical Ozone Season Weekday: The 2002 Chicago Area ozone precursor emissions inventory, which established the baseline for the CAA-required RFP emissions reductions, is based on activity on a typical ozone season weekday. The primary parameters affected by this choice of temporal time frame are the temperature and the adjustment of VMT to account for increased travel during the summer.

Temperature: U.S. EPA guidance for the use of the MOBILE6 model calls for the use of representative summer daily temperatures. For future years, the representative summer temperatures are the National Weather Service's climatological average minimum and maximum temperatures at Chicago's O'Hare Airport for the summer months of June, July, and August. Those are 61 ^{o} F and 81 ^{o} F, respectively.

Absolute Humidity: U.S. EPA guidance calls for the use of the lowest absolute humidity on days corresponding to the summer climatological temperatures in the region as calculated from local climatological data published by the National Weather Service. A climatological average summer weekday absolute humidity value of 97 grains of water (vapor) per pound of dry air was calculated for O'Hare Airport.

Motor Vehicle Emission Controls: The primary motor vehicle emission control programs that will be in place in the Chicago NAA in 2008 and 2009 are (1) an OBD-II-based vehicle emissions testing program, and the requirement that gasoline sold in the area be "reformulated gasoline", fuel that is specially formulated to reduce emissions.

Inspection and Maintenance (I/M): The I/M program in effect since 2007 requires biennial On-Board Diagnostics (OBD) testing on all model year (MY) 1996 and newer (MY96+) light duty gasoline vehicles, and biennial exhaust idle and gas cap testing on MY96+ heavy duty gasoline vehicles including gasoline-powered buses, registered in the I/M area (the "testable area"). The program includes a 4 year grace period for new vehicles (that is, a MY 2004 car would be tested every other year starting in 2008.) See Attachment A for more information. This post-2007 I/M program was established after the Illinois legislature amended the Illinois Vehicle Inspection law in 2005 to (a) drop dynamometer testing of vehicles, (b) require an OBD-based program beginning in February 2007, and (c) remove the requirement for testing compliant pre-MY-1996 vehicles. (Motorcycles and diesel vehicles are not subject to I/M.)

The Chicago testable area is based upon urbanized areas and includes all of Cook, DuPage, and Lake Counties, and parts of Kane, McHenry, Will, and Kendall Counties. Some of the VMT in the Chicago testable area is generated by vehicles that come from outside the testable area and are therefore not required to undergo I/M testing. Conversely, some VMT in an area without I/M (such as Grundy County's NAA townships) may be generated by I/M vehicles from a neighboring testable area. The VMT estimates used when calculating I/M emission credits for a county or township must be adjusted to reflect VMT from vehicles subject to I/M only. This is done using I/M coverage factors derived ultimately from transportation modeling outputs. (I/M Credits are subtracted from emissions calculated assuming no I/M to give Net Emissions with I/M.) The coverage factors are 98% for Cook and DuPage Counties (that is, 98% of the gasoline-vehicle VMT in the county is from vehicles subject to I/M) , 95% for Lake County, 81% for Kendall County's NAA township, 65% for Will County, 60% for Kane County, 50% for McHenry County, and 25% for Grundy County's NAA townships.

Fuels: Reformulated gasoline (RFG) has been required in the Chicago NAA since 1995. The attainment demonstration and RFP plan both assume all gasoline sold in the Chicago NAA since 1995 is "Northern" RFG, and that this will continue through and beyond 2008 and 2009. Although a small amount of non-RFG fuel comes into the NAA in the fuel tanks of vehicles from outside the area, it is assumed that the use of non-reformulated gasoline fuel in the Chicago area is negligible.

Gasoline Sulfur: Gasoline sulfur levels were assumed to be 30 parts per million (ppm) in 2008 and 2009 in accordance with the federal Tier 2 gasoline regulations which required the 30 ppm level beginning in 2006.

Diesel Sulfur: Diesel sulfur levels were assumed to be 15 parts per million in 2008 and 2009 in accordance with the U.S. EPA's Highway Diesel Rule which was finalized in January 2001. This regulation required the sale of on-road diesel fuel with no greater than 15 ppm of sulfur beginning in June 2006.

Speeds: For the Chicago area, the Illinois EPA assumed an area-specific vehicle speed distribution that appears in the VMT-by-Speed-Bin external file SVMTCH07.DEF, which is described in more detail later in this document. The speed distribution in this file is for freeways and arterials only (local roads and ramps have a fixed speed in MOBILE6), and was based on transportation model output (modeled speeds on links of various classes of roads by modeling period) from CMAP (CATS) for the year 2007 (the most recent available). This speed distribution is assumed valid for 2008 and 2009 as well.

VMT Mix: The regional VMT mix inputs used for 2008 and 2009 were based on Chicago-area-specific 2005 VMT-by-vehicle-type data supplied by IDOT, modified to reflect expected changes in the ratio of cars to light trucks. This information is used in the MOBILE model to compute the average emission factors for certain combined vehicle classes, and the all-vehicle emission rate.

Registration Distribution: A Chicago-area-specific vehicle registration distribution profile based upon 2003-04 information data was supplied by Illinois EPA's Division of Mobile Source Programs from data provided by the Illinois Secretary of State's Department of Motor Vehicles.

Emissions Computation: Illinois EPA calculates emissions budgets using the following formula:

1. No-I/M County Emissions by vehicle type (VT) and functional class (FC) = (County ASWVMT by FC) * (VMT Mix by VT and FC) * No-I/M emission factors (EF) by pollutant, VT, and FC) * 1.102 (grams to ton conversion factor). For areas without I/M, this is the only calculation.

2. I/M Credits by VT and FC = (County ASWVMT by FC) * (VMT Mix by VT and FC) * (No-I/M EF – I/M EF [both by pollutant, VT, and FC]) * I/M coverage factor * 1.102. This is for areas with I/M only.

