

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

AQPSTR 09-03

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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
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
NO _x	Oxides of Nitrogen
NSPS	New Source Performance Standards
OBD	On-Board Diagnostics
OTB	On the Books
OTC	Ozone Transport Commission
PM _{2.5}	Particulate Matter less than 2.5 microns in diameter
PM ₁₀	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
SO ₂	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) promulgated in 1997. 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, 2010.

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.

A key element of the strategy, the Clean Air Interstate Rule (CAIR) which was promulgated by U.S. EPA on March 10, 2005, was remanded without vacatur by the U.S. Court of Appeals for the D.C. Circuit on December 23, 2008. As a result of this ruling, Phase I of CAIR is being implemented, as scheduled. The magnitude of future emission reductions expected from this

program is, 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 2010, except in Holland, MI. As mentioned previously, Holland, MI is expected to attain the standard by 2012.

Another key element of the emission reduction strategy is the implementation of Reasonably Available Control Technology (RACT) for oxides of nitrogen (NO_x), a key precursor to the formation of ozone, in the Chicago NAA by 2012. Although NO_x RACT emission reductions were not relied upon to demonstrate attainment in the Chicago NAA by 2010, these reductions are an element of the emission reduction strategy that demonstrates attainment of the standard in Holland, MI by 2012.

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 here 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;
- The 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 the monitor located in Holland, Michigan. The projected concentration of 85.3 ppb is well within the range of the weight of evidence (WOE) test provided for in U.S. EPA's modeling guidance. In addition, the monitor is projected to attain the 85 ppb level by 2012 with the emission reduction strategy described in this document.

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, the guidance allows for the use of alternative base years, and the LADCO Project Team opted to include a more recent year. The methods used to compile the inventories for both base years were similar. Inventories were compiled for point, area, on-road mobile, nonroad, and biogenic emission categories for three ozone precursor pollutants - CO, NO_x, and VOM. Inventories were prepared directly from the Illinois statewide database or generated from approved emissions 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 (Appendix A). Within the narrative of the TSD (Appendix A, 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, are 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.

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

The overall goal of Title IV, the Acid Rain Program, was to achieve significant environmental and public health benefits through reductions in emissions of sulfur dioxide (SO₂) and NO_x - the primary causes of acid rain. The program established a goal of significantly reducing both SO₂ and NO_x emissions from coal-fired electric utility boilers from 1980 levels. The program was implemented in two phases, Phase I beginning in 1996 and Phase II beginning in 2000.

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

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

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 VOM MACT standards.

Projected reductions in VOM and NO_x emissions in Illinois reflect U.S. EPA-estimated values.

VOM 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.

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.

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

Vehicle inspection and maintenance programs (I/M) help improve air quality by identifying high-emitting vehicles in need of repair (through visual inspection, emissions testing, and/or the downloading of fault codes from a vehicle's onboard computer) and causing them to be fixed as a prerequisite to vehicle registration within a given non-attainment area. The 1990 Amendments to the Clean Air Act made I/M mandatory for several areas across the country, including the Chicago area.

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

Reformulated gasoline (RFG) is gas blended to burn cleaner by reducing smog-forming and toxic pollutants emitted by motor vehicles. The CAA requires that RFG be used in cities with the worst ozone pollution, including the Chicago area. The law also specifies that RFG contain oxygen (2 percent by weight), which is accomplished with fuel additives, or oxygenates (ethanol in the Chicago area), that contain oxygen which can boost gasoline's octane quality, enhance combustion, and reduce exhaust emissions. The term oxygenated gasoline most commonly refers to the wintertime program that reduces emissions of carbon monoxide (CO) from motor vehicles.

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 NO_x, non-methane organic gases, and sulfur compounds will be reduced. Vehicle NO_x 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.

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 NO_x emissions have been and will continue to 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 NO_x emissions levels that are 90 percent below year 2000 levels.

Evaporative Large Spark Ignition and Recreational Vehicle Standards (Federal Register: November 8, 2002, vol.67, no.217, pp. 68241-68447)

U.S. EPA has adopted exhaust emission standards for marine spark-ignition engines and small land-based nonroad engines, and evaporative emission standards for equipment and vessels using these engines. These standards apply only to newly manufactured products. The rule sets emission standards for VOM, NO_x, and CO for new small nonroad spark-ignition engines rated below 25 horsepower used in household and commercial applications, including lawn and garden equipment, utility vehicles, generators, and a variety of other construction, farm, and industrial equipment. The rule also established new emission standards for spark-ignition engines used in marine vessels, including outboard engines, personal watercraft, and sterndrive/inboard engines.

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 NO_x, non-methane hydrocarbons, fine particulate (PM_{2.5}), 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 NO_x emissions will be reduced more than 90 percent.

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)

Existing federal regulations in 40 CFR parts 92 and 94 include standards for emissions of PM, NO_x, VOM, and CO from locomotive and marine compression-ignition engines (also called marine diesel engines). These standards rely on engine-based technologies to reduce emissions. U.S. EPA adopted new standards for these engines in 2008, which will provide additional emission reductions in future years.

Consent Decrees---Dynergy 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 SO₂ and PM control on the FCCU, and imposes an SO₂ emission limit of “25 parts per million by volume dry (ppmvd) at 0% O₂ on a 365-day rolling average basis and 50 ppmvd at 0% O₂ 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-NO_x Burners and Ultra Low-NO_x Burners on combustion units at its “Distilling West” operations. Other NO_x 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 NO_x control on the Joliet refinery fluid catalytic cracking unit (FCCU). Compliance with SO₂ emission limits of “25 ppmvd at 0% O₂ on a 365-day rolling average basis and 50 ppmvd at 0% O₂ 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 NO_x reductions will also come from other emission sources (e.g., FCCU catalyst regenerators, combustion units, etc.).

