

Carol L. Dorge
Attorney at Law
315 E. Sheridan Road
Lake Bluff, Illinois 60044

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CAROL L. DORGE
Direct dial: 847 295-7031
Telecopier: 847 295-6815

Note: Attachments
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STATE OF ILLINOIS
Pollution Control Board
WAUKEGAN
200 N. County
Waukegan, IL 60085
847 662-8775
Telecopier: 662-8265

November 5, 2000

R01-10
P.C. #166

Clerk, Illinois Pollution Control Board
State of Illinois Center
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601

Re: R01-10

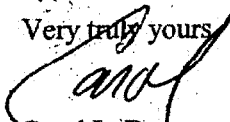
To whom it may concern:

Enclosed for filing are comments in the peaker plant proceeding.

During the last hearing in Springfield, I submitted excerpts from the Skygen/Zion Energy permit application. I am concerned a page of data may have been missing from the copy submitted, and I have enclosed another copy of this exhibit.

Thank you. Please feel free to contact me if there are questions regarding the enclosed.

Very truly yours



Carol L. Dorge

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NOV 06 2000

STATE OF ILLINOIS
Pollution Control Board
Lake Bluff, IL 60044

1-847-662-8775 ■ Fax: 1-847-295-6815

e mail CarolDorge@AOL.com

Lake County Conservation Alliance

IN THE MATTER OF:

NATURAL GAS FIRED PEAK LOAD)
ELECTRICAL POWER GENERATING) R01-10
FACILITIES (PEAKER PLANTS))

**FINAL COMMENTS OF CAROL L. DORGE, ATTORNEY, ON BEHALF OF THE
LAKE COUNTY CONSERVATION ALLIANCE (LCCA), NOVEMBER 3, 2000**

Members of the Lake County Conservation Alliance (LCCA or the Alliance) have a great amount of personal experience with the current regulation of peaker power plants in Illinois. We have tried to convey our knowledge and experiences to the Board in oral testimony and the written materials we have submitted in the course of these proceedings. At this juncture, we would like to highlight some of our more compelling concerns and observations.

The "peaker plant" industry.

The peaker plants that have been the subject of these hearings are natural gas fired electric generating units. Some are also being permitted to use diesel fuel as an alternate fuel. (The Skygen-Zion Energy draft PSD permit allows diesel to be burned 500 hours per turbine for a total of 2500 hours). The focus has been on simple cycle units, although combined cycle facilities have also been discussed. Combined cycle units are more energy efficient and generate less air pollution in relation to the amount of fuel consumed and energy generated, although their water demand threatens aquifers and must be addressed somehow.

Since these hearings commenced, in August, the number of peaker plants seeking air pollution permits from IEPA has grown from around 45 to over 60. Each plant has multiple turbines—usually three or more (Elwood is the largest, having applied for air permits for 19 turbines). It appears that the turbines are being designed and permitted to operate during daytime hours, from spring to fall, and to a limited extent during the winter. The number of operating hours per turbine varies, but is on the order of 2000-4000 hours or more. Total operating hours, per plant (all turbines) is much greater. These plants (which include some combined cycle facilities) are not truly "peakers," although we will continue to refer to them that way.

We estimate their combined generating capacity to be 27,500 MW and their combined emissions (NOX) to exceed 20,000 tons.

These plants are being permitted and being built in Illinois and around the country, to serve intermediate and base load demand, as well as peak demand. They have been designed and built to serve an intermediate and base load demand here, in Wisconsin, New York, California, Pennsylvania, Connecticut, Massachusetts, Hawaii, Texas, Michigan and other states. This is a new industry. It is a big industry, and it has arrived, in Illinois, big time.

The Board, and Governor Ryan, need to look at the numbers and recognize the reality. First, the fact that is a big new industry and a real industry, and is not designed to serve only peak demand as peakers have in the past. Second, the fact that deregulation of the electric power industry, and relatively lax environmental regulations and local siting have contributed to an explosion in the number of plants choosing Illinois, over other states.

Simple cycle turbines are not “energy efficient” energy producers and they will contribute significantly to the ozone problem in Illinois and Wisconsin. These plants generate fewer jobs and less tax revenue than other types of industry. They take up large tracts of land. Most of the electricity they produce will be sold to out-of-state customers, and we can expect higher electric prices, and higher natural gas prices. There are few discernable benefits. Most of the municipalities that are approving these facilities are being enticed by financial incentives, through host agreements, or threatened by lawsuits.

The state is currently issuing permits which would allow these sources to emit roughly 20,000 tons of NOX (estimated), when the state’s air regulations and SIP proposals project a NOX demand for new sources of 1500 tons. Noise is a problem. The transportation and storage of millions of gallons of diesel fuel through and adjacent to residential areas is a problem. We are already observing clustering of facilities, with multiple facilities in close proximity, even across the street from each other. Their combined impact needs to be considered. The state should be proactive and adopt regulations addressing these environmental impacts before millions of dollars are invested in the facilities that are being proposed.

Air permit procedures need to be strengthened.

Almost all of these plants approach or exceed major source thresholds for NOX, CO, VOM and toxics. We have monitored a great number of permitting proceedings and have a number of observations.

First we note that facilities are being permitted to emit a wide range of emissions. Emissions of NOX range from 2.5 ppm to over 40-55 ppm—even plants that are major and subject to BACT.

Some of these plants are admittedly major, and subject to PSD and BACT. IEPA has accepted dry low NOX technology as BACT for NOX, with little or no control on emissions during startup or emissions of other pollutants. The LCCA believes that even the sources being permitted as major sources are being allowed to emit far more air pollution than BACT should allow.

It is well known that pollutant emissions from combustion processes are higher during periods of start-up (and possibly shut-down). This is particularly true for carbon monoxide and unburned hydrocarbons, many of which are air toxics. According to one turbine manufacturer, this information has been provided to "some" of their Illinois customers.

IEPA has not been requiring applicants to obtain reliable emissions data from the manufacturers and include the information in their application—including data on emissions during startup. In fact, IEPA only recently started considering startup emissions, in its permit review, and IEPA is still relying on assumptions, and not on reliable data. These applications are being written using performance data provided by turbine salesmen. Reliable engineering data for normal operation and startup is essential, due to the nature of peaker plant operations.

Modeling has not included emissions during startup. This should also be required.

Many of these plants are being permitted as synthetic minors with emissions of NOX and CO approaching major source thresholds. VOM and toxics may also be significant. We believe these sources would be major, if all emissions (including emissions during startup) were properly accounted for. IEPA should establish standardized procedures for calculating emissions, using reliable engineering data, and taking into account appropriate operating parameters.

The Clean Air Act established New Source Review as a means of demonstrating a facility would be in compliance with the Act and regulations, before it was constructed. These permits are not being issued based on good engineering data, IEPA has not been taking into account all of the sources emissions, particularly emissions during startup.

IEPA construction permits are allowing the plants to achieve compliance, if they can, through trial and error. Construction permits allow these plants to operate for a whole season (180 days) before demonstrating an ability to comply with permit limitations, through testing—and we have heard that many plants are having difficulty achieving emission limitations. IEPA is allowing these sources to declare an artificial cap on emissions and to be constructed, and then operate for months and months, while they make adjustments and tinker with their turbines to bring them into compliance.

We need to bring meaningful New Source Review back to Illinois. The following information should be a part of every permit application. It is not being required by the IEPA, and should be expressly required by regulation:

1. Identity of the real operator and a demonstration of ability to operate, maintain and decommission the facility. Detailed information regarding who will be responsible for operation of the units and permit compliance, and how operations will be controlled. If there are computerized controls, who controls

the computer and how. To what degree does the manufacturer exercise operational control. Will the units be turned on and off remotely by anyone other than the owner/operator identified in the application, i.e. by an ISO.

2. Information on the duration and expected frequency of startup and shutdown, and emissions of all pollutants during startup. This should include information on emissions of NOX, CO, VOM and all air toxics, among other things. It should include information on startup at various ambient temperatures. There should be standardized procedures for calculating emissions during startup and shutdown.
3. Information regarding emissions of toxics during normal operation.
4. Good operating practices for their units.
5. Information regarding operating factors affecting emissions (e.g. evaporative cooling, steam injection) and the impact on emissions at various ambient air temperatures or other conditions.
6. Standard procedures for calculating emissions during normal operation. This would include operating assumptions for operation at various ambient temperatures appropriate for Illinois. (For example, emissions would be calculated at set temperatures and percentages, e.g. 95 degrees with evaporative cooling-10%, 59 degrees with evaporative cooling-80 %, 0 degrees without evaporative cooling-10%). Computer programs for calculating emissions should be made available.
7. Identification of monitoring procedures available to monitor all conditions impacting emissions (ambient air temperature, evaporative cooler on or off, steam injection, fuel usage, operation and effectiveness of low-NOX pilot, other).
8. Modeling, including a demonstration that the facility will not contribute to the ozone non-attainment problem. Offsets should be required.
9. What operator training is required and who will train the operators.
10. Contractual warranties.

Some of these plants are being permitted, bought and sold while they are still on the drawing board. We have also heard the manufacturer exercises some control through a central computer. The application asks for nothing more than the name of the operator. Many of the operators are small companies—even home based businesses. We would like assurance that the operator is able to operate the plant, and will have the resources to properly maintain and

decommission the facility.

We feel the residents of Illinois and Wisconsin are entitled to air which is as clean as can be achieved with modern technology. These facilities should install LAER, and every effort should be taken to prevent backsliding, particularly in the case of NOX and VOM emissions. The NSPS (at around 75 ppm NOX) is over 20 years old and grossly outdated.

The Board should declare all of these sources "major" for purposes of all air regulations.

These sources will cause non-attainment of the ozone standard.

We have also noted that these plants operate during summer months when the pollution problem—particularly the ozone problem—is the greatest.

Last August, IEPA showed us, through modeling, that the combined impact of the roughly 45 plants in the pipeline would cause exceedences of the ozone standard, at least at Wisconsin locations. The number of applications is now over 60, and growing. More regulation is required, to protect our air.

We also note that the Illinois attainment demonstration for ozone appears to account for roughly half of the plants that are being permitted, and does not account for additional plants that may be proposed. We know other plants are being considered. The attainment demonstration is inconsistent with the testimony given in August, and the numbers clearly suggest we will have a problem achieving the standard.

There is substantial evidence that new natural gas fired electric generating units are currently being proposed and constructed with the potential to emit in excess of 20,000 tons of NOX, far in excess of the approximately 1500 tons available under the proposed NOX budget.

These new sources are not currently securing offsets. Only a few of the proposed sources will utilize LAER. They are contributing significantly to the state's NOX problem, while contributing nothing toward a solution. It will not be technically feasible for these sources to reduce their emissions to 1500 Tons or to purchase the necessary allowances from Illinois sources. They will be purchasing allowances from out-of-state sources, while continuing to emit high levels of NOX, in Illinois.

Any regulatory initiative should include incentives designed to reduce levels of NOX emitted within the state. There should be incentives which encourage the purchase of offsets from Illinois sources.

The NOX waiver should be lifted.

USEPA and the courts have determined that Illinois NOX is contributing to the ozone problem

and NOX emissions must be reduced. The NOX waiver should be lifted.

Noise.

Susan Zingle provided the Board with expert testimony that was submitted in the Indeck proceeding (Howard Schacter). She will also be submitting a videotape of a November 4, 2000 forum in Beach Park, Illinois, with additional testimony. These plants are potentially very noisy, although the noise can be reduced in various ways. The noise can be irritating, particularly in a rural, residential setting.

These applicants should be required to hire noise experts and demonstrate noise will be controlled, before these plants are build.

Water Usage

We believe the state should adopt regulations governing water usage and that this should also be subject to review in a permit proceeding.

Water discharge.

The NPDES program may adequately address concerns associated with water discharges, including storm water discharges, however, this should also be made part of the record in the permitting process proposed below.

Spills and Releases.

Citizens are extremely concerned about the possibility of spills, releases and possible explosions associated with peaker plant operations, including the storage of diesel fuel near these large combustion sources—and near to peoples homes. (Skygen, in Zion, proposes to store 1.5 million gallons of diesel fuel within 500 feet of a residential parcel.)

No state agency has responded to those concerns.

Environmental/Engineering Review/Permitting.

We recommend a state level environmental/engineering review and peaker plant permitting process which takes into account all of the environmental impacts associated with these plants, and imposes requirements to mitigate all environmental impacts.

The permit applicant should identify all impacts and propose measures to mitigate all impacts. It should demonstrate an ability to operate the facility in compliance with all requirements. It should also include a financial demonstration of some sort, and a decommissioning plan and demonstrate an ability (including the financial resources), to properly decommission.

This permit process would be an engineering review, taking into account good engineering practices, good environmental practice, good operating practices, and the applicant's ability to perform.

Complete application.

We have already discussed the need for greater specificity as to what constitutes a complete application. We believe the Board should adopt regulations, or the Agency should adopt enforceable guidelines, requiring submission of the items on our list, in addition to what is already required. There should be similar guidelines for the peaker permit discussed above.

These guidelines should be rigorously enforced. When an application is truly complete, the agency should issue Notice of Receipt of a Complete Permit Application to all parties to the permit proceeding, as discussed below with respect to siting.