3. Net County Emissions by VT and FC = (I/M County Emissions by VT and FC) - I/M Credits by VT and FC. This is for areas with I/M only.

The Illinois EPA performs these above calculations on a multi-page spreadsheet which automatically calculates emissions and I/M credits by county or township for each pollutant, VT, and FC, sums them by VT and FC, and aggregates them into area totals. Attachment A of this section provides additional details on the MOBILE6 model inputs used in the development of the 2009 Chicago NAA motor vehicle emissions budgets.

Motor Vehicle Emissions Budgets

Using the above VMT and control program assumptions and methodology, following are the 8-hour ozone motor vehicle emissions budgets for the Chicago nonattainment area for use in determining transportation conformity.

Proposed Chicago NAA 2009 Motor Vehicle Emissions Budgets

(tons per ozone season weekday)

Pollutant	Emissions
VOC	106.92
NOx	261.02

Attachment A

Transportation Conformity

External MOBILE6.2 Inputs:

In the examples of external files shown below, the actual command lines are **boldfaced**; the unbolded lines represent comments. The actual text files have no such distinction in typefaces. The unbolded lines have been "commented out" and have no effect on the MOBILE model. They may therefore be omitted, but it is suggested that they remain in the files for documentation, and to make the files easier for the user to read and understand.

The comments and other text in the External Files have been shown in the `Courier New` typeface. Actual command lines—the inputs that MOBILE actually uses—are shown in **`Courier New Bold`**

In certain cases (especially the VMT-by-Speed-Bin files) the typeface has been reduced in size so that the lines would fit within the margins of the page. This makes them easier to read.

Vehicle Inspection and Maintenance (I/M) Program

The External I/M files giving the inputs used in the MOBILE6 model in this exercise were ILLOBDIM.D (for 2002 and through 2006) and IM07ON.D (for 2007 and later years). When evaluating I/M credits for 2008, the residual effect of the ILLOBDIM program in the summer of '08 is taken into account by assuming that 75% of the vehicle fleet subject to I/M has been tested under the IM07ON program by that time, and that the other 25% have been tested under the ILLOBDIM in late 2006 and have not yet come up for retesting under IM07ON by summer 2008 (both programs are biennial). The effective I/M emission rate in 2008 is thus 25% of ILLOBDIM's plus 75% of IM07ON's. By summer 2009, all vehicles subject to I/M will have been tested under IM07ON, so this question does not arise: the I/M emission rate is simply that for the IM07ON program.

The IM07ON.D File, used for the 2008 and 2009 target year inventory

The external I/M file IM07ON.D is described below. It represents an I/M program with four components, chief of which is an OBD (on-board diagnostics) test for vehicles of model year (MY) 1996 and newer. The order in which the components appear in the external file is not significant, but they must be numbered consecutively. Illinois EPA begins IM07ON.D with identifying comments, and adds other comment lines or blank lines to make the file easier to read and understand. Programs after the first need comparatively few comments because the commands are largely self-descriptive.

```
* ILLINOIS ENHANCED I/M DESCRIPTION

*  Filename: IM07ON.D

* External input file for Illinois' OBD-only I/M program
*  from 2007 on.
*  OBD-only applies to light-duty vehicles only; HDVs still get
*   an Idle Test & Gas Cap Check.
*  All program start years set to 1986 per U.S. EPA guidance in
*   "Frequently Asked Questions on MOBILE6" from U.S. EPA/OTAQ.

*  This represents the NEW I/M program in which only 1996 &
*   newer vehicles are tested with an OBD test; and the OBD test
*   applies only to LDVs.
*  This program came into effect in February 2007.


*-------------------------------------------------
*  Program description for post MY'96 LDV OBD I/M
*=================================================

* FIRST I/M program--"Evaporative]" OBD for MY 1996+ LDVs
*-------------------------------------------------
I/M PROGRAM         : 1 1986 2050 2 T/O EVAP OBD
I/M MODEL YEARS     : 1 1996 2050
I/M VEHICLES        : 1 22222 11111111 1
I/M STRINGENCY      : 1 20.0
I/M COMPLIANCE      : 1 95.0
I/M WAIVER RATES    : 1 0.5 2.2     '01 data
I/M EXEMPTION AGE   : 1 25
I/M GRACE PERIOD    : 1 4
```

In each case, the first number after the colon refers to the I/M program's component number.

I/M PROGRAM : 1 1986 2050 2 T/O EVAP OBD

Testing began in 1986 and runs into the indefinite future (2050). The program is a biennial test-only (2 T/O, here and in other program components) program, in this case an Evaporative On-Board Diagnostics (OBD) test. The On-Board Diagnostic program in a vehicle's engine computer records information from sensors in the engine and fuel system. Indications of malfunctions or out-of-specification operations of the engine or fuel and evaporative emission control systems are stored in the engine computer as "fault codes". An OBD test consists of plugging a special scanner into an output jack from vehicle's engine computer. The scanner queries the computer and records any fault codes that the computer's OBD system has saved. OBD tests are quick, dependable, and clean, and, if a vehicle fails an OBD test, the fault codes that the scanner displays help mechanics diagnose the problem.

I/M MODEL YEARS : 1 1996 2050

This program component covers only vehicles manufactured between model year (MY) 1996 (start year) and the indefinite future (MY 2050, the end year). More and more

vehicles are becoming subject to this test as new vehicles are bought and older (pre-MY-1996) ones are scrapped vehicles.

I/M VEHICLES : 1 22222 11111111 1

Only the five light-duty vehicle types (cars [LDGVs], and light trucks [LDGTs 1, 2, 3, and 4]) are covered by this program component (22222). Heavy-duty gasoline trucks (eight types) and gasoline buses are not covered by this program component (11111111 1), but rather by Programs 3 and 4, described below.

