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Briefing Report to Congressional Requesters

January 1988

AIR POLLUTION

Efforts to Control Ozone in Areas of Illinois, Indiana, and Wisconsin

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Resources, Community, and
Economic Development Division

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January 29, 1988

The Honorable Robert W. Kasten, Jr.
The Honorable William Proxmire
United States Senate

The Honorable Les Aspin
The Honorable Steve Gunderson
The Honorable Robert W. Kastenmeier
The Honorable Gerald Kleczka
The Honorable Jim Moody
The Honorable David R. Obey
The Honorable Thomas Petri
The Honorable Toby Roth
The Honorable F. James Sensenbrenner, Jr.
House of Representatives

In response to your September 29, 1986, letter and subsequent discussions with your offices, we examined information addressing your concerns that pollutants from northeastern Illinois and northwestern Indiana are causing violations of the ozone air quality standard in southeastern Wisconsin and that neither Illinois nor Indiana had obtained U.S. Environmental Protection Agency (EPA) approval of its ozone control plans for these areas. On July 30, 1987, we briefed your offices on the results of our work. This briefing report summarizes the information relevant to your concerns and also discusses several specific questions you raised.

Ozone is a secondary pollutant formed in the atmosphere through a complex series of chemical reactions between hydrocarbons and nitrogen oxides in the presence of sunlight and heat. Its formation and location are affected by weather conditions, such as wind patterns, wind speed, and the intensity of sunlight. Consequently, high concentrations of ozone often occur miles downwind from the sources emitting ozone-forming pollutants. These variables make it extremely difficult to assess the extent to which emissions from any one source or area contribute to creating an ozone problem. Because of the complex nature of ozone's formation, neither EPA nor the states can determine with any precision the extent to which emissions from sources in

Illinois and Indiana contribute to Wisconsin's ozone problem. However, officials at EPA and the three states' environmental agencies acknowledge that pollution from industrial sources in Chicago and northwestern Indiana contributes to the ozone problem in two Wisconsin counties--Racine and Kenosha. They also agree that ozone and its associated chemical compounds can be transported for miles both during and after transformation and that winds generally move ozone and its precursor chemical compounds in a northward direction along Lake Michigan. Further, EPA and Wisconsin officials stated that the two counties should not produce enough emissions to cause the counties' high ozone readings.

The officials disagree, however, on the effect that emission sources in Illinois and Indiana have on Milwaukee County's ozone levels. Wisconsin officials charge that Illinois and Indiana sources are also responsible for violations in this county. On the other hand, EPA officials told us that, while these sources could have some effect, Wisconsin industrial sources could produce sufficient emissions to pollute the air.

Related to the issue of the effect of Illinois' and Indiana's emissions on Wisconsin is the concern about the states' plans for ozone control. As required by the Clean Air Act, to protect the public health and environment, EPA established national standards for several pollutants, including ozone. Each state was required to submit a plan for EPA approval that, among other things, identifies the rules and regulations that the state would implement to control the emission of ozone-forming substances and to enable the state to achieve the national standard no later than December 31, 1987. The act further provides that EPA prepare and publish regulations establishing these plans if the states do not do so.

EPA has not approved the ozone control plans for northeastern Illinois and northwestern Indiana. A number of factors account for this, including EPA policy changes, the states' delay in implementing required vehicle inspection and maintenance programs, and the states' failure to adopt required controls and regulations. However, the states and EPA have been working cooperatively to develop the plans, and EPA has approved some portions of the plans and proposed to approve others. The states have passed the legislation and adopted the rules required to implement many of the control measures needed for full plan approval and have,

according to state reports, reduced the levels of ozone-forming pollutant emissions.

EPA prefers this cooperative approach to developing a federal plan for controlling ozone and requiring the states to implement it, as long as the states are making reasonable progress toward producing approvable plans. However, because Illinois and Indiana were unlikely to reach attainment by the December 31, 1987, deadline, EPA proposed, on July 14, 1987, to disapprove the states' plans as not meeting the Clean Air Act requirement to demonstrate attainment of the ozone standard by the end of 1987. As part of that announcement, EPA also proposed to ban the construction or modification of factories in Illinois and Indiana that would be major sources of ozone-forming pollutants until it approves the states' ozone plans. This ban would be on top of an existing construction ban in Illinois imposed as a result of a federal court decision that invalidated Illinois' rules for constructing or modifying facilities that emit controlled chemicals.

On December 22, 1987, legislation was enacted (P.L. 100-202) that prohibits EPA from taking action to impose economic sanctions under the Clean Air Act in ozone and carbon monoxide nonattainment areas until August 31, 1988.