Siting.

We believe that there is also a need for some state involvement in siting in some, but not all cases. We also believe there are local issues, and local zoning and other requirements should apply, in addition to other limitations imposed at the state level.

Siting and Permitting Proposal

We propose:

- 1. Local siting (zoning) approval is required, as well as compliance with other local requirements.**
- 2. State siting approval may also required. See item 7, below.**
- 3. All property owners located within 2500 feet of the property line of a proposed facility should be provided with notice of the air permit application and peaker permit application at the time of the application.**
- 4. Any person could asked to be placed on the notice list and request service of all application materials (applicant and agency documents), and could become a party to any permit proceeding and be provided with those materials at no cost.**
- 5. Hearings will be held upon the request of any party.**
- 6. Any party to a permit proceeding could appeal any permit that was issued.**
- 7. In addition, we feel an "SB 172" type proceeding is warranted. Alternatively, we would**

support an option giving any person, including any municipality or in the case of unincorporated area, the county, the right to initiate an "SB 172" type siting proceeding by filing notice with the Board within a specified number of days of receipt of Notice of a Complete Application (discussed above) or issuance of the draft permit, or some other appropriate milestone. The proceeding would take into account the factors relevant to permitting including the environmental impacts, and need for and benefits associated with the plant, as well the plant's compatibility with surrounding land use, and the impact of clustering of these facilities. We would like the Board to hold these hearings. (We feel it is important that these decisions be made by a specialized Board with technical competence.) The decision to grant siting approval would not supercede any local zoning.

Personal Observation

I have visited and photographed a few peaker plants and plants under construction. One of the plants was an older plant which was operating. Photos are enclosed. It was in an industrial area, which was appropriate. It was near a Chevron bulk terminal and several manufacturing operations. There were no residences within one-half mile.

It was very noisy—the noise was loud and irritating 1000 feet away. The pictures show what it looked like.

There clearly is a need for permitting and siting to assure plants like this are not placed in inappropriate areas.

QUESTIONS POSED BY GOVERNOR RYAN

Finally, we would like to revisit our responses to questions raised by the Governor.

1. Do peaker plants need to be regulated more strictly than Illinois' current air quality statutes and regulations provide?

Answer: The answer is an unequivocal yes. They are major in terms of their impact during the ozone season and should be declared major sources of air pollution, by regulation. They should be subject to LAER, MACT, the ERMs program, and offset requirements. Existing emission standards—particularly the NSPS—are terribly outdated.

The regulations should also better define permit application requirements, and what constitutes a complete application. The application should require the submission of backup documentation. Manufacture's data should be certified in some manner, by a professional engineer. (We are told that data used to compute emissions is supplied by the turbine salesman, not the manufacturer's engineering department.) The application should also be certified in some manner by a professional engineer. Procedures from computing emissions

should be standardized, and good data for emissions during startup and shutdown is essential. The application should include detail regarding operation and control, including good operating practices. It should identify the person or persons in control, including the extent of control that may be exercised by any non-owner (e.g. remotely by an ISO or by the manufacturer. We are told the manufacturers monitor operation of these units through a central computer system.)

Many of these applicants appear to small, poorly capitalized corporations. They are really seeking permits for a site—more than a facility they will truly operate. The permit and site is then sold to another entity. There should be some financial assurance the facility will be built, operated and decommissioned in a proper manner.

The Agency says it does require modeling for ozone. There must be a way to account for the combined contribution of these facilities, to the ozone problem.

A noise standard should be adopted which takes into account the character of the surrounding area, and a noise permit required prior to commencing operation. All engineering information should be certified in some manner by a professional engineer.

Siting regulations are needed. Local zoning does not adequately address siting considerations. We will provide more specific recommendations at a later hearing.

The analysis of environmental impact should not begin at the property line. If these sources are going to occupy large parcels of land, any other land use (e.g. farming or other activity on-site) needs to be taken into account, including the impact of noise and pollution on any “visitor” to the property.

Storm water permits should also be required.

The combined effect of these facilities needs to be considered in all permitting and siting. We have two across the street from each other in Zion (potentially 18 stacks). What is to prevent us from having 10 – or 100 in close proximity. Their combined impact needs to be assessed.

2. Do peaker plants pose a unique threat, or a greater threat than other types of State-regulated facilities, with respect to air pollution, noise pollution, or groundwater or surface water pollution?

Yes, based on the sheer number of units that have been proposed and their combined emissions are very significant and will cause continued violations of the ozone standard, among other things. Deregulation and other circumstances in Illinois (NOX Waiver, no siting requirements) created a friendly environment which is attracting applicants faster than the State can respond, with appropriate environmental regulations.

Deregulation upset our equilibrium, when it comes to these sources, resulting in surprise, and regulatory gaps. That is not the case with other types of regulated facilities that have come into existence over the years in a free market where some sort of equilibrium lends more predictability.

3. Should new or expanding peaker plants be subject to siting requirements beyond applicable local zoning requirements.

Absolutely. Local zoning is not adequate, particularly where facilities are sited near a municipality's boundary and near residential areas.

4. If the Board determines that peaker plant should be more strictly regulated or restricted, should additional regulations or restrictions apply to currently permitted facilities or only to new facilities and expansions?

The type of regulations we support would be a "new source review" type approach to noise, air, siting and other environmental permit requirements. The regulations will only be effective if they are retroactive, to cover sources whose applications are pending, who have not commenced construction as of today. Those facilities are on notice that more stringent regulations are being discussed, and they should be subjected to those requirements.

5. How do other states regulate or restrict peaker plants?

We have spoken to representatives of many states. Almost all of them have some degree of state level siting. Some require best available technology for all new plants, major or minor.

Illinois regulation is inadequate, and has contributed to the large volume of applications.

Respectfully submitted,

LAKE COUNTY CONSERVATION ALLIANCE

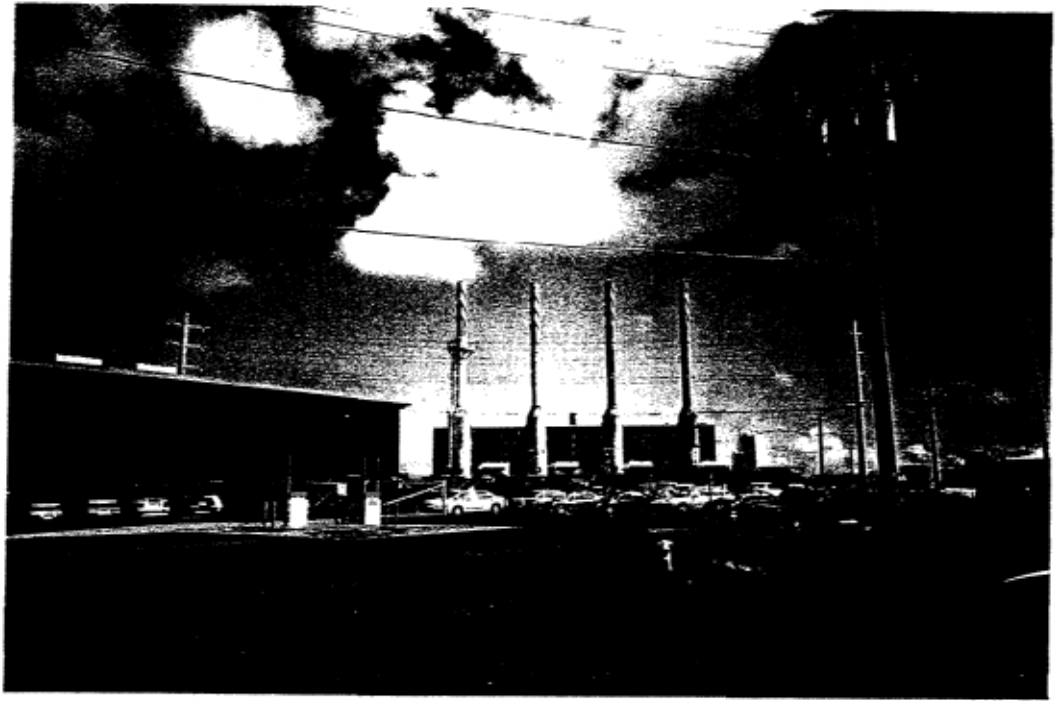


Carol L. Dorge, Attorney, LCCA

ENCLOSURES

1. Photographs

2. Illinois Attainment Demonstration



**OZONE ATTAINMENT
DEMONSTRATION
FOR THE
CHICAGO NONATTAINMENT AREA**

**Illinois Environmental Protection Agency
Bureau of Air
1021 North Grand Avenue, East
Springfield, Illinois 62794-9276**

October 6, 2000

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Executive Summary

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EXECUTIVE SUMMARY

This document updates the ozone attainment demonstration previously submitted to the U.S. Environmental Protection Agency (“U.S. EPA”) by the State of Illinois in April 1998. On December 16, 1999 (64 FR 70496, 64 FR 70514, 64 FR 70531), the U.S. EPA published notices of proposed rulemaking conditionally approving the 1-hour ozone attainment demonstration for the severe nonattainment areas (“NAA”) in northeastern Illinois, northwestern Indiana, and southeastern Wisconsin. The proposed conditional approval is based, in part, on a commitment by these States to submit an updated ozone attainment demonstration State Implementation Plan (“SIP”) and a post-1999 Rate-of-Progress (“ROP”) Plan by December 31, 2000.

Illinois has worked closely with the U.S. EPA and the States of Indiana, Wisconsin and Michigan, in cooperation with the Lake Michigan Air Director Consortium (“LADCO”), to prepare this attainment demonstration. LADCO’s modeling is considered to be an important element of Illinois’ attainment demonstration SIP submittal, the results of which are described in the following three documents:

- “Midwest Subregional Modeling: 1-Hour Attainment Demonstration for Lake Michigan Area – Summary”, LADCO, September 18, 2000.
- “Technical Support Document – Midwest Subregional Modeling: Emissions Inventory”, LADCO, September 27, 2000.
- “Technical Support Document – Midwest Subregional Modeling: 1-Hour Attainment Demonstration for Lake Michigan Area”, LADCO, September 27, 2000.

The updated attainment strategy consists of four sets of controls: (1) Federal Clean Air Act controls, (2) State ROP emission reductions, (3) the Tier II/Low Sulfur program, and (4) regional NOx controls required by U.S. EPA’s oxides of nitrogen (“NOx”) SIP Call. These controls are shown to provide for attainment of the 1-hour NAAQS throughout the Lake Michigan area by 2007, the attainment deadline specified by the Clean Air Act

("CAA"). The modeling has been performed consistent with U.S. EPA guidance. It should be noted that the NOx reductions specified by the NOx SIP Call do not impact the NOx waiver, which remains in place for the Lake Michigan area, including Chicago. The regional NOx reductions that will be obtained by the NOx SIP Call, along with the other control requirements listed above will provide for attainment of the 1-hour ozone National Ambient Air Quality Standard ("NAAQS").

The Illinois Environmental Protection Agency ("IEPA") has further refined LADCO's modeling to address two issues specific to Illinois: incorporation of a transportation conformity budget for the Chicago nonattainment area and inclusion of emissions associated with new combustion turbine electrical generating units recently permitted in Illinois. The IEPA's additional modeling is described in Chapter I of this document. The modeling performed by the IEPA demonstrates that these two issues do not alter the conclusion that the NOx SIP Call and other planned control measures will provide for attainment of the 1-hour zone NAAQS.

Section 182(b)(1) requires all ozone NAAs classified as moderate and above to submit a SIP revision to U.S. EPA which describes, in part, how the area will achieve an actual volatile organic material ("VOM") emissions reduction of at least 15% during the first six years after enactment of the CAA or by November 15, 1996. The portion of the SIP revision that illustrates the plan for achievement of this emissions reduction is referred to as the 15% Rate-Of-Progress Plan ("15% ROP Plan"). The IEPA submitted this plan to U.S. EPA on November 15, 1993, which the U.S. EPA subsequently approved on December 18, 1997. Section 182(c)(2) of the CAA requires each serious and above ozone nonattainment area to submit a SIP revision which provides for an actual reduction in ozone precursors of at least 3% per year averaged over each consecutive 3-year period, for a total reduction of 9%. This requirement began in 1997 and continues until the area attains the 1-hour ozone standard. Illinois' SIP revision that addresses this requirement in Chicago for the period 1997-1999 is referred to as the 9% Rate-of-Progress Plan ("9% ROP Plan"). The IEPA submitted this plan to the U.S. EPA on December 18, 1997. U.S. EPA has proposed to approve this plan on March 3, 2000.

Chapter II of this document addresses the ROP requirements for the remaining milestone periods from 2000 through 2007. Chapter II also addresses the requirement for contingency measures, pursuant to Section 172(c)(9) of the CAA. Contingency measures must be implemented if the nonattainment area fails to achieve the required ROP reductions or fails to attain the NAAQS within the CAA-specified timeframe.