I/M STRINGENCY : 1 20.0

Stringency (exhaust inspection failure rate) is 20%. A Stringency entry is necessary for an Exhaust test, but not an Evaporative test, so this entry can be omitted or "commented out". In this Evap test case, it will be ignored by the model, but is included for reference.

I/M COMPLIANCE : 1 95.0

Compliance rate (tested vehicles as percent of all vehicles subject to I/M) is 95%

I/M WAIVER RATES : 1 0.5 2.2 '01 data

The Waiver Rate is the fraction of tested vehicles that get a waiver—i.e., do not pass the I/M test but, because repairs cost more than a specified amount, get a certificate of compliance. Waiver rate is 0.5% for MY 1980 and earlier vehicles (irrelevant now that pre-MY-96 vehicles are not tested), and 2.2% for MY 1981 and later vehicles. These figures are from VIM's actual 2001 waiver statistics, and have been representative of the last few years, so are deemed representative of 2009. In this case the comment stating that fact is allowed in the same line as the data.

I/M EXEMPTION AGE : 1 25

Vehicles older than 25 years are not subject to this program. This will not happen until at least 2021. The default is 25, and the model does not calculate benefits for vehicles older than 25 years, so in essence this command has no effect. It could be omitted, but is included for completeness.

I/M GRACE PERIOD : 1 4

Vehicles less than 4 model years old—in this case MY2006, '07, '08, and '09—are exempt from I/M testing.

Most of the inputs to the second and subsequent program components are the same as those for the first program, so the description of the components will be abbreviated and summarized as below, rather than after each command line as above.

```
* Second I/M program--"Exhaust" OBD for MY 1996+ LDVs
*-------------------------------------------------
I/M PROGRAM        : 2 1986 2050 2 T/O OBD I/M
I/M MODEL YEARS    : 2 1996 2050
I/M VEHICLES       : 2 22222 11111111 1
I/M STRINGENCY     : 2 20.0
I/M COMPLIANCE     : 2 95.0
```

```
I/M WAIVER RATES   : 2 0.5 2.2     '01 data
I/M EXEMPTION AGE  : 2 25
I/M GRACE PERIOD   : 2 4
*
```

The second program component is a biennial, test-only Exhaust OBD test for MY 1996 and later LDGVs and LDGTs. In this OBD test, the scanner queries the vehicle's computer for fault codes concerning exhaust emissions. Stringency, Compliance, Waiver Rates, Exemption Age, and Grace Period are the same as in the first program. An entry for I/M STRINGENCY (20%) is required for an Exhaust I/M program.

```
*-----------------------------------------------------
*  Program description for post MY'96 HDV Idle & GC I/M
*=====================================================

* Third I/M program--HDV IDLE for MY 1996+ HDVs
*-----------------------------------------------
I/M PROGRAM        : 3 1986 2050 2 T/O IDLE
I/M MODEL YEARS    : 3 1996 2050
I/M VEHICLES       : 3 11111 22222222 2
I/M STRINGENCY     : 3 20.0
I/M COMPLIANCE     : 3 95.0
I/M WAIVER RATES   : 3 1.2 1.5     '01 data
I/M EXEMPTION AGE  : 3 25
I/M GRACE PERIOD   : 3 4
```

The third program component is a biennial, test-only Idle test for MY 1996 and later HDGVs and Gas Buses (22222222 2). Light-duty vehicles are not subject to this component (11111), but rather to components 1 and 2. Stringency, Compliance, Exemption Age, and Grace Period are the same as in component 1, but the pre- and post-MY 1981 Waiver Rates (1.2% and 1.5%, respectively), are slightly different from those in components 1 and 2. HDGVs are few in number, and most of them are commercial vehicles.

```
* Fourth I/M program--Gas Cap Check for MY 1996+ HDVs
*-------------------------------------------------
I/M PROGRAM        : 4 1986 2050 2 T/O GC
I/M MODEL YEARS    : 4 1996 2050
I/M VEHICLES       : 4 11111 22222222 2
I/M COMPLIANCE     : 4 95.0
I/M WAIVER RATES   : 4 1.2 1.5     '01 data
I/M EXEMPTION AGE  : 4 25
I/M GRACE PERIOD   : 4 4
```

The fourth program component is a biennial, test-only Gas Cap Check for MY 1996 and later HDVs. Compliance, Waiver Rates, Exemption Age, and Grace Period are the same as in the third program. Since a Gas Cap Check is an evaporative I/M test, the I/M STRINGENCY command is not necessary and is not included here.

Illinois EPA includes further notes and comments in the I/M file to document it further, as shown below:

```
* NOTES

*  This is a standard Illinois I/M input, describing the I/M
*   program with OBD Only as it is supposed to exist after
*   January 2007.  It is the file to be used for regular M6
*   I/M runs for 2007 and future years.
*
*  This file was originally SB397.D, supplied 24.viij.05.
*   Original SB397.D has been slightly revised by
*   the addition of comments such as this one.  The actual
*   inputs have not been changed.  This was done to put the two
*   LDV OBD programs (exhaust and evaporative) together, and the
*   two HDV programs together too.  The order of the programs in
*   the I/M file is not significant and has no effect in M6, but
*   the programs must be numbered sequentially.
* DVIM verified that this file as shown is correctly describes the
*   I/M program planned for introduction in January '07.
* ----------------
* COMPARISON WITH ILLOBDIM.D:
* The first three programs in ILLOBDIM.D, covering the idle
*  test for MY'68-'81 LDVs, IM240 for '81-'95 LDVs, and gas
*  cap check for MY'68-'95 LDVs have been eliminated from
*  IM07ON; and the two HDV programs now refer only to MY'96
*  and later.
```

There is no “MYCUTS.D” file associated with IM07ON.D, as there was in the previous ILLOBDIM.D file. The old ILLOBDIM.D file is not included here.