The settlement reached with Dynegy Midwest Generation (DMG) 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 NO_x and “maintain a 30-day rolling average emission rate of not greater than 0.120 lb/mmBTU NO_x at Baldwin Unit 3.” Low NO_x burners and Overfire Air Technology are required on Dynegy Midwest Generation’s Wood River Units #4 and #5. The Consent Decree actually imposes a near-immediate operational timeframe in specifying that “Beginning 30 days after entry of this Consent Decree, and continuing thereafter, DMG shall operate each SCR in the DMG system at all times when the Unit it serves is in operation . . .” Additionally, “Beginning 45 days from entry of this Consent Decree, DMG shall operate low NO_x burners (“LNB”) and/or Overfire Air Technology (“OFA”) on the DMG System Units” including Baldwin Units 1-3, Havana Unit 6, Hennepin Units 1 and 2, Vermilion Unit 2, and 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 NO_x 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.

Reasonably Available Control Technology (RACT) for NO_x

Illinois EPA intends to meet the requirement to implement NO_x RACT through implementation of control measures at major stationary emission sources in the Chicago NAA. The Illinois EPA has proposed two rules which are now being considered by the Illinois Pollution Control Board (IPCB). The first rulemaking affects large stationary reciprocating internal combustion engines and combustion turbines. The second rulemaking affects EGU and industrial boilers, process heaters, cement and lime kilns, glass melting furnaces, reheat, annealing, and galvanizing furnaces used in iron and steel making, and reverberatory and crucible furnaces used in aluminum manufacturing. Most of these measures will not be implemented until after 2010 and will, therefore, not contribute to attainment by the 2009 attainment deadline for the Chicago NAA. Illinois' NO_x RACT program is an element of the emission reduction strategy modeled to demonstrate attainment of the ozone standard 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 NO_x 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 regulations
- Federal architectural and industrial maintenance coatings regulations
- 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 15.72 percent reduction in VOM emissions from 2002 emissions levels by the year 2008. These emission reductions, therefore, achieve the 15% RFP target for the Chicago nonattainment area. In addition, continuing VOM emission reductions after 2008 are estimated to result in year 2010 VOM emissions at 20.97 percent below 2002 levels.

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 NO_x) 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 may consist of one or more individual emission units. 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 NO_x was previously waived under the 1-hour ozone standard, and Illinois is adopting new regulations to implement NO_x 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 for VOM is still being met for the current 8-hour ozone standard.

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. 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. Illinois' generic rules apply to non-CTG sources that have the potential to emit 100 tons or more per year of VOM.

Table E-1 in Appendix E summarizes the CTG source categories, CTG reference documents, and the applicable Illinois rules promulgated in response to the CTGs, including the generic rule that addresses non-CTG source categories. Illinois EPA will soon be proposing regulations to implement the CTG categories issued in 2006 and 2007 by the U.S. EPA. Table E-2 in Appendix E presents CTG and non-CTG source categories for which the Illinois EPA believes there are no applicable sources in the Chicago NAA. Based on this review, Illinois EPA has adopted applicable rules, or will soon conduct rulemaking, addressing all CTG categories adopted by U.S. EPA through 2007 for which there are existing sources in the Chicago NAA. Illinois has therefore met the obligation to implement RACT for 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.

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 evaluated a wide range of potential control measures that could be implemented to improve ozone air quality in the Chicago NAA. Illinois has adopted a number of SIP revisions 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 to expedite attainment. This conclusion is not surprising given the long history of ozone planning in the Lake Michigan region. Therefore, the Illinois EPA concludes 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 requires 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 time frame.

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	14.06	15.14	16.21
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	50.61	53.85	56.87

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

	2010	2011	2012
Tier 2	57.65	62.01	71.22
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	68.43	126.13	137.00

7.0 Transportation Conformity

Illinois is required to establish motor vehicle emissions budgets for the Chicago nonattainment area as part of the 8-hour ozone attainment demonstration. For the 8-hour ozone standard, the Illinois EPA is proposing average summer weekday motor vehicle emissions budgets for the projected attainment year 2009 for the precursor pollutants, VOM and NO_x. These budgets were developed consistent with the motor vehicle activity assumptions and emissions control strategies incorporated into the 8-hour ozone attainment demonstration modeling analysis. The budgets reflect an emissions level determined using vehicle miles travelled (VMT) and fleet mix characteristics provided by the Chicago Metropolitan Agency for Planning (CMAP).

A motor vehicle emissions budget is that portion of the total allowable emissions allocated to highway and transit vehicle use that are identified 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 mobile, non-road mobile), 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. In response to a comment received from CMAP, this final plan also incorporates a change in emissions resulting from the use 2008 vehicle registration distribution dataset.

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. 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, low sulfur gasoline, and low sulfur diesel fuel. Using these control program assumptions and methodology, the motor vehicle emissions budgets for 2009 for the Chicago NAA for use in determining transportation conformity are presented in Table 7.1. Complete details on the derivation of the motor vehicle emissions budgets, including discussion of the MOBILE6 model inputs and assumptions, is included in Appendix F.

Table 7.1

Proposed Chicago NAA Year 2009	
Motor Vehicle Emissions Budgets	
Pollutant	2009
VOM	133.78
NO_x	284.65

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 to provide adequate funding and personnel to implement the provision of this plan for meeting the air quality standards.

The Illinois Pollution Control Board (IPCB) 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 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 IPCB in accordance with the Act and applicable State rules.

The IPCB's orders may be enforced by the Illinois EPA, 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

Appendix D

Reasonable Further Progress Demonstration

Appendix E

Summary of VOM RACT Implementation

APPENDIX F

TRANSPORTATION CONFORMITY