Another component of the attainment demonstration SIP is a motor vehicle emissions budget for transportation conformity purposes. Transportation conformity is a process for ensuring that States consider the effects of emissions associated with new or improved federally-funded roadways on attainment of the standard. As described in Section 176(c)(2)(A) of the Clean Air Act, attainment demonstrations necessarily include the estimates of motor vehicle emissions that are consistent with attainment, which then act as a budget or ceiling for the purposes of determining whether transportation plans and projects conform to the attainment SIP. Each state is responsible for submitting a transportation conformity budget. In order to demonstrate conformity to the motor vehicle emission budget, emissions from the implementation of a transportation plan or transportation improvement program must be less than or equal to the budget level. The motor vehicle emissions budgets included at Chapter III of this submittal reflect 1990 levels of vehicle miles traveled in the region ("VMT"), grown to 2007 levels, and MOBILE model emissions assumptions appropriate for that year. The motor vehicle emissions budgets satisfy the criteria contained in the transportation conformity regulations.

Finally, Chapter IV of this document describes the IEPA's 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.

Chapter I

Attainment Demonstration

ATTAINMENT DEMONSTRATION

Introduction

The Illinois Environmental Protection Agency (“IEPA”) has performed a modeling analysis to be submitted as a supplement to the 1-hour ozone attainment demonstration for the Lake Michigan area prepared by the Lake Michigan Air Directors Consortium (“LADCO”) dated September 18, 2000. The additional modeling performed by the IEPA addresses two issues specific to Illinois: incorporation of a transportation conformity budget for the Chicago nonattainment area (“NAA”), and inclusion of emissions from combustion turbine electrical generating units recently permitted in Illinois.

Transportation Conformity

A detailed discussion of transportation conformity, including the establishment of motor vehicle emissions budgets for the Chicago NAA, is provided in Chapter III of this document. The attainment demonstration documentation prepared by LADCO (September 18, 2000) includes the 2007 Chicago link-based transportation network recently developed and provided to LADCO by the Chicago Area Transportation Study (“CATS”). The LADCO modeling is based on a volume of approximately 186 million vehicle miles traveled (“VMT”). Historically, the IEPA has used a higher VMT estimate for 2007 provided in the early 1990’s by the Illinois Department of Transportation (“IDOT”) based on their analysis of traffic counts in the Chicago area. The higher VMT estimates were used in previous Rate-of-Progress (“ROP”) submittals, including Illinois’ 15% ROP Plan (1993) and the 9% ROP Plan (1997). The higher VMT estimates were also included in the emissions modeling performed by the Ozone Transport Assessment Group (“OTAG”) and U.S. EPA’s NOx SIP Call modeling. The 2007 VMT estimates were generated using the actual 1990 VMT figures used in the 1990 baseyear Chicago ozone precursor emissions inventory. As described in the Chicago 15% and 9% ROP Plans, VMT was assumed to grow by 2.7% per year from 1990 to 1996, and then by 2.0% per year thereafter to 2007. The 1990 baseyear inventory included a Chicago NAA VMT estimate of approximately 140

million miles per summer weekday. Using the 2.7% growth factor for the years 1990 to 1996, and the 2.0% per year growth factor for 2000 to 2007, yields an estimate of approximately 204 million miles per summer weekday for 2007. This VMT estimate is being used to develop the 2007 motor vehicle emissions budget as described in Chapter III of this document.

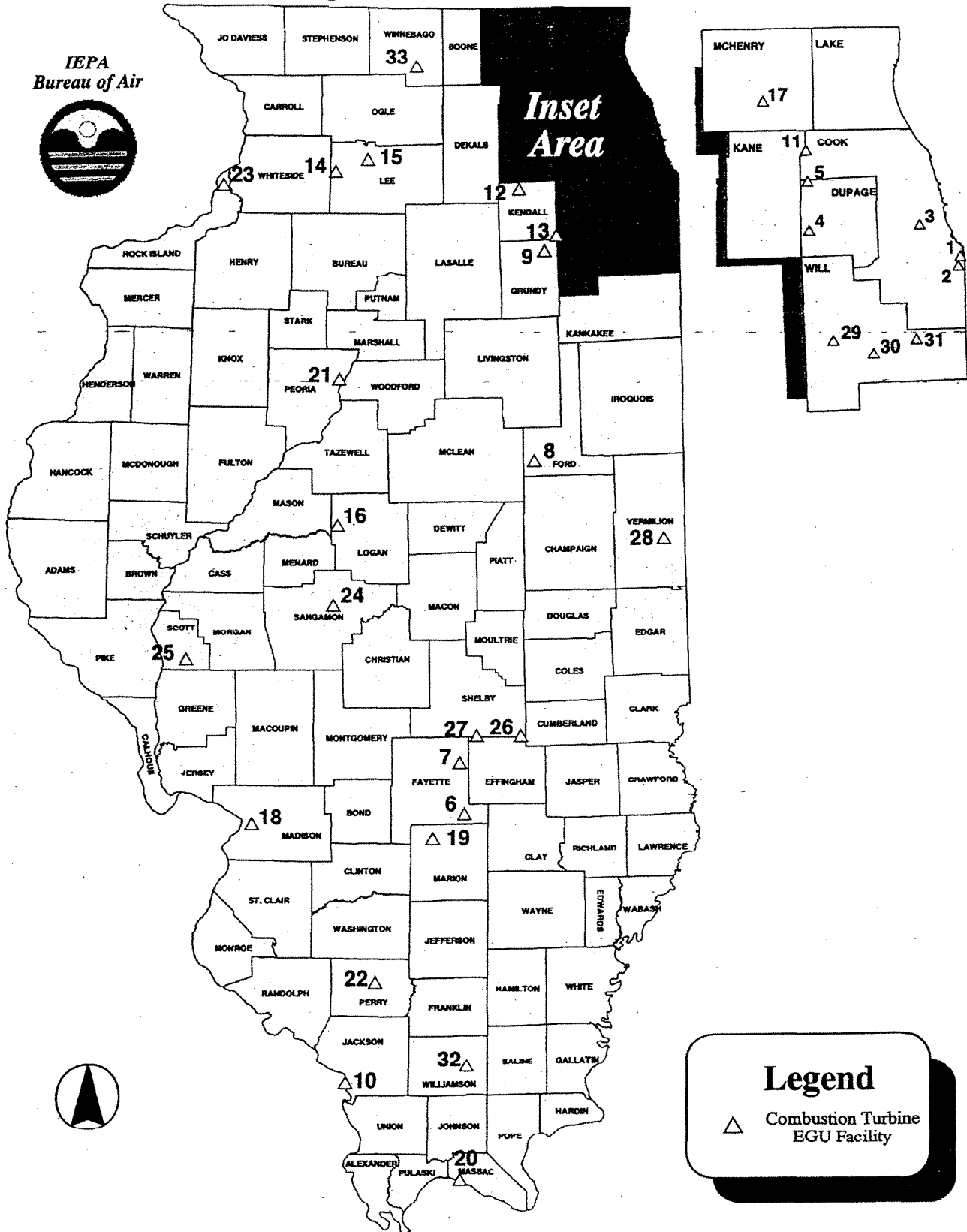
To resolve this inconsistency between previous VMT projections and the data currently used by LADCO, the IEPA is basing the budget on the results of CATS conformity analysis conducted for the year 2015. The CATS conformity analysis conducted for the year 2015 resulted in a VMT of 204.2 million miles which closely approximates the VMT level assumed in prior budgets and rulemakings. Applying MOBILE model emission factors reflecting year 2007 conditions results in a 9.4% increase in volatile organic compounds (“VOC”) and a 10.4% increase in oxides of nitrogen (“NOx”) emissions compared to the 2007 transportation network data used by LADCO. The increased emissions from motor vehicles which reflect the higher VMT levels used to establish the 2007 conformity budget were included in the present modeling analysis performed by the IEPA to verify that planned control strategies still provide for attainment of the 1-hour ozone standard.

Combustion Turbine Electrical Generating Units

The IEPA compiled a statewide inventory of recently permitted combustion turbine electrical generating units and ancillary emission sources to evaluate whether the potential ozone impacts resulting from the additional NOx, VOC and carbon monoxide (“CO”) emissions from these sources would affect LADCO’s attainment demonstration. The location of these sources is illustrated in Figure 1. Sources are indexed by site identification number to facility electrical output and emission rate information in Table 1.

Figure 1
Location of Combustion Turbine Electrical
Generating Units used in Ozone Modeling

IEPA
 Bureau of Air



*Whole state
permitted and/or
built
(as of
mid Aug)*

TABLE 1

COMBUSTION TURBINE ELECTRICAL POWER GENERATION SOURCES---SUPPLEMENTAL INVENTORY

Site ID	County	Geocode	Facility Owner-Operator <Site Location>	Electrical Output (megawatts)	Modeled Emission Rates (tons/day)		
					NOX	CO	ROG
1	Cook	031600GGV	People's Energy/Calumet Power LLC <Chicago>	276	1.677	0.654	0.124
2	Cook	031600GHA	Calumet Energy LLC <Chicago>	305	1.788	0.432	0.108
3	Cook	031600GHS	Commonwealth Edison/West Tech Turbines <Chicago>	110	1.572	0.69	0.048
4	DuPage	043407AAF	Reliant Energy <Aurora>	950	1.822	1.508	0.068
5	DuPage	043412AAH	ABB Energy Ventures/Grand Prairie Energy <Bartlett>	508	0.51	0.266	0.03
6	Fayette	051030AAD	Spectrum Energy/Central Illinois Power <St. Peter>	45	0.244	0.178	0.02
7	Fayette	051808AAK	Spectrum Energy/Central Illinois Power <St. Elmo>	45	0.244	0.178	0.045
8	Ford	053803AAL	Ameren Energy Generating Company <Gibson City>	270	1.348	0.816	0.072
9	Grundy	063800AAJ	Calpine (Morris), LLC <Morris>	182	0.811	0.225	0.004
10	Jackson	077806AAA	Ameren CIPS-Grand Tower <Grand Tower>	600	5.239	3.439	0.346
11	Kane	089425AAC	Dynegy/Rocky Road <E.Dundee>	398	2.122	1.382	0.118
12	Kendall	093801AAN	Kendall New Century Development/Enron <Plano/Yorkville>	664	1.434	2.353	0.091
13	Kendall	093808AAD	LSP Kendall Energy, LLC <Minooka>	1100	5.472	5.366	1.387
14	Lee	103814AAC	LSP Nelson Energy, LLC <Nelson>	1100	5.472	5.467	1.456
15	Lee	103817AAH	Duke Energy/Lee Generating Station <South Dixon>	640	2.28	2.208	0.076
16	Logan	107815AAC	Spectrum Energy/Logan County Power <New Holland>	135	0.734	0.536	0.136
17	McHenry	111805AAP	Reliant Energy <Woodstock>	510	0.657	0.315	0.031
18	Madison	119090AAH	Reliant Energy Cardinal, L.P. <Roxana>	634	1.026	3.902	0.529
19	Marion	121803AAA	Ameren Energy Generating Company <Patoka>	270	1.348	0.816	0.072
20	Massac	127899AAA	Electric Energy/Midwest Electric Power <Joppa>	318	2.136	0.625	0.043
21	Peoria	143810AAG	CILCO/Caterpillar (Medina Cogeneration Plant) <Mossville>	50	1.081	1.178	0.098
22	Perry	145842AAA	Ameren Energy Generating Company <Pinckneyville>	194	1.272	0.42	0.048
23	Rock Island	161807AAN	Cordova Energy Co./Mid America <Cordova>	580	0.869	2.81	0.242
24	Sangamon	167822ABG	CWLP <Springfield>	120	2	0	0
25	Scott	171851AAA	Soyland Power <Alsey>	129	3.748	1.297	0.209
26	Shelby	173801AAA	Reliant Energy (Shelby Energy Center) <Sigel>	328	1.92	1.872	0.004
27	Shelby	173807AAG	Constellation Power/Holland Energy LLC <Beecher City>	680	0.752	2.494	0.286
28	Vermilion	183090AAE	Dynegy Midwest Generation, Inc. <Tilton>	176	0.984	0.648	0
29	Will	197808AAG	Peoples Energy Resrcs Corp. (McDowell Energy Cntr) <Elwood>	3100	5.235	6.08	0.176
30	Will	197811AAH	DesPlaines Greenland/Enron <Manhattan>	831	1.432	2.35	0.091
31	Will	197899AAB	Univ Park Energy LLC/Constellation Power <University Park>	300	1.684	1.022	0.129
32	Williamson	199856AAK	Reliant Energy (Williamson Energy Center) <Crab Orchard>	328	1.92	1.872	0.004
33	Winnebago	201030BCG	Indeck-Rockford <Rockford>	300	1.038	0.632	0.096

These combustion turbine units include “combined-cycle” installations for providing base load and intermediate to peak load production, as well as “simple-cycle” installations for providing peak load generating capacity (so-called “peaker plants”). Some of the combustion turbine units have been built to replace existing industrial and utility boilers (Caterpillar (Mossville), Wood River Refinery (Roxana), and Ameren (Grand Tower)), and others have been constructed to reduce existing boiler usage (Electric Energy (Joppa) and Calpine/Equistar (Morris)). Boilers replaced by turbines have been removed from the inventory. Modeled emission rates were reduced for boilers operating at reduced levels so as to avoid double-counting. Ancillary equipment such as fuel gas heaters, auxiliary boilers, a gas-fired chiller, and diesel generators were also included in the inventory.