The Registration Distribution

The Registration Distribution (RD) for a vehicle type is an indication of the fraction of the vehicle fleet of that type that is made up of vehicles of a given age.

The following is based on 2003 registration data from the Illinois Secretary of State’s office (ISOS). It and its contents are described in detail in the comments to the file. This file contains data (commented out so not used) from the 2001 RD file (CHIRD01) for historical and reference purposes. As noted above, those data may be deleted.

```
REG DIST
*
* This file CHIRD03.D is derived from REGDATA.D, the default MOBILE6 RD file.
*  This file was created 22.ij.06 by SSL and revised on 10.iv.06.  The values
*  shown for LDVs and LDTs are from 2003 ISOS registration data, as given in
*  RD03ERG.xls.  In the 22.ij. version, only LDGV RDs were changed from the
*  2002 values, but in the 10.iv. version, the RDs for the four LDT types were
*  changed to those given in RD03ERG.xls for the Chicago area.
*
* This file contains Registration Distribution fractions for the 16 vehicle
*  classes by age for July of any calendar year for the Chicago NAA, based on
*  2003/41 gasoline-vehicle age distribution data supplied to IEPA by ISOS, just
*  as the CHRD01.D file came from I/M test data supplied by DVIM.
```

```
*  (See C:\SSLFILES\INVEN\RDAGE01.XLS.)  Age distribution fractions have been
*  rounded to 4 decimal places, and some of the RDs from  for late years
*  (typically in the last line--entries 21-25) have at times been modified by
*  +/- 0.0001 or so as necessary to make the RDs add up to 1.0000.
*
* The user is referred to REGDATA.D and to M6 Users Guide Section 2.8.7.1
*  p. 63 ff) for more detailed information about the nature of RD files.  See
*  also Section 5.3.2 (p. 169 ff)  for information on converting M5b RDs to M6
*  RDs.  See also \SOURCE\BD20.FOR for default RDs.
*
* In this file, the first number in each distribution is an integer that
*  indicates which of the 16 M6 vehicle classes are represented by the RD in
*  question.  That number is followed by 25 age fractions arranged in two rows
*  of 10 values followed by a row with the last 5 values.  (This is similar to
*  the format used in M5b for RDs.)
*
* RDs for all vehicle classes are given in this file.  This is for completeness
*  even though only those vehicle classes whose RDs were changed from the
*  REGDATA defaults need to be included in this file.  Those that were not
*  changed, are so noted.
*
* It is assumed that the RDs for diesel vehicles are the same as the RDs for
*  the corresponding gasoline vehicles; in particular,  LDDV and LDDT RDs are
*  assumed the same as LDGV and LDGT RDs.  Since the (default) HDV RDs are
*  based  more on diesel vehicles to start with, and HDGVs are many fewer than
*  HDDVs, especially in the higher weight classes, we feel the HDV RDs
*  represent both HDGV and HDDV reasonably well.
*
* Default RDs assumed for the various HDV classes.  Good area-specific
*  HDV age distribution data are lacking--RD03ERG covered only LDVs--and
*  besides, much Chicago-area HDV VMT is from vehicles registered outside the
*  Chicago area.   The best choice, then, was to go with the HDV defaults; and
*  similarly with MCs.
*
*  ---SL
*
*
* M6 LDV = M5 LDV (Light-duty Vehicles--passenger cars--from
*  RD03ERG.XLS for Chicago
 1 0.0603 0.0804 0.0805 0.0818 0.0845 0.0773 0.0673 0.0670 0.0574 0.0620
   0.0493 0.0449 0.0388 0.0331 0.0280 0.0233 0.0169 0.0122 0.0089 0.0067
   0.0045 0.0025 0.0014 0.0009 0.0101
* The following, commented out, are the CHIRD01 values.
*1  0.0548 0.0870 0.0798 0.0735 0.0751 0.0668 0.0775 0.0655 0.0609 0.0565
*   0.0530 0.0505 0.0472 0.0399 0.0295 0.0241 0.0174 0.0114 0.0062 0.0033
*   0.0023 0.0024 0.0030 0.0021 0.0103
*
* M6 LDT1 = M5 LDT1 from RD03ERG.xls for Chicago
 2 0.0796 0.1061 0.1062 0.0532 0.0365 0.0331 0.0358 0.0331 0.0546 0.0569
   0.0676 0.0520 0.0396 0.0516 0.0443 0.0444 0.0300 0.0282 0.0188 0.0103
   0.0052 0.0026 0.0021 0.0016 0.0066
* The following, commented out, are the CHIRD01 values
* 2 0.0746 0.1128 0.1041 0.1055 0.0886 0.0737 0.0719 0.0694 0.0572 0.0451
*   0.0437 0.0329 0.0333 0.0289 0.0202 0.0140 0.0092 0.0053 0.0024 0.0015
*   0.0011 0.0006 0.0008 0.0006 0.0026
*
* M6 LDT2 = LDT2 from RD03ERG.xls for Chicago
 3 0.0767 0.1023 0.1024 0.1053 0.1024 0.0893 0.0920 0.0766 0.0563 0.0517
   0.0434 0.0348 0.0237 0.0157 0.0082 0.0061 0.0061 0.0015 0.0014 0.0010
   0.0009 0.0005 0.0003 0.0002 0.0012
* The following, commented out, are the CHIRD01 values
* 3 0.0746 0.1128 0.1041 0.1055 0.0886 0.0737 0.0719 0.0694 0.0572 0.0451
*   0.0437 0.0329 0.0333 0.0289 0.0202 0.0140 0.0092 0.0053 0.0024 0.0015
```

```
*   0.0011 0.0006 0.0008 0.0006 0.0026
*
* M6 LDT3 = LDT3 from RD03ERG.xls for Chicago
 4 0.0674 0.0899 0.0900 0.0830 0.0867 0.1041 0.0614 0.0594 0.0433 0.0571
   0.0479 0.0391 0.0303 0.0218 0.0232 0.0236 0.0185 0.0130 0.0092 0.0066
   0.0049 0.0031 0.0017 0.0005 0.0143
* The following, commented out, are the CHIRD01 values
* 4 0.0629 0.1095 0.1300 0.0889 0.0835 0.0624 0.0725 0.0611 0.0455 0.0388
*   0.0300 0.0348 0.0387 0.0313 0.0236 0.0225 0.0161 0.0123 0.0076 0.0034
*   0.0017 0.0032 0.0074 0.0049 0.0074
*
* M6 LDT4 = LDT2 from RD03ERG.xls for Chicago
 5 0.0695 0.0926 0.0927 0.1167 0.1127 0.1290 0.0953 0.0753 0.0561 0.0505
   0.0405 0.0135 0.0137 0.0049 0.0065 0.0041 0.0035 0.0024 0.0042 0.0029
   0.0017 0.0010 0.0003 0.0002 0.0102
* The following, commented out, are the CHIRD01 values
* 5 0.0629 0.1095 0.1300 0.0889 0.0835 0.0624 0.0725 0.0611 0.0455 0.0388
*   0.0300 0.0348 0.0387 0.0313 0.0236 0.0225 0.0161 0.0123 0.0076 0.0034
*   0.0017 0.0032 0.0074 0.0049 0.0074


*
* HDV2B (Heavy-duty vehicles 2B--M6 Default RDs)
 6 0.0503 0.0916 0.0833 0.0758 0.0690 0.0627 0.0571 0.0519 0.0472 0.0430
   0.0391 0.0356 0.0324 0.0294 0.0268 0.0244 0.0222 0.0202 0.0184 0.0167
   0.0152 0.0138 0.0126 0.0114 0.0499
* HDV3 (Heavy-duty vehicles3, same RD as HDV2B, M6 Default RDs)
 7 0.0503 0.0916 0.0833 0.0758 0.0690 0.0627 0.0571 0.0519 0.0472 0.0430
   0.0391 0.0356 0.0324 0.0294 0.0268 0.0244 0.0222 0.0202 0.0184 0.0167
   0.0152 0.0138 0.0126 0.0114 0.0499
* HDV4 (Heavy-duty vehicles 4, M6 default RDs)
 8 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDV5 (Heavy-duty vehicles 5, same RD as HDV4, M6 Default)
 9 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDV6 (Heavy-duty vehicles 6, same RD as HDV4, M6 Default)
10 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDV7 (Heavy-duty vehicles 7, same RD as HDV4, M6 Default)
11 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDV8A (Heavy-duty vehicles 8A same RD as HDV4, M6 Default)
12 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDV8B (Heavy-duty vehicles 8B,same RD as HDV4, M6 Default)
13 0.0388 0.0726 0.0679 0.0635 0.0594 0.0556 0.0520 0.0486 0.0455 0.0425
   0.0398 0.0372 0.0348 0.0326 0.0304 0.0285 0.0266 0.0249 0.0233 0.0218
   0.0204 0.0191 0.0178 0.0167 0.0797
* HDBS (HDV School buses; this M6 RD default is assumed)
14 0.0393 0.0734 0.0686 0.0641 0.0599 0.0559 0.0522 0.0488 0.0456 0.0426
   0.0398 0.0372 0.0347 0.0324 0.0303 0.0283 0.0264 0.0247 0.0231 0.0216
   0.0201 0.0188 0.0176 0.0165 0.0781
* HDBT (HDV Transit buses; this M6 RD default is assumed)
15 0.0307 0.0614 0.0614 0.0614 0.0614 0.0614 0.0614 0.0614 0.0614 0.0613
   0.0611 0.0607 0.0595 0.0568 0.0511 0.0406 0.0254 0.0121 0.0099 0.0081
   0.0066 0.0054 0.0044 0.0037 0.0114
* Motorcycles (this M6 default RD is the same as M5a/b's default RD)
```

```
16 0.1440 0.1680 0.1350 0.1090 0.0880 0.0700 0.0560 0.0450 0.0360 0.0290
   0.0230 0.0970 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
   0.0000 0.0000 0.0000 0.0000 0.0000
*
```