Modeled emission rates and operating parameters (exhaust temperature, velocity, and flow rate) generally reflect vendor performance specification data for the maximum ambient temperature (from meteorological records) or an average maximum temperature. Since peaking units typically operate when ambient temperatures are high this approach is reasonable. Modeled emission rates are based upon the turbines at 100% load. Simple cycle combustion turbines were assumed to operate for 12 hours (from 7AM to 7PM) and combined cycle combustion turbines were assumed to operator for 24 hours (uniform distribution of emissions).

Modeling Methodology

The IEPA has performed additional modeling to supplement the 1-hour ozone attainment demonstration prepared by LADCO to address transportation conformity, and recently permitted combustion turbines. The LADCO strategy modeling which reflects the NOx SIP Call, and other mandated control measures including Tier II motor vehicle standards, Low Sulfur gasoline requirements, the Enhanced Inspection and Maintenance program, and Phase II Reformulated Gasoline, is the basis for IEPA’s attainment demonstration. This scenario is referred to in LADCO’s September 18, 2000 report as “Strategy Run 16” or “SR16”.

The first modification to LADCO's emissions inventory for SR16 reflects the increase in future year VMT levels in the Chicago NAA counties consistent with previous Rate-of-Progress submittals. Motor vehicle NOx emissions used for modeling were increased 9.4%, VOC emissions were increased 10.2%, and CO emissions were increased 10.0% from the emissions levels used by LADCO. The increases approximate the increases in emissions to reflect the transportation conformity budget as described in Chapter III of this document.

The second modification to LADCO's emissions inventory for SR16 was to explicitly include all combustion turbine electrical generating facilities permitted in Illinois. Of all the peaking units currently permitted, only a few have actually been built. It is important to note that the combustion turbines will be subject to the NOx emission allowance limits provided by the NOx SIP Call. It is expected that statewide NOx emissions for sources subject to the NOx SIP Call generally will not exceed the allocated allowances. To ensure conservatism of the modeling results, the IEPA has added the projected emissions from the combustion turbines to the inventory of emission sources without offsetting these increases with decreases from other sources. In other words, emissions from peakers were modeled *in addition to* the NOx emissions levels represented by the NOx SIP Call scenario, even though they will have to operate within the emission constraints provided by the NOx SIP Call.

Other than the inventory adjustments mentioned above, the IEPA's supplemental modeling used the same modeling approach used by LADCO. The Urban Airshed Model, Version 1.24 ("UAM-V") was used for the analysis. The modeling domain, referred to as Grid M, was used at a grid resolution of 12 kilometers. The IEPA's modeling is based on the July 1991 ozone episode, which proved to be the controlling episode in LADCO's modeling analysis.

Modeling Results

The U.S. EPA's current modeling guidance (1996) allows two attainment tests: a deterministic test and a statistical test. These tests are applied to the results of the

modeling to determine whether the modeled strategy is sufficient to demonstrate attainment. The deterministic test is passed if the daily maximum concentrations predicted in each surface grid cell are < 125 ppb for all primary episode days. LADCO's results show that the deterministic test is not met by any of the tested strategies including the NOx SIP Call scenario (SR16). Thus, LADCO relied on the statistical test to demonstrate attainment of the 1-hour ozone NAAQS.

The statistical approach permits occasional exceedances and reflects an approach comparable to the form of the 1-hour NAAQS. The statistical approach includes three benchmarks related to the frequency and magnitude of allowed exceedances and the minimum level of improvement. The first benchmark limits the number of modeled exceedances in each grid cell (less than 3). The second benchmark limits the magnitude of the peak concentration of the exceedances, depending on the severity of meteorological conditions on the exceedance days. The third benchmark requires a minimum level of improvement on the modeled exceedance days. The number of grid cells \geq 125 ppb must be reduced by 80% on each severe day. This benchmark is included to provide protection in cases where the model underpredicts observed ozone concentrations.

LADCO has shown that the modeled results for SR16, the NOx SIP Call, satisfy U.S. EPA criteria using the statistical attainment test. The first benchmark is passed since the maximum number of exceedance days for SR16 is 1 for any grid cell, and the modeled exceedances all occur on days considered to be severe in terms of ozone conducive meteorological conditions. The second benchmark is passed, since the maximum modeled concentrations on severe days are less than the allowed values. The most restrictive day, or the episode day which comes closest to the allowed value, was July 20, 1991. The maximum modeled concentration on this day, 128.9 ppb, is less than the allowed value, 130 ppb, thereby satisfying the second benchmark. LADCO has also shown that the number of grid cells exceeding 124.9 ppb, the level of the 1-hour ozone NAAQS, have been reduced by more than 80% on each severe day, which passes the third benchmark. LADCO concluded that the results from SR16 satisfy U.S. EPA's

statistical attainment test, and therefore, adequately demonstrate that the modeled strategy provides for attainment of the 1-hour ozone standard in the Lake Michigan region.

The results of IEPA's supplemental modeling are shown in Table 2, and depicted graphically in Figures 2, 3, and 4. Table 2 compares the daily peak 1-hour ozone concentrations from LADCO's modeling for SR16 to the results from IEPA's modeling. Daily peak 1-hour ozone concentrations are predicted to increase 1-2 ppb as a result of IEPA's modifications to LADCO's emissions inventory for SR16. The peak values are well below the level of the NAAQS, 124.9 ppb, for 4 of the 5 days tested. On July 20th, both LADCO's and IEPA's modeling predicted an exceedance of the ozone standard. As discussed previously, the results for this day are still consistent with a demonstration of attainment as long as the peak concentration does not exceed 130 ppb. The results from LADCO's SR16 scenario is below the allowed value, and just meets the allowed value for IEPA's supplemental modeling. U.S. EPA's attainment benchmark is therefore passed for both model runs.

Table 2
Comparison of Peak Predicted 1-Hour Ozone Concentrations –
LADCO “SIP Call Scenario” (SR16) and IEPA Supplemental Modeling

Episode Day	LADCO SR16	IEPA Supplement
7-16-91	103	104
7-17-91	89	90
7-18-91	109	109
7-19-91	111	113
7-20-91	128	130

Figure 2 shows the peak daily ozone concentrations projected for each day of the July 1991 ozone episode based on LADCO's NOx SIP Call (SR16) scenario for the year 2007. Ozone concentrations exceeding 100 ppb are indicated over Lake Michigan and some on-shore areas on most of the days examined. Peak concentrations exceeding 115 ppb are indicated on only one episode day, July 20. The modeled peak concentration for this day is 128.9 ppb, which slightly exceeds the level of the 1-hour ozone standard,

124.9 ppb. As discussed previously, the modeled exceedance on this day is within the limits specified by U.S. EPA's statistical attainment test.

Figure 3 shows the peak daily ozone concentrations projected for the same episode days based on IEPA's supplemental modeling results. The spatial patterns for each day are similar to the results from LADCO's SR16 modeling (see Figure 2), indicating that there are not substantial differences in the model's response for these two scenarios.

Figure 4 shows the differences in peak daily ozone concentrations resulting from the emissions changes in Illinois' supplemental modeling. Yellow and red contours indicate ozone increases in response to the emissions changes, whereas areas shown in blue indicate ozone decreases in response to the emissions changes. The results indicate that the changes in emissions in IEPA's supplemental modeling cause both ozone increases and ozone decreases. The ozone decreases in the range of 1-3 ppb occur on a few days in limited areas. Ozone increases on the order of 2-4 ppb are indicated on all episode days, and occur over relatively large areas. The resultant concentrations on these days are still below the allowed concentration thresholds. It is concluded from this analysis that the results of IEPA's supplemental modeling do not significantly affect LADCO's SR16 modeling scenario. Both LADCO's and IEPA's modeling results pass U.S. EPA's attainment criteria. The results of this scenario indicate that the control measures contained in Illinois' attainment demonstration are adequate to provide for attainment of the 1-hour ozone standard.

Figure 2

Daily Peak Ozone from LADCO Strategy Run 16

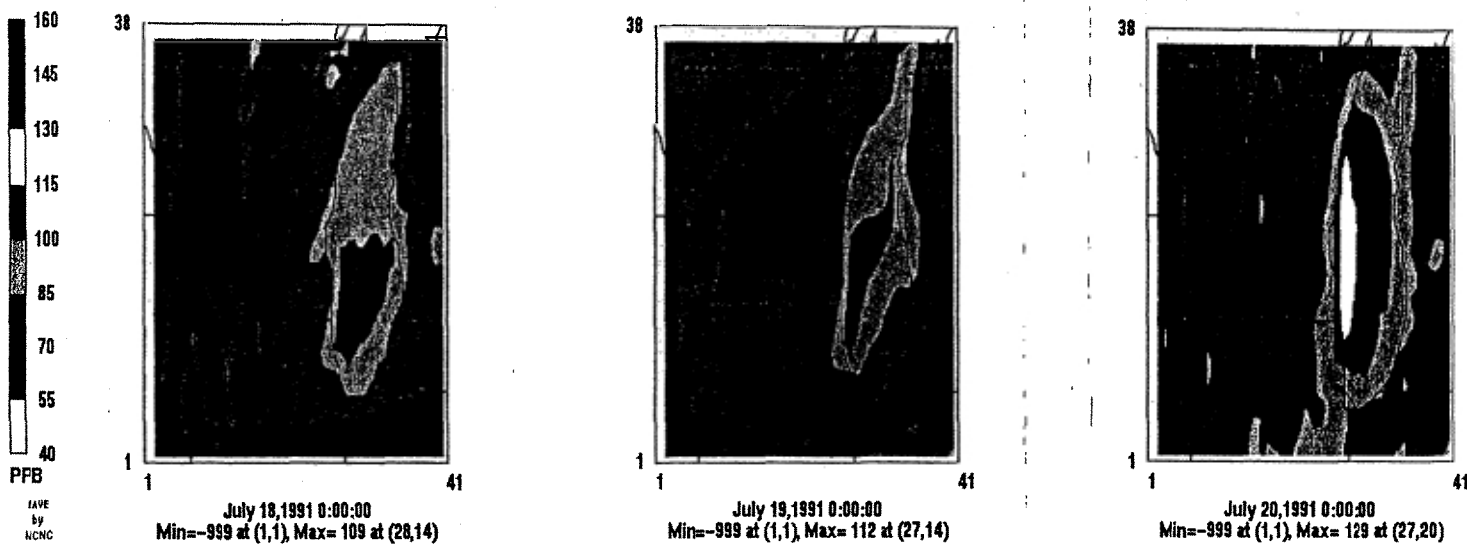
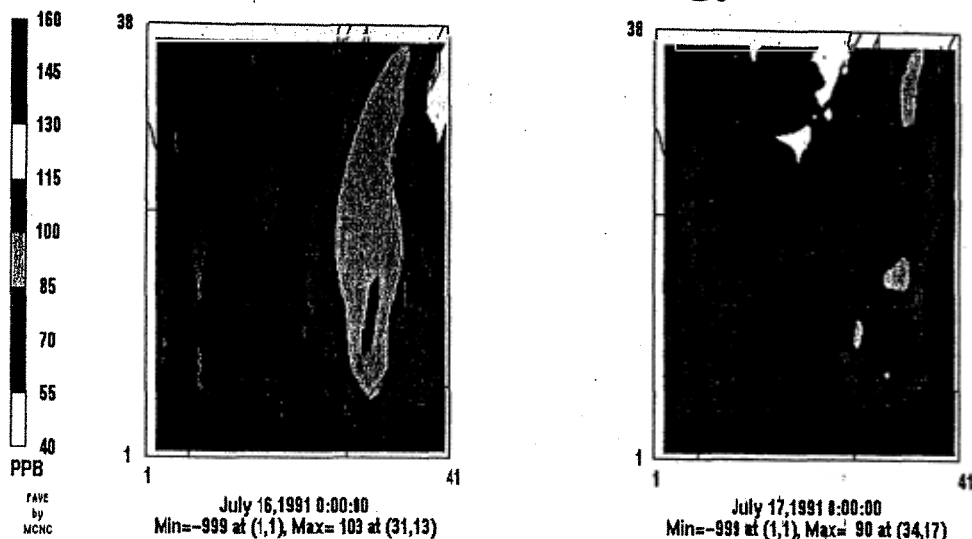