External MOBILE6.2 Activity File Inputs: VMT by Facility Type, VMT by Hour, VMT by Speed Bin.

The following files were used in the 2002 base year and the 2008 and 2009 future year estimates.

VMT by Facility Type

The M6.2 default file is FVMT.D, provided with the MOBILE6 model. The Chicago-area-specific VMT-by-facility-type file is FVMTCH07.D, shown below. It based on the most recent complete data from CMAP on VMT by hour by vehicle class. This is a very long file —about 750 lines—so for the purposes of this Attachment, only the data for vehicle types 1, 6, 11, 13, 24 (LDGV, HDGV2b, HDGV7, HDGV13, and MC) are shown; the others are omitted. See the second paragraph of the introduction to the file.

```
VMT BY FACILITY
*
* This is [F:\]AREASPEC\CHNAA\FVMTCH07.DEF, an FVMT file, which was
*  developed from CATS 2007 transportation model output
*  as given in his MF13.XLS file as sent to and recalculated by
*  SL.  13.xj.02.
*
* VMT fractions are listed for 28 vehicle classes for each hour of
*  the day starting at 6AM, as follows
*   Classes 1-5 (LDGV, LDGT1, LDGT2, LDGT3, and LDGT4), and
*     Classes 14, 15, and 28 (LDDV, LDDT12, LDDT34) were all assumed
*     to have the "Light-duty Vehicle" distribution on page "SL VMT
*     by vtype reedited" of the MF13 file.
*   Classes 6-10 and 16-20 (HDGV2b-HDGV6 and HDDV2b-HDDV6) were assumed
*    to have the "LTRK" (light HDV) distribution on that page.
*   Classes 11 & 12 and 21 & 22 (HDGV7 & HDGV8a, and HDDV7 & HDDV8a) were
*    assumed to have the "MTRK" (medium HDV) distribution on that page.
*   Classes 13 and 23 (HDGV8b and HDDV8b) were assumed to have the
*    "HTRK" (heavy HDV) distribution on that page
*   Classes 24 and 25-27 (Motorcycles and the three bus classes [HDGB,
*    HDDBT and HDDBS]) were assumed to have the default distribution
*    for those types in FVMT.DEF.
*
* The four values in each line represent the VMT distribution on
* freeway, arterial, local and ramps--in that order--as shown.
*
* See M6UG 2.8.5.1.f., p. 49, or CLASLIST.TXT for further info.
* (The CLASLIST file describes the vehicle classes.)
*
* Veh   Int&   Arts&   Local
*Class  Fwys   Colls   Rd/St   Ramps
*-----  ----   -----   -----   -----
*
    1  0.3341  0.5393  0.1105  0.0161
```

```
       0.2604  0.6106  0.1160  0.0130
       0.2604  0.6106  0.1160  0.0130
       0.2669  0.5831  0.1365  0.0135
       0.2576  0.5823  0.1468  0.0133
       0.2576  0.5823  0.1468  0.0133
       0.2576  0.5823  0.1468  0.0133
       0.2576  0.5823  0.1468  0.0133
       0.2683  0.5830  0.1354  0.0133
       0.2683  0.5830  0.1354  0.0133
       0.2646  0.5911  0.1315  0.0128
       0.2646  0.5911  0.1315  0.0128
       0.2825  0.5568  0.1468  0.0139
       0.2825  0.5568  0.1468  0.0139
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
       0.3363  0.5122  0.1358  0.0157
.
```

[Data for Vehicle Types 2 through 5 omitted]

.

```
    6  0.3836  0.5157  0.0827  0.0180
       0.3045  0.5985  0.0822  0.0148
       0.3045  0.5985  0.0822  0.0148
       0.3589  0.5412  0.0829  0.0170
       0.3791  0.5203  0.0826  0.0180
       0.3791  0.5203  0.0826  0.0180
       0.3791  0.5203  0.0826  0.0180
       0.3791  0.5203  0.0826  0.0180
       0.3606  0.5397  0.0827  0.0170
       0.3606  0.5397  0.0827  0.0170
       0.3581  0.5432  0.0816  0.0171
       0.3581  0.5432  0.0816  0.0171
       0.4101  0.4884  0.0815  0.0200
       0.4101  0.4884  0.0815  0.0200
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
       0.4312  0.4663  0.0818  0.0207
.
```

[Data for Vehicle Types 7 through 11 omitted]

.

```
   11  0.4158  0.4904  0.0752  0.0186
       0.3337  0.5763  0.0749  0.0151
       0.3337  0.5763  0.0749  0.0151
       0.3905  0.5165  0.0755  0.0175
       0.4111  0.4952  0.0752  0.0185
       0.4111  0.4952  0.0752  0.0185
       0.4111  0.4952  0.0752  0.0185
       0.4111  0.4952  0.0752  0.0185
       0.3928  0.5144  0.0753  0.0175
```

```
       0.3928  0.5144  0.0753  0.0175
       0.3896  0.5185  0.0742  0.0177
       0.3896  0.5185  0.0742  0.0177
       0.4423  0.4630  0.0743  0.0204
       0.4423  0.4630  0.0743  0.0204
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
       0.4619  0.4425  0.0745  0.0211
.
```

[Data for Vehicle Types 7 through 12 omitted]

.

```
   13  0.6106  0.3299  0.0430  0.0165
       0.5563  0.3937  0.0367  0.0133
       0.5563  0.3937  0.0367  0.0133
       0.6241  0.3235  0.0376  0.0148
       0.6260  0.3178  0.0403  0.0159
       0.6260  0.3178  0.0403  0.0159
       0.6260  0.3178  0.0403  0.0159
       0.6260  0.3178  0.0403  0.0159
       0.6561  0.2957  0.0340  0.0142
       0.6561  0.2957  0.0340  0.0142
       0.6029  0.3414  0.0401  0.0156
       0.6029  0.3414  0.0401  0.0156
       0.5776  0.3523  0.0508  0.0193
       0.5776  0.3523  0.0508  0.0193
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
       0.5737  0.3512  0.0547  0.0204
.
```

[Data for Vehicle Types 14 through 23 omitted]

.

```
   24  0.392   0.457   0.117   0.034
       0.344   0.497   0.129   0.030
       0.338   0.497   0.135   0.029
       0.349   0.492   0.129   0.030
       0.346   0.497   0.127   0.030
       0.333   0.509   0.129   0.029
       0.324   0.516   0.132   0.028
       0.334   0.506   0.131   0.029
       0.334   0.506   0.131   0.029
       0.320   0.519   0.134   0.028
       0.330   0.506   0.135   0.029
       0.312   0.521   0.140   0.027
       0.295   0.538   0.141   0.026
       0.310   0.527   0.137   0.027
       0.329   0.510   0.133   0.029
       0.343   0.497   0.131   0.030
       0.381   0.460   0.126   0.033
```

```
0.405   0.437   0.123   0.035
0.426   0.418   0.118   0.037
0.443   0.403   0.115   0.039
0.457   0.394   0.110   0.040
0.461   0.391   0.107   0.040
0.453   0.400   0.108   0.039
0.418   0.434   0.112   0.036
```

[Data for Vehicle Types 25 through 28 omitted; the file ends after Vehicle Type 28.]