Figure 3

Daily Peak Ozone from Revised LADCO Strategy Run 16

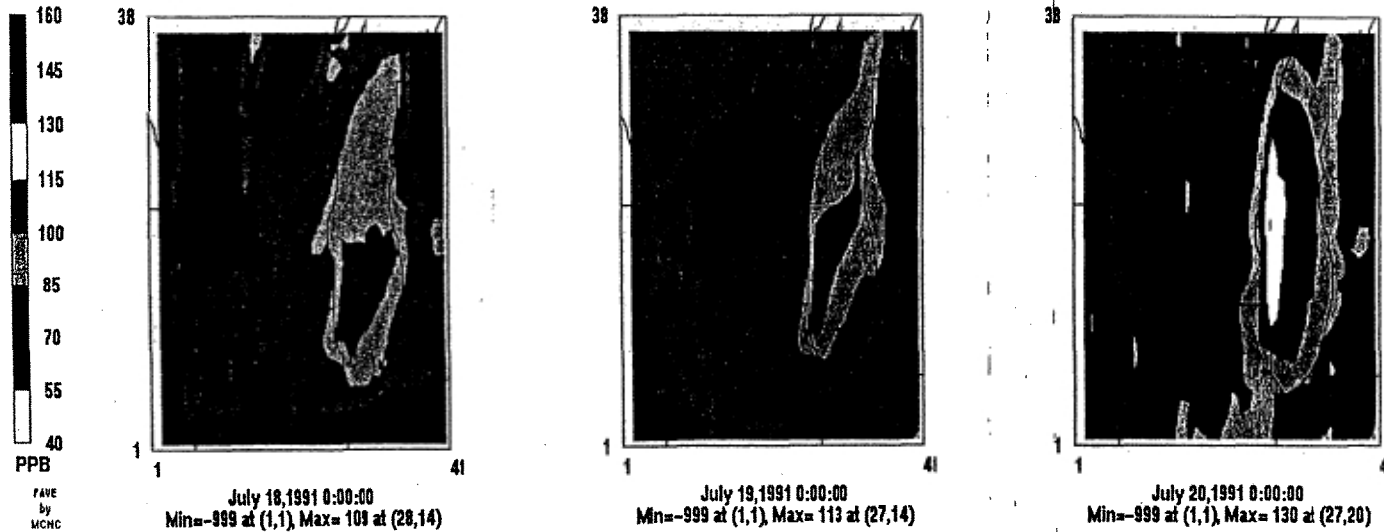
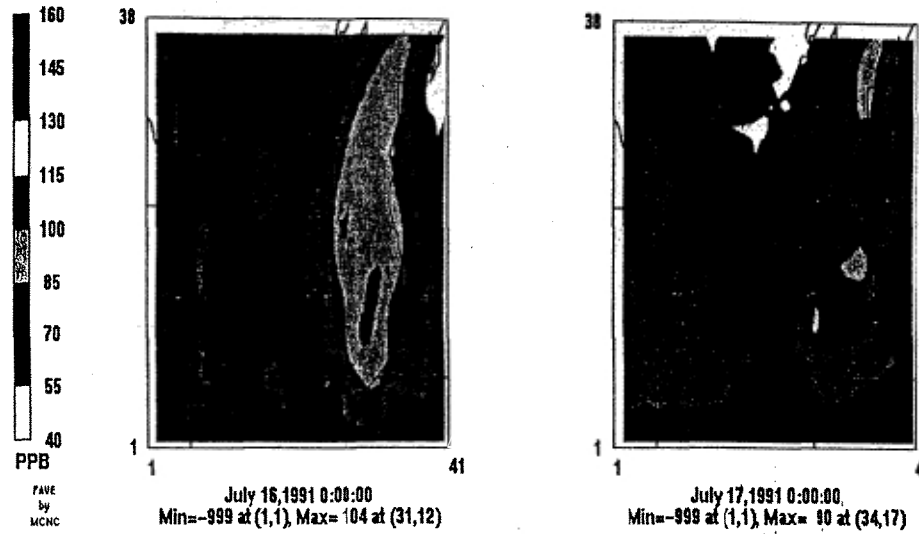
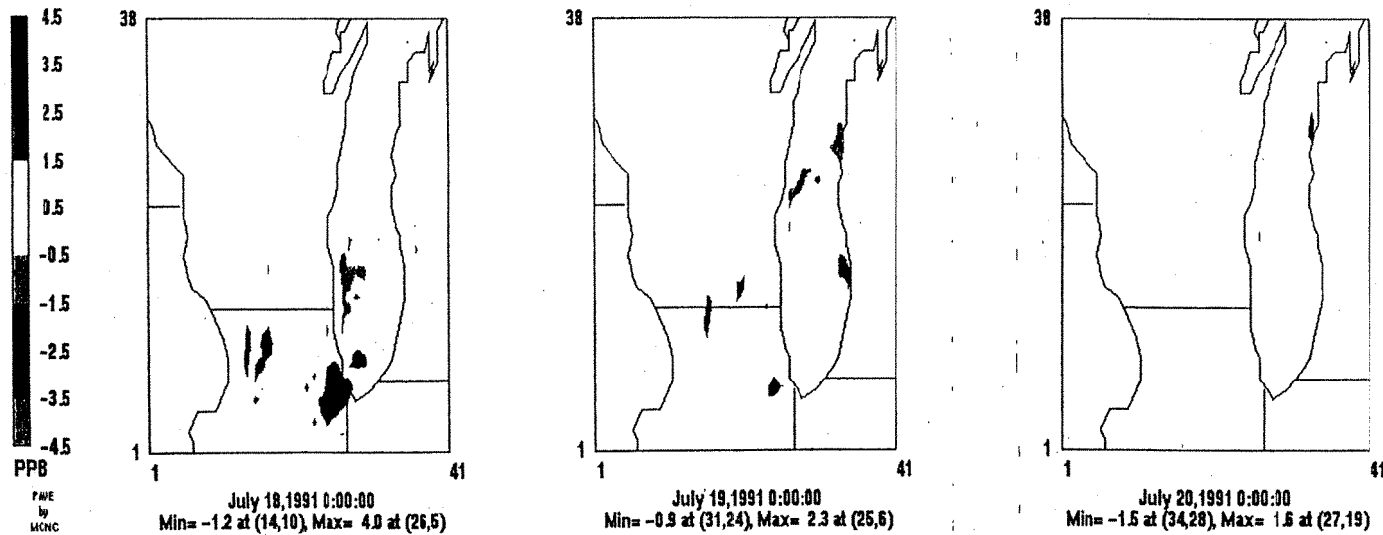
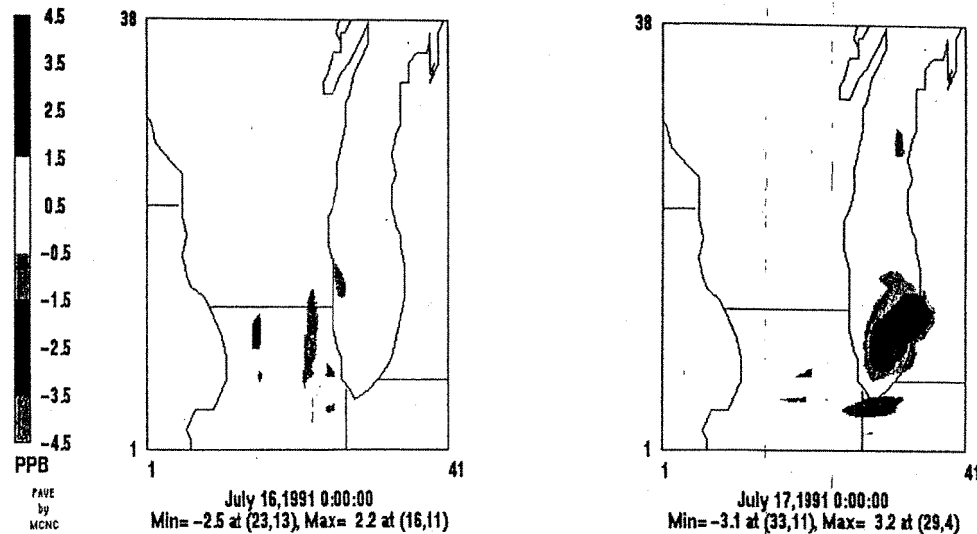


Figure 4

Difference between LADCO Strategy Run 16 & Revised Strategy Run 16



Chapter II

Rate-of-Progress and Contingency Measures

RATE-OF-PROGRESS AND CONTINGENCY MEASURES

Introduction

Section 182(b)(1) requires all ozone nonattainment areas ("NAAs") classified as moderate and above to submit a State Implementation Plan ("SIP") revision to U.S. Environmental Protection Agency ("U.S. EPA") which describes, in part, how the area will achieve an actual volatile organic material ("VOM") emissions reduction of at least 15% during the first six years after enactment of the Clean Air Act ("CAA") or by November 15, 1996. The Chicago ozone nonattainment area is a severe area and is therefore subject to this requirement. The portion of the SIP revision that illustrates the plan for achievement of this emissions reduction is referred to as the 15% Rate-Of-Progress Plan ("15% ROP Plan"). Illinois Environmental Protection Agency ("IEPA") completed the 15% ROP Plan for Chicago in October 1993 and submitted it to U.S. EPA on November 15, 1993. U.S. EPA approved the Illinois 15% ROP Plan on December 18, 1997.

Section 182(c)(2) of the CAA requires each serious and above ozone nonattainment area to submit a SIP revision which provides for an actual reduction in ozone precursors of at least 3% per year averaged over each consecutive 3-year period, for a total reduction of 9%. This requirement began in 1997 and continues until the area attains the 1-hour ozone standard. Illinois' SIP revision that addresses this requirement in Chicago for the period 1997-1999 is referred to as the 9% Rate-of-Progress Plan ("9% ROP Plan"). The IEPA prepared the 9% ROP Plan for Chicago in the fall of 1997 and, following an October 24, 1997, public hearing submitted the plan to the U.S. EPA on December 18, 1997, as a revision to the Illinois SIP.

Since that submittal, a number of actions have occurred which impacted the 9% ROP Plan and resulted in IEPA supplementing the originally submitted plan. Some of these actions stemmed from U.S. EPA issuing a revised policy regarding implementation of the 1-hour National Ambient Air Quality Standards ("NAAQS") for ozone. Other actions involved changes in VOM emissions reduction credit allowed by U.S. EPA. In addition,

delays in the implementation of several federal and state regulatory programs necessitated an adjustment to the reduction credit previously claimed in the 9% ROP Plan. On January 18, 2000, IEPA held a public hearing in Chicago for the purpose of gathering public comment on its supplement to the 9% ROP Plan for Chicago to address these issues. The hearing also addressed the establishment of motor vehicle emissions budgets for the year 2007 and a commitment that Illinois made with respect to attainment planning for the Northeastern Illinois ozone nonattainment area. After reviewing the comments from the hearing, IEPA made adjustments to its draft "Supplement to 9% Rate-of-Progress Plan for the Chicago Ozone Nonattainment Area 1997-1999" document to reflect the comments received. Details of the comments received and the IEPA's response may be found in its "Response to Comments" document. The final 9% ROP Plan for the 1997-1999 period was submitted to the U.S. EPA on February 17, 2000, and demonstrates that the federal ROP requirements were met. U.S. EPA proposed approval of Illinois' 9% ROP Plan on March 3, 2000.

This section addresses the ROP requirements for the remaining milestone periods through 2007, the year of attainment.

Rate-Of-Progress Analysis

The condition for meeting the rate-of-progress requirement is that the sum of all creditable VOM and NOx emission reductions must equal 3% per year averaged over each applicable milestone period. The VOM reduction is determined from the VOM rate-of-progress inventory, and the NOx reduction is determined from the NOx rate-of-progress inventory.

If a State plans to substitute NOx reductions for VOM reductions, separate target level(s) of emissions must be calculated for both NOx and VOM. The target levels of emissions represent the maximum amount of emissions allowed in each post-1996 milestone year in order to meet the 3% per year rate-of-progress requirement. Illinois' post-1996 ROP plans rely on both NOx and VOM reductions to satisfy its ROP requirements. IEPA found that a combination of 2% VOM reductions from the Chicago NAA and 7% NOx

reductions from the statewide attainment area was sufficient to satisfy its 1997-1999 9% ROP requirement for Chicago. IEPA has determined that this approach also satisfies the ROP requirements for the remaining ROP milestone years of 2002 through 2007. Illinois is therefore relying on this same combination of NAA VOM reductions (2%) and attainment area NOx reductions (7%) to meet the remaining Chicago NAA ROP requirements.

The U.S. EPA prescribed methodology for determining the NOx and VOM target levels based on Section 4.0 of its Guidance Document is explained in the IEPA's 9% ROP SIP document. Specifically, Section IV in the "SUPPLEMENT TO 9% RATE-OF-PROGRESS PLAN FOR THE CHICAGO-OZONE NONATTAINMENT AREA 1997-1999" dated February, 2000 (IEPA document AQPSTR 1-00), contains the detailed information and data necessary to calculate the target levels for both VOM and NOx for each periodic milestone year from 1999 through 2007. Table 1 summarizes these target levels. As stated above, the VOM target levels are based on the Chicago ozone NAA, while the NOx target levels are based on the statewide attainment area.

Table 1
Chicago ROP Target Levels
Tons per Day ("TPD")

Pollutant	1999	2002	2005	2007
VOM	807.82	770.11	740.92	729.13
NOx	1820.51	1657.23	1514.41	1412.76

In order to determine whether the ROP requirements are met, an analysis must be completed to estimate the impact of the emissions reduction strategy on each milestone period emissions level and compare that to the ROP target level. Illinois' emissions reduction strategy, as contained in its attainment demonstration for Chicago, couples local NAA VOM reductions described in the 9% ROP Plan with statewide NOx emission reductions per the federal NOx SIP Call. Details of the VOM emissions reduction programs are described in the 9% ROP Plan. In addition to these programs, the Emissions Reduction Market System ("ERMS"), the enhanced inspection and

maintenance system ("EI/M"), and the reformulated gasoline ("RFG") Phase II program are fully operational in the 2002 milestone year. Reductions from these programs in the 9% ROP Plan were previously delayed or substantially reduced due to delays in their implementation. Also, Phase 2 of Illinois' cold cleaning degreasing rule becomes effective in 2001, which will provide 11.68 TPD of VOM reductions in the Chicago NAA.