VMT by Hour of the Day

The MOBILE6.2 default file is HVMT.D. The most current Chicago-area-specific file is HVMTCH7R.SL, shown below, derived from 2007 modeling output from CMAP. Again, this file contains "commented-out" data from previous files for comparison purposes.

```
VMT BY HOUR
*  Fraction of all vehicle miles traveled by hour of the day.
*  First hour is 6 a.m.  These data are for the Chicago NAA for
*   2007, derived from CMAP VbyHr07.def file based
*   upon his run iepa07 300_20070830, VMT for 2007.
*
*  This file is HVMTCH7R.SL representing SL's estimate of VMT by hour.
*   IEPA estimates are based on CMAP data, but assume VMT in multi-hour
*   modeling periods is distributed as the default is distributed across
*   the hours in question.  Calculations made from VbyHr07.def
*   in accordance with USEPA guidance on the subject.  See M6 Technical Guidance
*   Document (Jan '02) Section 4.3.3 for details.


0.03358  0.07039  0.06240  0.07658  0.05870  0.06327
0.06609  0.06207  0.06693  0.07118  0.07991  0.07507
0.05924  0.04599  0.02160  0.01851  0.01360  0.01010
0.00757  0.00603  0.00568  0.00561  0.00687  0.01304

*  Here are RP's original fractions from VbyHr07.def
*  0.033579 0.066392 0.066392 0.076578 0.062532 0.062532
*  0.062532 0.062532 0.069056 0.069056 0.077490 0.077490
*  0.052616 0.052616 0.010861 0.010861 0.010861 0.010861
*  0.010861 0.010861 0.010861 0.010861 0.010861 0.010861

*  These following are the default values from HVMT.DEF
*   supplied for comparison.
*      0.0569  0.0740  0.0655  0.0555  0.0540  0.0582
*      0.0608  0.0571  0.0598  0.0636  0.0777  0.0730
*      0.0501  0.0389  0.0308  0.0264  0.0194  0.0144
*      0.0108  0.0086  0.0081  0.0080  0.0098  0.0186
*
*  Following are SL's original HVMTCH07 fractions based upon DE's '07 model
*   runs made in 2002 (for information).
*      0.0443  0.0851  0.0755  0.0577  0.0541  0.0583
*      0.0609  0.0572  0.0659  0.0701  0.0818  0.0769
*      0.0576  0.0447  0.0219  0.0188  0.0138  0.0102
*      0.0077  0.0061  0.0058  0.0057  0.0070  0.0132
```

All these Hourly-VMT files show similar profiles, with morning and afternoon peaks, a noontime dip, and a minimum about 3AM - 4AM, which is to be expected.

VMT by Speed Bin

The MOBILE6.2 default file is SVMT.D. The Chicago-area-specific Speed-bin file is SVMTCH07.DEF, shown below. It represents 2007 CMAP transportation model output, deemed representative for 2008 and 2009 as well.

```
SPEED VMT
  1  1 0.0053 0.0044 0.0088 0.0299 0.0300 0.0484 0.0641 0.0632 0.0709 0.0801 0.0981 0.2160 0.1953 0.0857
  1  2 0.0135 0.0570 0.0859 0.0790 0.0766 0.0954 0.0681 0.0704 0.0722 0.1018 0.0761 0.1084 0.0524 0.0432
  1  3 0.0135 0.0570 0.0859 0.0790 0.0766 0.0954 0.0681 0.0704 0.0722 0.1018 0.0761 0.1084 0.0524 0.0432
  1  4 0.0017 0.0054 0.0027 0.0159 0.0331 0.0451 0.0702 0.0761 0.0892 0.1259 0.1164 0.2390 0.0989 0.0805
  1  5 0.0017 0.0047 0.0109 0.0329 0.0238 0.0300 0.0439 0.0582 0.0740 0.1160 0.1244 0.2584 0.1237 0.0975
  1  6 0.0017 0.0047 0.0109 0.0329 0.0238 0.0300 0.0439 0.0582 0.0740 0.1160 0.1244 0.2584 0.1237 0.0975
  1  7 0.0017 0.0047 0.0109 0.0329 0.0238 0.0300 0.0439 0.0582 0.0740 0.1160 0.1244 0.2584 0.1237 0.0975
  1  8 0.0017 0.0047 0.0109 0.0329 0.0238 0.0300 0.0439 0.0582 0.0740 0.1160 0.1244 0.2584 0.1237 0.0975
  1  9 0.0072 0.0093 0.0142 0.0382 0.0420 0.0478 0.0654 0.0898 0.0849 0.1104 0.1195 0.2126 0.0722 0.0866
  1 10 0.0072 0.0093 0.0142 0.0382 0.0420 0.0478 0.0654 0.0898 0.0849 0.1104 0.1195 0.2126 0.0722 0.0866
  1 11 0.0081 0.0325 0.0434 0.0683 0.0493 0.0530 0.0780 0.0803 0.0773 0.0953 0.1179 0.1443 0.0875 0.0648
  1 12 0.0081 0.0325 0.0434 0.0683 0.0493 0.0530 0.0780 0.0803 0.0773 0.0953 0.1179 0.1443 0.0875 0.0648
  1 13 0.0016 0.0013 0.0059 0.0137 0.0237 0.0247 0.0391 0.0556 0.0479 0.0729 0.0904 0.2202 0.2979 0.1049
  1 14 0.0016 0.0013 0.0059 0.0137 0.0237 0.0247 0.0391 0.0556 0.0479 0.0729 0.0904 0.2202 0.2979 0.1049
  1 15 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 16 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 17 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 18 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 19 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 20 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 21 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 22 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 23 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  1 24 0.0011 0.0002 0.0000 0.0000 0.0000 0.0038 0.0101 0.0178 0.0386 0.0660 0.0981 0.1509 0.5215 0.0919
  2  1 0.0000 0.0004 0.0017 0.0041 0.0160 0.0461 0.1311 0.1952 0.1835 0.2385 0.0665 0.1170 0.0000 0.0000
  2  2 0.0021 0.0328 0.0517 0.0618 0.0924 0.1181 0.1447 0.1449 0.1170 0.1185 0.0457 0.0704 0.0000 0.0000
  2  3 0.0021 0.0328 0.0517 0.0618 0.0924 0.1181 0.1447 0.1449 0.1170 0.1185 0.0457 0.0704 0.0000 0.0000
  2  4 0.0001 0.0007 0.0025 0.0068 0.0232 0.0572 0.1470 0.2077 0.1791 0.2034 0.0682 0.1041 0.0000 0.0000
  2  5 0.0000 0.0008 0.0029 0.0074 0.0224 0.0565 0.1435 0.1985 0.1862 0.2044 0.0681 0.1093 0.0000 0.0000
  2  6 0.0000 0.0008 0.0029 0.0074 0.0224 0.0565 0.1435 0.1985 0.1862 0.2044 0.0681 0.1093 0.0000 0.0000
  2  7 0.0000 0.0008 0.0029 0.0074 0.0224 0.0565 0.1435 0.1985 0.1862 0.2044 0.0681 0.1093 0.0000 0.0000
  2  8 0.0000 0.0008 0.0029 0.0074 0.0224 0.0565 0.1435 0.1985 0.1862 0.2044 0.0681 0.1093 0.0000 0.0000
  2  9 0.0002 0.0028 0.0064 0.0149 0.0423 0.0779 0.1620 0.1879 0.1732 0.1734 0.0644 0.0947 0.0000 0.0000
  2 10 0.0002 0.0028 0.0064 0.0149 0.0423 0.0779 0.1620 0.1879 0.1732 0.1734 0.0644 0.0947 0.0000 0.0000
  2 11 0.0017 0.0151 0.0292 0.0423 0.0720 0.1030 0.1538 0.1654 0.1429 0.1415 0.0511 0.0821 0.0000 0.0000
  2 12 0.0017 0.0151 0.0292 0.0423 0.0720 0.1030 0.1538 0.1654 0.1429 0.1415 0.0511 0.0821 0.0000 0.0000
  2 13 0.0000 0.0003 0.0018 0.0039 0.0140 0.0369 0.1146 0.1939 0.1865 0.2383 0.0751 0.1348 0.0000 0.0000
  2 14 0.0000 0.0003 0.0018 0.0039 0.0140 0.0369 0.1146 0.1939 0.1865 0.2383 0.0751 0.1348 0.0000 0.0000
  2 15 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 16 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 17 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 18 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 19 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 20 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 21 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 22 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 23 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
  2 24 0.0003 0.0000 0.0002 0.0008 0.0008 0.0042 0.0749 0.1565 0.1661 0.3285 0.0786 0.1890 0.0000 0.0000
*
* Speed Bins:
*       2.5    5.0    10.0   15.0   20.0   25.0   30.0   35.0   40.0   45.0
50.0   55.0   60.0   65.0+
*
*  Speed bins extend 2.5 mph on either side of the bin name (i.e., the 30 mph
speed bin encompasses speeds from 27.5 to 32.5 mph), except for the 2.5 mph bin
(0 to 2.5 mph) and the 65+ mph bin (62.5 mph or above)
*
*  This is SVMTCH07.DEF.
```

```
*
*  These data come from a spreadsheet page titled "[DE] spdvmt" in the Excel
file MF13.XLS, supplied to IEPA by CATS, in October '02, being VMT output from
CATS's transportation model aggregated into the various speed bins by county and
M6 road type for the 8 CATS time periods.  SL
*   slightly modified and reformatted the page, and verified that DE's vmt-by-
speed-bin calculations were correct.  See also CATS's file titled VBYSPD.DEF
*
*  The information in this file strictly speaking represents a speed
distribution for 2007, but this is assumed (after discussion with CATS)
reasonably valid throughout the 2000-2010+ period.
*
*  The above data are for the Chicago NAA, and for Freeways and Arterials only.
*
*  See M6 User's Guide Sec. 2.8.8.2.c and Appendix B, Table 5: "Average Speed
Ranges for Speed Bins
*   (SPEED VMT Command)" for further information about this file and its use.
*
*  The first number in each line is roadway type: 1 = Freeways; 2 = Arterials.
Locals and Ramps have a fixed speed in M6, and therefore are not affected by
this file.
*  The second number is the hour of the day, hour 1 being [hour beginning at] 6
AM, and hour 24 being [hour beginning at] 5 AM the next day.
*  The third and subsequent numbers are the fractions of VMT in that hour that
occur within the specified speed bins.  These fractions were calculated from
DE's file, which gave estimates of VMT assigned to each of the 8 CATS modeling
periods.
*
*  Note that, for Freeways, most VMT is in the 45-50-55-60-mph speed bins, with
lower speeds more common during Peak hours (which is reasonable).  Much the same
holds for Arterials, where most VMT is in the 30-35-40-45 mph speed bins (also
reasonable).
*
*  See also the default VMT-by-speed file SVMT.DEF for more information and
comments.
*
*   --SL, 25.xj.02
*     Revisions:
*        7.ix.06...Small changes made to text of these comments by SL; no
changes to numerical data.
```