In regard to NOx emissions reductions, Illinois is complying with the federal NOx SIP Call and is adopting controls for large electrical generating units ("EGUs"), large non-EGUs, and large cement kilns. Control of NOx emissions from these sources will begin in 2004. NOx reductions in 2007 from application of these control requirements to those sources located in the ozone attainment area have been determined to be 432 TPD from the EGUs, and 21 TPD from the non-EGUs, including the cement kilns. These reductions were required pursuant to the federal NOx SIP Call and are consistent with U.S. EPA's NOx control requirements and reduction amounts. These reductions are in addition to the NOx controls described in the 9% ROP Plan. Details of the NOx SIP Call controls can be found in the IEPA Technical Support Documents ("TSD") for the large EGU, non-EGU, and cement kilns rulemakings. Details of the previously relied upon NOx control programs can be found in IEPA's 9% ROP Plan.

IEPA has relied on its emissions inventory developed for the OTAG transport project, and updated for the NOx SIP Call, to estimate the impact of these emissions control strategies. This inventory was used in the development of the 9% ROP Plan, and was the basis for the modeling inventory used in the Chicago NAA attainment demonstration. The 9% ROP Plan inventory has been updated to include the reductions from the additional above-mentioned programs to determine compliance with the remaining ROP milestone target levels. Table 2 summarizes the emissions levels for VOM for the Chicago ozone NAA and for NOx for the ozone attainment area incorporating the control strategies included in the attainment demonstration for each milestone year and the associated target levels for that year. The results demonstrate that Illinois' attainment strategy satisfies federal ROP requirements.

Table 2
Chicago 1999-2007 ROP Assessment
Tons per Day ("TPD")

Ozone Nonattainment Area:

VOM	1999	2002	2005	2007
Controlled Level	772.72	678.23	654.33	644.24
ROP Target Level	807.82	770.11	740.92	729.13

Attainment Area:

NOx	1999	2002	2005	2007
Controlled Level	1632.81	1538.77	1067.78	1043.08
ROP Target Level	1820.51	1657.23	1514.41	1412.76

Contingency Measures

As explained in the 9% ROP Plan, an additional 3% reduction in emissions must be provided per Section 182(c)(9) of the CAA as a buffer that must be maintained through each ROP milestone. Illinois will provide all of the necessary contingency measure reductions from VOM emissions in the Chicago ozone nonattainment area. As determined in the 9% ROP Plan analysis, the contingency measure requirement is 31.11 TPD of VOM emissions. As in past ROP Plans, Illinois is including this amount of reduction along with the required creditable reduction amount, to determine the total required ROP VOM reduction amount. Illinois has adopted a single control plan which includes all necessary measures and which will provide the total reductions needed for ROP and contingency. U.S. EPA has found this approach to be acceptable in its previous approval of the Illinois 15% and 9% ROP Plans.

Based on a comparison of the ROP Target Level and the controlled level of VOM emissions as shown in Table 2, the amount of contingency provided is 35 TPD, 92 TPD, 87 TPD, and 85 TPD for each of the milestone years from 1999 to 2007. (The 1999 contingency amount has already been proposed for approval by the U.S. EPA in the Illinois 9% ROP Plan). These amounts all exceed the minimum 31 TPD required for contingency by the CAA.

Therefore, Illinois' attainment strategy satisfies the contingency requirement of the ROP provisions. Although not required, Illinois' attainment strategy also provides for NOx contingency emissions of 188 TPD, 118 TPD, 446 TPD, and 370 TPD for each of the milestone years from 1999-2007, respectively. In addition, Illinois expects to also control large internal combustion engines after the U.S. EPA repromulgates NOx emissions standards for this category of NOx sources. The NOx SIP Call control requirements for this category were remanded back to U.S. EPA for reconsideration by a federal court in response to a lawsuit over the NOx SIP Call.

Chapter III

Transportation Conformity

TRANSPORTATION CONFORMITY

Introduction

The purpose of this document is to establish and describe the emissions budgets for the year 2007 for volatile organic compounds (“VOC”) and oxides of nitrogen (“NOx”) motor vehicle emissions in the Chicago ozone nonattainment area. These budgets were developed consistent with the motor vehicle emissions control strategies included in this attainment demonstration submittal. The budgets reflect an emissions level determined using projected vehicle miles traveled (“VMT”) for the attainment year, 2007, derived from transportation modeling data prepared by the Chicago Area Transportation Study (“CATS”), in cooperation with the Illinois Department of Transportation (“IDOT”). The projected VMT levels are consistent with the VMT used in previous attainment plan submittal and with the Chicago “15%” and “9%” Rate-of-Progress State Implementation Plans (“SIP”) submittals.

Background

A motor vehicle emissions budget is that portion of the total allowable VOC and NOx emissions allocated to highway and transit vehicle use that are defined in the SIP for a certain date. 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 Clean Air Act (“CAA”) requirements of reasonable further progress and attainment.” In order to demonstrate conformity to the motor vehicle emissions budget, emissions from the implementation of a transportation plan or a transportation improvement program must be less than or equal to the budget level (40 CFR § 93.118(a)).

Transportation conformity will be based on these submitted motor vehicle emissions budgets after the U.S. Environmental Protection Agency ("U.S. EPA") declares 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 criterion under § 93.118(e) are 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 EPA; and EPA's stated concerns, if any, were addressed;
- 3) The motor vehicle emissions budgets(s) is clearly identified and precisely quantified;
- 4) The motor vehicle emissions budget(s), when considered together with all other emission sources, is consistent with all applicable requirements for reasonable further progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission);
- 5) The motor vehicle emissions budget(s) is consistent with and clearly related to the emissions inventory and the control measures in the submitted control strategy implementation plan revision or maintenance plan, and
- 6) Revisions to previously submitted control strategy implementation plans explain and document any changes to previously submitted budgets and control measures, impacts on point and area source emissions; any changes to established safety margins; and reasons for the changes (including the basis for any changes related to emission factors or estimates of vehicle miles traveled).

The required public hearing to accept public comment on the proposed motor vehicle emissions inventory is scheduled for 10:00 p.m., November 8, 2000 at the James R. Thompson Center in downtown Chicago. Notification of this hearing was printed in the "Chicago Sun Times" on October 9, 2000 and a copy of that notice will be included with the final version of this submittal. After the close of the public hearing

comment period, a "Responsiveness Summary" will be prepared addressing any comments received.

In compliance with adequacy criterion #2, a Tier II Interagency Consultation meeting was held on October 4, 2000. 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. Concerns raised by the U.S. EPA regarding the inclusion of Transportation Control Measures were addressed through an expanded discussion of this program with this document.

Compliance with the remaining adequacy criteria is contained within the narrative of the attainment demonstration document and this transportation conformity section.

The 2007 Attainment Demonstration

In April 1998, the Illinois Environmental Protection Agency ("IEPA"), along with the States of Indiana, Michigan and Wisconsin, submitted a Phase II attainment plan for the Lake Michigan area. The technical analysis that was included in the submittal indicated the States will be able to attain the 1-hour ozone National Ambient Air Quality Standard ("NAAQS") in the region. In November 1999, the U.S. EPA required that motor vehicle emissions budgets consistent with the April 1998 Attainment Plan be submitted by December 31, 1999. These budgets were also required to be determined "adequate" by U.S. EPA by May 31, 2000.

The motor vehicle emissions budgets established and described herein were developed consistent with the methodology and control strategy assumptions used in the Phase II Attainment Demonstration and both the Chicago 15% Rate of Progress ("ROP") Plan and the 9% ROP Plan submittals. They rely on the mobile source control measures included in the ROP plans, and continuing implementation of national control measures. Emission control measures specific to motor vehicle emissions which have

been included in the respective ROP plans and the Phase II attainment demonstration include:

- Vehicle emission standards: the 1990 Federal Motor Vehicle Control Program, Tier I engine standards, the National low emission vehicle ("NLEV") program, Tier II engine standards and gasoline sulfur limits, and the U.S. EPA heavy duty diesel engine emission requirements.
- Vehicle Inspection and Maintenance ("I/M"): the 1990 program, the 1992 improvement to the program, and the 1999 implementation of the enhanced I/M program.
- Fuel requirements: the Phase I reformulated gasoline ("RFG") program in 1995, Phase II RFG which began in 2000, and the CAA-required use of gasoline detergent additives.

To maintain consistency, the 2007 Chicago nonattainment area motor vehicle emissions budgets were determined using the same inputs and methodologies used in previous ROP submittals. These assumptions were also included in the emissions modeling performed by the Ozone Transport Assessment Group ("OTAG"), which were part of the April 1998 attainment demonstration submittal. These inputs include the methodology for estimating VMT, use of temperatures and other appropriate MOBILE model inputs to reflect Chicago area conditions and emission control programs. The 2007 VMT estimates were generated using the actual 1990 vehicle miles traveled figures used in the 1990 baseyear Chicago ozone precursor emissions inventory. As described in the Chicago 15% and 9% ROP, VMT was assumed to grow by 2.7% per year from 1990 to 1996, and then by 2.0% per year thereafter to 2007. The 1990 baseyear inventory included a Chicago NAA VMT estimate of 140,350,076 miles per summer weekday. Using the 2.7% growth factor for the years 1990 to 1996, and the 2.0% per year growth factor for 2000 to 2007, yields an estimate of approximately 204 million miles per summer weekday for 2007. This VMT estimate is being used to develop the 2007 motor vehicle emissions budget.

The attainment demonstration documentation prepared by LADCO includes the 2007 Chicago link-based transportation network provided by CATS. The LADCO modeling is based on a volume of approximately 186 million VMT. To resolve this inconsistency between previous VMT projections and the data currently used by LADCO, the IEPA is basing the budget on the results of CATS conformity analysis conducted for the year 2015. The CATS conformity analysis conducted for the year 2015 resulted in a VMT of 204.2 million miles applying MOBILE model emission factors reflecting year 2007 conditions resulting in a 10% increase in both VOC and NOx emissions compared to the 2007 transportation network. This analysis incorporates the increased VMT impact on congestion and vehicle speeds. This motor vehicle emissions increase was input into the emission model and included in the attainment demonstration.

Motor Vehicle Emission Reduction Program

Consistent with the April 1998 Attainment Plan submittal, the proposed motor vehicles emissions budgets assume the presence of several emission control programs the benefits of which are quantified using the U.S. EPA motor vehicle emissions model, MOBILE5b. These emission control programs assumed in the Attainment Plan included an enhanced vehicle inspection and maintenance program, the use of federal reformulated gasoline, and the phase-in of the national Tier 1 vehicle standards, the national low emission vehicle standards and the national heavy duty diesel engine emission standards. In addition to these measures the attainment demonstration and the motor vehicle emissions budgets proposed herein also include benefits from the U.S. EPA national Tier II motor vehicle emissions program. This program was adopted by U.S. EPA in December 1999, subsequent to the submittal of the Attainment Plan motor vehicle emissions budgets. This program establishes more stringent engine emission standards, especially for NOx emissions, and includes a limit on the sulfur content in gasoline. According to U.S. EPA guidance, this program will provide approximately a 2.5% reduction in VOCs and a 10.5% reduction in NOx emissions in the year 2007. These benefits have been incorporated into both the Attainment Demonstration and the

proposed motor vehicle emissions budgets. Following is a description and explanation of the MOBILE model inputs describing these control programs.

Motor Vehicle Emission Controls: The primary Chicago area-specific motor vehicle emission control programs that will be in place in 2007 are an enhanced vehicle I/M program and the required use of reformulated gasoline.

Inspection and Maintenance: The I/M inputs reflect the 2007 I/M program in Illinois: biennial Enhanced I/M at full outpoints for newer vehicles older than 4 years; biennial regular I/M for older (pre-'81) vehicles; partial pressure test credit for gascap check but no other anti-tampering check and no purge test. Since not 100% of the VMT in a county comes from vehicles that are required to undergo I/M testing, estimates of I/M coverage for each county are used when calculating emissions by county, functional class and vehicle type. The I/M coverage factors are 98% for Cook and DuPage Counties, 60% for Kane, 95% for Lake, 50% for McHenry, and 65% for Will. The corresponding factors for the nonattainment townships of Grundy and Kendall Counties are 25% and 81%, respectively. These percentages were used to estimate average countywide emission factors from the I/M and no-I/M outputs.

Reformulated Gasoline: Chicago is one of nine cities required by the Clean Air Act to use reformulated gasoline. Phase I of the program began in 1995, with Phase II starting in January 2000. U.S. EPA estimates that the use of Phase II reformulated gasoline will reduce summertime VOC and NO_x emissions by 25% and 7%, respectively, from 1990 levels. The emission reduction benefits from the use of this cleaner burning fuel are accounted for through the MOBILE model.

Other Emission Reduction Programs

In addition to these measures, several other programs are in place in the Chicago area which provide emission reduction benefits which are not calculated by the MOBILE model. These include the implementation of transportation control measures ("TCMs"), and the use of clean fuels and vehicles resulting from the implementation of the Energy Policy Act of 1992 ("EPAct") and the State Clean Fuel Fleet Program. The Chicago nonattainment area 15% and 9% ROP SIPs have included a 2.0 ton per day credit for the implementation of TCMs. However, the effect of individual TCM projects is not significant enough to be captured by the regional transportation network model. Therefore, off-model emissions benefits analyses are performed by project implementers after such projects have been completed or put into operation. These

analyses are compiled by the CATS and periodically submitted to IEPA. These documents serve as documentation in support of the SIP credit taken in the ROP plans.

Further VOC emission reduction benefits from TCMs are expected to occur within the 2007 attainment demonstration timeframe. The IEPA is relying on an 8.0 ton per day VOC emission reduction benefit from implemented TCM projects and programs between 1990 and 2007. The 2007 VOC motor vehicle emission budget reflects this emission reduction benefit.

Two additional programs which achieve VOC emission reductions from the motor vehicle fleet and the Clean Fuel Fleet Program and Federal Alternative Fuel Usage requirements of the NEPA. The Clean Fuel Fleet Program requires motor vehicle fleet operators to purchase a set percentage of vehicles which, at a minimum, meet the low emission vehicle emission standards. It is estimated that this program will achieve a 2.8 ton per day reduction in VOC emission in 2007. The NEPA requires government agencies to purchase a certain percentage of vehicles which operate on alternative fuels. The use of these vehicles and fuels is estimated to result in a 0.2 ton per day reduction in VOC emissions in 2007. The combination of these programs result in a VOC emission reduction of 11.0 tons per day in 2007. The 2007 VOC emission budget proposed in this attainment demonstration incorporates this benefit. As these emission reductions are not quantified through the MOBILE model the CATS in conducting transportation conformity determinations accounts for these benefits by subtracting their total from the emission estimate generated using the regional transportation model VMT estimates and MOBILE model emission factors.

Motor Vehicle Emissions Budgets

Using the above VMT and control program assumptions and methodology, following are the year 2007 motor vehicle emissions budgets for the Chicago nonattainment area for use in determining transportation conformity.

VOC Emissions: 152.91 tons per day

NOx Emissions: 293.92 tons per day

Chapter IV

Legal Authority and Resource Commitments

LEGAL AUTHORITY AND RESOURCE COMMITMENTS

Introduction

As set forth in earlier State Implementation Plan (“SIP”) revisions, the Illinois Environmental Protection Agency (“IEPA”) 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 IEPA is designated as the air pollution agency for the State for all purposes of the Clean Air Act (“CAA”), including developing SIPs and proposing regulations. In accordance with and by the authority granted by the Act, the IEPA 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 regulations for the control of oxide of nitrogen (“NOx”) emissions from utility boilers and other industrial sources that are included in this plan (Section 5 of the Act).

Legal Authority to Enforce Applicable Laws, Regulations and Standards and to Seek Injunctive Relief

The IEPA is empowered to enforce the Act and applicable regulations promulgated thereunder (Title VIII of the Act). The IEPA 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 IEPA 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 IEPA 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 thereunder 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.

**MIDWEST SUBREGIONAL MODELING:
1-HOUR ATTAINMENT DEMONSTRATION
FOR LAKE MICHIGAN AREA**

SUMMARY

Illinois Environmental Protection Agency
Indiana Department of Environmental Management
Michigan Department of Environmental Quality
Wisconsin Department of Natural Resources

September 18, 2000

September 18, 2000

The purpose of this document is to summarize the updated 1-hour ozone attainment demonstration for the Lake Michigan area. The attainment demonstration is based on a state-of-the-art photochemical modeling analysis plus supplemental weight-of-evidence information (i.e., air quality data analysis). The final attainment strategy consists of four sets of controls: (1) Federal Clean Air Act controls, (2) State rate-of-progress emission reductions, (3) the Federal Tier II/Low S program, and (4) a range of regional point source NO_x controls. The modeling shows that these controls provide for attainment of the 1-hour NAAQS throughout the Lake Michigan area.

Overview of Modeling: The Urban Airshed Model, version 1.24 (UAM-V) was used for the analysis. The modeling domain, which is shown in Figure 1, includes the areas of high ozone concentrations around Lake Michigan (the purple shaded area in the figure) and possible upwind source areas impacting these high concentration areas. Grid resolution was 12 m for most model runs and 4 km for a few runs.

Four episodes were modeled: June 22 - 28, 1991; July 14 - 21, 1991; June 13 - 15, 1995; and July 7 - 18, 1995. These episodes were selected because they are representative of high ozone episodes in the Lake Michigan area.

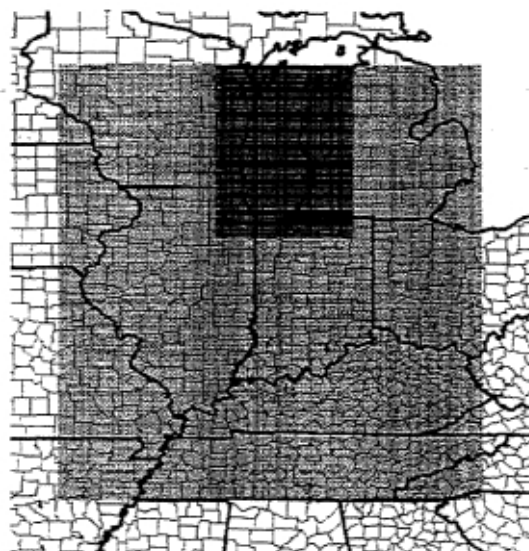


Figure 1. Map of Ozone Modeling Domain

There are three key model inputs: emissions, meteorology, and boundary conditions. The development of these inputs for the current model basecase is discussed briefly here.

Emissions: UAM-V requires a regional inventory of gridded, hourly emissions estimates for speciated volatile organic compounds (VOC), oxides of nitrogen (NO_x), and carbon monoxide (CO). The emissions were processed with the EMS-95 emissions model. Emissions inventories were prepared for a 1996 base year, a 2007 base year, and several 2007 strategy/sensitivity scenarios. The inventories include 1996 state periodic inventory data for point and area sources, updated state transportation data, and updated growth and control data. Temperatures from the RAMS3a meteorological modeling were used in the calculation of motor vehicle and biogenic emissions. Biogenic emissions were based on USEPA's BEIS2 model, with an adjustment of the isoprene emissions in the Ozarks based on the OZIE field data.

Meteorology: UAM-V requires 3-dimensional hourly values of winds, temperatures, pressure, water vapor, vertical diffusivity, clouds, and precipitation. Most meteorological inputs were developed through prognostic modeling with RAMS3a. Cloud and precipitation fields were developed based on National Weather Service observations. Preliminary evaluation of the meteorological model results showed adequate representation of the general airflow features, and good agreement between modeled and measured wind speeds, temperatures, and water vapor. These findings suggest that the model results are reasonable and can be used to provide meteorological inputs for UAM-V.

Boundary Conditions: Boundary conditions were developed by applying UAM-V over the eastern half of the U.S. at 36 km grid resolution and extracting the concentration values in the grid cells that are along the edges of Grid M.

Basecase Modeling: The purpose of basecase modeling is to evaluate model performance by comparing observed and modeled concentrations. The model performance evaluation considered the spatial pattern, temporal profile, and magnitude of modeled and measured 1-hour ozone concentrations.

Peak daily 1-hour modeled and observed ozone concentrations for a representative high ozone day (July 12, 1995) are shown in Figure 2.

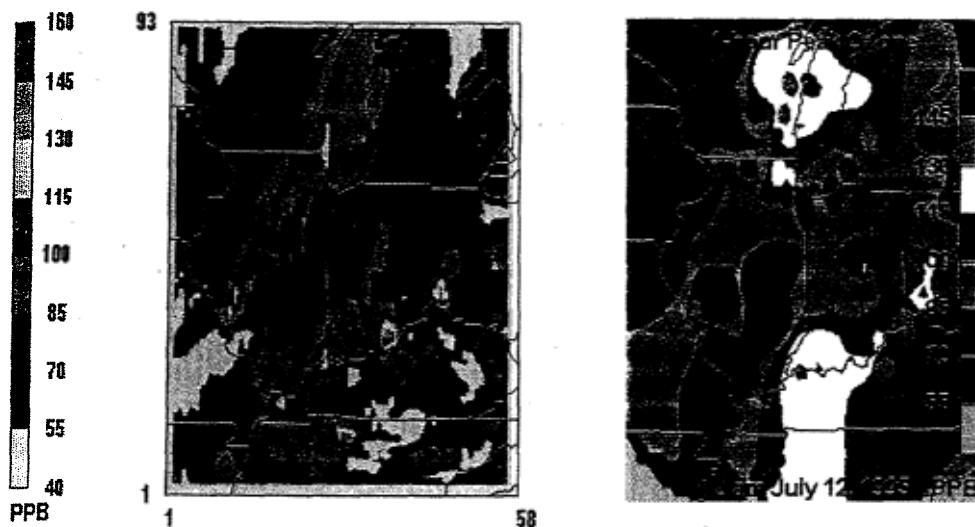


Figure 2. Predicted (left) v. Observed (right) Ozone Concentrations (July 12, 1995)

The areas of high modeled ozone concentrations correspond with the areas of high measured ozone concentrations (e.g., over Lake Michigan). Also, the regional (rural) modeled and measured ozone concentrations are comparable (i.e., on the order of 70 - 100 ppb). Peak ozone concentrations over Lake Michigan appear to be underestimated on this and many other days.

Time series plots of 1-hour modeled and observed ozone concentrations for a high ozone site in northeastern Illinois for the July 1995 episode is provided in Figure 3.

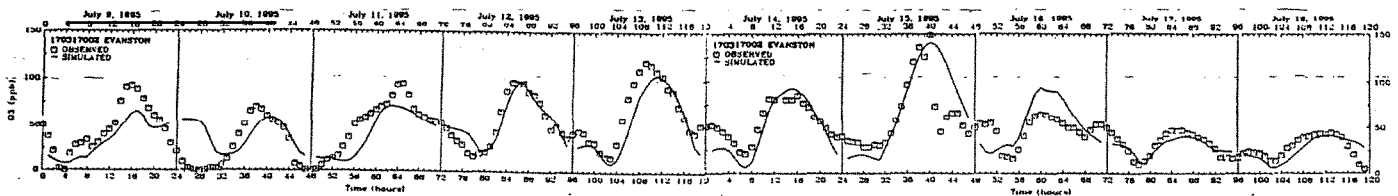


Figure 3. Time Series Plot of Modeled (line) and Observed (boxes) Ozone Concentrations

The hour-to-hour and day-to-day variation of modeled and measured ozone concentrations are comparable, with some overestimation of nighttime concentrations and some underestimation of peak afternoon concentrations.

Ozone statistics (unpaired peak accuracy, average accuracy of peak, normalized bias, and normalized gross error) are presented in Table 1. The results for the Lake Michigan area generally comply with USEPA's criteria and further indicate the tendency of the model to underestimate measured ozone concentrations. USEPA recommended that the attainment tests be applied to those days with the best model performance. Based on the results in Table 1, the following 18 days were determined to be appropriate for applying the attainment tests:

June 25, 1991	July 16, 1991	June 21, 1995	July 12, 1995
June 26, 1991	July 17, 1991	June 22, 1995	July 13, 1995
June 27, 1991	July 18, 1991	June 23, 1995	July 14, 1995
June 28, 1991	July 19, 1991	June 24, 1995	July 15, 1995
	July 20, 1991	June 25, 1995	

In summary, it is reasonable to conclude that model performance is acceptable and that the model can be used for regulatory application in the Lake Michigan area. Given the model's tendency to underestimate peak concentrations, however, it should be understood that the modeled attainment demonstration provides no margin of safety.

Strategy Modeling: The purpose of strategy modeling is to evaluate the ozone air quality impact of various control scenarios. For this modeling analysis, the following strategies were modeled:

- SR1 CAA controls
- SR8¹ CAA controls + 0.25 utilities + 0.25 utilities + Tier II/Low S
(IL,IN,WI) (KY,MO,TN)
- SR9 CAA controls + 0.20 utilities + 0.25 utilities + Tier II/Low S
(IL,IN,WI) (KY,MO,TN)
- SR10 CAA controls + 0.20 utilities + 0.25 utilities + SIP Call non-utilities+ Tier II/Low S
(IL,IN,WI) (KY,MO,TN) (IL,IN,WI)
- SR11 CAA controls + 0.15 utilities + 0.25 utilities + SIP Call non-utilities+ Tier II/Low S
(IL,IN,WI) (KY,MO,TN) (IL,IN,WI)
- SR12 CAA controls + 0.15 utilities + SIP Call non-utilities+ Tier II/Low S
- SR13 SR8 w/ some changes²
- SR14 SR12 w/ some changes²
- SR15 SR8 w/ some new changes³
- SR16 SR12 w/ some new changes³
- SR17 SR12 w/ some new changes³

The strategy runs assumed CAA boundary conditions unless otherwise noted (i.e., sources outside of the Grid M modeling domain reflect only CAA controls). The following sensitivity runs were also modeled:

- SR1a CAA controls + Tier II/Low S
- SR8a SR8 + 0.25 utilities (IA)
- SR8b SR8 w/ -25% VOC (L.Michigan area)
- SR12a SR12 w/ -25% utility NOx
- SR12b SR12 w/ -25% VOC (L.Michigan area)

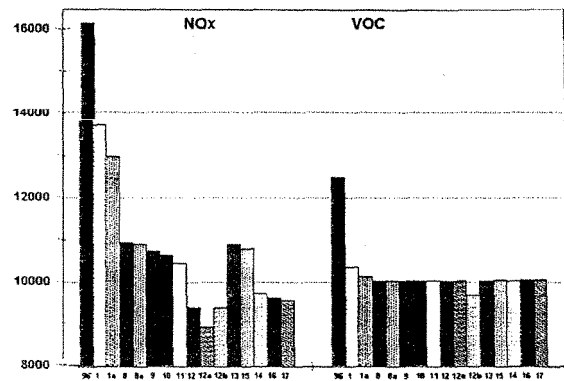


Figure 4. Domainwide Anthropogenic Emissions (tons per day)

The emissions for the strategy and sensitivity scenarios are shown in Figure 4.

¹ MI @final State rule for utilities (0.25) and non-utilities in SR8-SR11, SR13, SR15.

² WI @ proposed State rule [0.25 utilities in 8 counties], CO credits, 13 TVA units @ 0.15, IN non-utility @ proposed State rule (SR13 only), IC engines @ CAA (SR14 only), higher VMT growth for WI, proposed diesel S rule, and updated CAA boundary conditions

³ WI @ final State rule [0.28 utilities in 8 counties], CO credits, 13 TVA units @ 0.15, IN non-utility @ proposed State rule (SR15 only), IC engines @ CAA (SR16, SR17only), MO @ SIP Call (SR17 only), higher VMT growth for WI, proposed diesel S rule, NOx I/M cutpoints in WI, corrected VMT for IL, updated MOBILE5 inputs for IL and WI, and updated CAA boundary conditions

Effect of CAA Controls:

The net effect of growth and CAA control is a reduction in VOC and NOx emissions is about 2100 tons and 2400 tons per day, respectively, compared to the 1996 base year emissions. The change in ozone concentrations due to growth and CAA controls for a high ozone day is shown in Figure 5. As can be seen, there are widespread ozone decreases and isolated increases. The ozone decreases occur in areas with high 1996 base year ozone concentrations (i.e., ozone benefits occur where it counts).

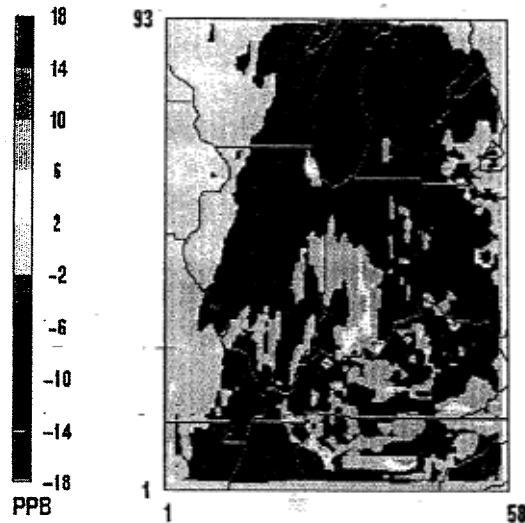


Figure 5. Change in Ozone Due to Clean Air Act Controls (July 12, 1995)

Effect of Tier II/Low S:

Tier II/Low S controls provide a reduction in VOC and NOx emissions of about 200 and 700 tons per day, respectively, compared to the Clean Air Act (SR1) control level. The change in ozone concentrations due to Tier II/Low S controls for a high ozone day is shown in Figure 6 (note that a finer concentration difference scale is used in this figure). As can be seen, there are widespread ozone decreases on the order of 1 - 3 ppb.

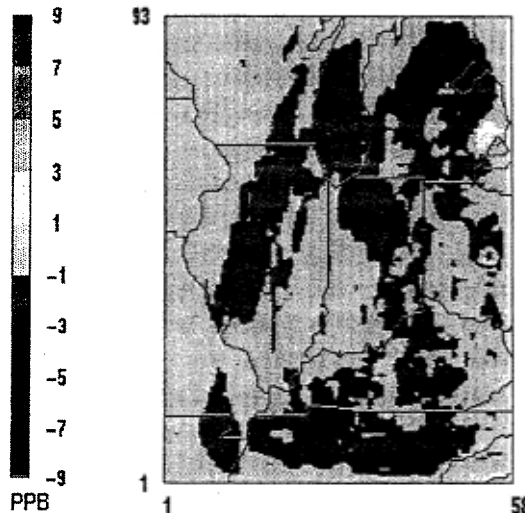


Figure 6. Change in Ozone Due to Tier II/Low S Controls (July 12, 1995)

Effect of Regional NOx Controls:

Regional utility controls (in IL, IN, MI, WI, KY, MO, and TN) reflecting 0.25 lb/MMBTU (i.e., SR8) provide a reduction in NOx emissions of about 2000 tons per day compared to the Clean Air Act (SR1) control level. The change in ozone concentrations for a high ozone day is shown in Figure 7. As can be seen, there are some areas with ozone decreases and a few spotty areas with ozone increases.

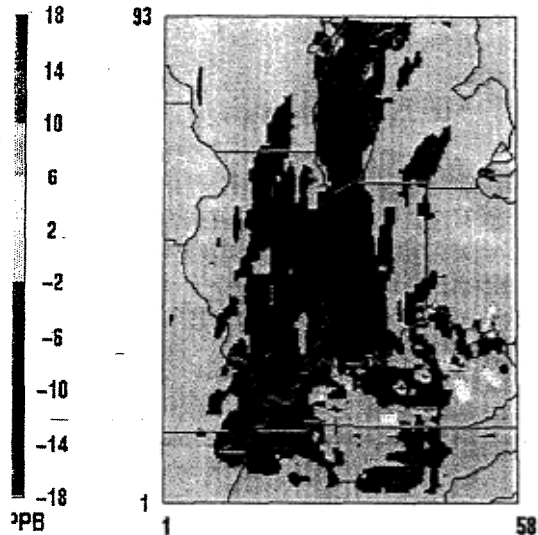


Figure 7. Change in Ozone Due to Additional 0.25 Utility Controls (July 12, 1995)

The SIP Call controls provide a reduction in NOx emissions of about 1600 tons per day compared to the 0.25 lb/MMBTU utility control strategy (SR8). The change in ozone concentrations for a high ozone day is shown in Figure 8. As can be seen, there some areas with ozone decreases and a few spotty areas with ozone increases. Note that the ozone decreases in Figure 7 are greater than those in Figure 8 because the associated emission reductions are greater (i.e., more reduction, more benefit).

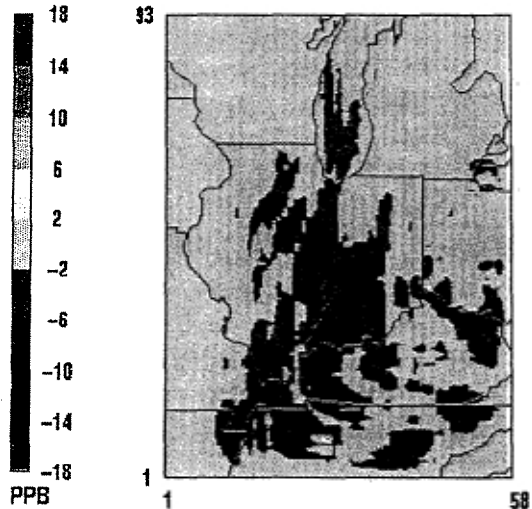


Figure 8. Change in Ozone Due to Additional SIP Call Controls (July 12, 1995)

Attainment Demonstration: USEPA's current guidance allows two attainment tests: a deterministic test and a statistical test. To supplement these tests, two additional analyses are presented: a relative attainment test and air quality data analyses (i.e., trends in ozone and ozone precursor concentrations, and application of observation-based methods).

The deterministic test is a conservative, simple means of assessing attainment. The deterministic test is passed if the daily maximum concentrations predicted in each grid cell are < 125 ppb for all days. The number of days with maximum concentrations \geq 125 ppb are as follows:

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
8	5	5	5	5	5	4	4	5	4	4

These results show that the deterministic test is not met by any of the strategies.

The statistical approach permits occasional exceedances and reflects an approach comparable to the form of the 1-hour NAAQS. The statistical approach test is passed if three benchmarks, which are related to the frequency and magnitude of modeled exceedances and the minimum level of improvement, are met. The benchmarks are addressed below.

Benchmark 1 requires both that the number of days with modeled exceedances in each grid cell must be less than 3 and that any modeled exceedance occurs on a "severe" day. According to USEPA's criteria, the following 10 modeling days are considered severe:

Jul 18,1991	Jun 19,1995	Jul 12,1995
Jul 19,1991	Jun 22,1995	Jul 13,1995
Jul 20,1991	Jun 24,1995	Jul 14,1995
		Jul 15,1995

The maximum number of exceedance days in any grid cell is as follows:

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
3	2	2	1	1	1	1	1	1	1	1

For each strategy except SR1, the modeled exceedance days all occur on severe days. For SR1, there are exceedances on two non-severe days (June 26, 1991; and June 23, 1995).

Benchmark 2 requires that the maximum modeled concentration on severe days shall not exceed 130 - 160 ppb, depending on the "severity" of the

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meteorological conditions. The number of days with modeled concentrations greater than the allowed value are as follows:

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
5	1	1	1	1	0	0	0	0	0	0

Benchmark 3 requires that the number of grid cells ≥ 125 ppb must be reduced by 80% on each severe day. The number of days the 80% criteria is not met are as follows:

SR1	SR8	SR9	SR10	SR11	SR12	SR13	SR14	SR15	SR16	SR17
6	0	0	0	0	0	0	0	0	0	0

These results indicate that: (1) SR1, which does not pass any of the benchmarks, is not sufficient to provide for attainment; (2) SR8 - SR11 come close to showing attainment, but appear to fall just short; and (3) SR12 - 14, which meet all three benchmarks, are sufficient to provide for attainment.

To supplement the model-based attainment tests, two additional analyses are provided: a relative attainment test and air quality data analyses. The relative attainment test uses the observed design values in concert with modeling data (i.e., the change in ozone concentrations between the base year and a given strategy). To show attainment, the resulting model-adjusted design value must be below the ozone NAAQS. For those sites with current observed design values above the NAAQS, the resulting model-adjusted design values are as follows:

SITE	Obs.	SR1	SR8	SR13	SR14	SR15	SR16	SR17
	D.V.							
Pleasant Prairie	131	126	116	115	114	114	113	113
Milwaukee-Bayside	128	123	116	115	114	114	113	113
Harrington Beach	127	123	113	112	111	112	110	109
Sheboygan	125	121	112	111	110	110	108	108
Manitowoc	127	121	112	111	109	110	108	108
Michigan City	140	132	125	124	121	122	119	119
Holland	133	127	121	120	118	119	117	117
Muskegon	132	126	120	118	117	118	117	117
Unmonitored(mid-Lake)	140	132	126	124	123	124	122	122

These results are consistent with those of the statistical attainment test.

Two air quality data analyses were considered: analysis of air quality trends and application of observation-based methods. The trends analysis shows that there has been considerable progress toward attainment of the 1-hour NAAQS in the Lake

Michigan area. Local ozone levels have declined in recent years, but incoming ozone levels remain high. The reduction in local ozone levels can be attributed to local VOC control programs, as evidenced by the decline in ambient VOC concentrations and the VOC-limited conditions in the severe nonattainment area. To reduce regional ozone levels, the observation-based methods indicate that regional NOx controls will be effective. Thus, a strategy of additional local VOC controls and regional NOx controls is necessary to provide for attainment in the Lake Michigan area. These findings corroborate the conclusions of the modeling analysis and support the general direction of the control strategies in the modeling.

Summary: A state-of-the-art modeling analysis was performed to support the updated 1-hour ozone attainment for the Lake Michigan area. The results of the analysis are considered to be technically credible. In particular, model performance was determined to be reasonable (i.e., there is good agreement in the magnitude, spatial pattern, and temporal profile of modeled and measured ozone concentrations) and the modeled control path was found to be consistent with corroborative air quality analyses. The model can, therefore, be used to support regulatory applications for the Lake Michigan area. Several policy-relevant findings should be noted:

- * Domainwide (principally, urban area) VOC emission reductions decrease ozone concentrations in urban nonattainment areas. The spatial extent of the ozone decreases is limited, but do occur in high population and generally high ozone areas.
- * Domainwide NOx emission reductions decrease ozone concentrations, but can sometimes increase ozone concentrations. Ozone decreases occur throughout much of the modeling domain, including areas with high base year concentrations. Ozone increases are limited mostly to urban areas, and are most pronounced on days with lower 1-hour concentrations.
- * The modeled attainment tests show that Clean Air Act controls alone will reduce ozone concentrations, but do not, by themselves, provide for attainment of the 1-hour NAAQS everywhere in the Lake Michigan area. The full set of controls (i.e., Federal Clean Air Act controls; State rate-of-progress emission reductions; Tier II/Low S program; and a range of regional point source NOx controls, as reflected by Strategy Runs 12 - 17) provide for attainment of the 1-hour NAAQS throughout the Lake Michigan area.