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We performed our work from January through November 1987. To respond to specific questions in the request, we interviewed EPA officials and officials of the states' pollution control agencies and reviewed applicable legislation, EPA policies and procedures, and state agency program records. (Section 1 contains a more detailed discussion of our objectives, scope, and methodology.)

In accordance with your request, we did not obtain official agency comments on a draft of this report. However, we discussed the information contained in this report with EPA officials and officials in each of the three states and have included their comments where appropriate. EPA, Illinois, and Indiana officials generally agreed with the information provided. Wisconsin officials expressed concern about several issues.

Subsequent to these discussions, the Wisconsin Department of Natural Resources submitted written comments reemphasizing its position that Illinois and Indiana had not taken sufficient actions to develop plans that included all the

required regulations to control industrial sources and that EPA should develop and implement the plans for these states. Further, the Department stated that the states also contributed to the ozone problem in Milwaukee County. As you requested, these comments are recognized and addressed, as appropriate, in this report.

As arranged with your offices, unless you release its contents earlier, we plan no further distribution of this briefing report until 30 days after the date of this letter. At that time, we will send copies of the report to appropriate congressional committees; the Administrator, EPA; state environmental agencies; and other interested parties.

Major contributors to this briefing report are listed in appendix V. If you have any questions about the report, please contact me on (202) 275-5489.

Hugh J. Wessinger
Senior Associate Director

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FIGURE

ABBREVIATIONS

EPA	U.S. Environmental Protection Agency
GAO	General Accounting Office
PPM	parts per million
RCED	Resources, Community, and Economic Development Division

OBJECTIVES, SCOPE, AND METHODOLOGY

- WE WERE ASKED TO DETERMINE

  WHETHER ILLINOIS AND INDIANA CONTRIBUTE TO WISCONSIN'S OZONE PROBLEMS,

  WHY ILLINOIS AND INDIANA DO NOT HAVE FULLY APPROVED IMPLEMENTATION PLANS,

  WHY EPA HAS NOT PROMULGATED PLANS FOR THE STATES,

  WHETHER EPA'S PROCESS FOR DETERMINING IF ONE STATE IS CAUSING ANOTHER TO VIOLATE AN AIR QUALITY STANDARD IS VIABLE FOR OZONE,

  WHETHER EPA UNIFORMLY IMPLEMENTED A BAN ON CONSTRUCTION FOR OZONE NATIONWIDE, AND

  WHETHER FACTORIES THAT EMIT MAJOR AMOUNTS OF HYDROCARBONS WERE BUILT IN THE THREE-STATE AREA.

- TO ADDRESS THESE QUESTIONS, WE INTERVIEWED AGENCY OFFICIALS AND REVIEWED RECORDS AND DOCUMENTS AT EPA AND THE THREE STATES.

SECTION 1

OBJECTIVES, SCOPE, AND METHODOLOGY

In a September 29, 1986, letter and subsequent discussions, the Wisconsin congressional delegation asked us to evaluate EPA efforts and state efforts to control hydrocarbon emissions in southeastern Wisconsin, northeastern Illinois, and northwestern Indiana. (See app. I for specific counties.) Specifically, they asked us to assess (1) whether Illinois and Indiana contribute to Wisconsin's ozone problem, (2) why Illinois and Indiana do not have EPA-approved implementation plans for ozone, (3) why EPA has not promptly developed and implemented federal plans for these states, (4) whether EPA's process for determining air quality violations across state lines is viable for ozone, (5) whether EPA uniformly implemented construction bans nationwide, and (6) whether factories that emit major amounts of hydrocarbons were built in the three states.

We conducted our review between January and November 1987 at EPA headquarters in Washington, D.C., and EPA's Office of Air Quality Planning and Standards in Durham, North Carolina. We also performed field work at EPA's region V office in Chicago, the Illinois Environmental Protection Agency in Springfield, the Indiana Department of Environmental Management in Indianapolis, and the Wisconsin Department of Natural Resources in Madison.

To address why Illinois and Indiana did not have fully approved plans, we discussed plan requirements with appropriate EPA headquarters and regional officials and with environmental officials in the three states. We reviewed federal and state legislation, regulations, and policies concerning clean air requirements. We discussed with state pollution control agencies program requirements, state implementation plans, and state reports submitted to EPA showing progress made toward meeting the national air quality standard. In addition, we compared the states' emission control programs and reviewed EPA's documentation on the status of the states' plans.

To determine whether Illinois and Indiana contribute to Wisconsin's ozone problems, we reviewed (1) EPA and state efforts to predict, measure, and monitor ozone concentrations, (2) ozone monitor readings along Lake Michigan for 1980 through 1987, and (3) emission reductions data for 1980 through 1985. We identified state actions to achieve emission reductions and discussed Illinois' and Indiana's contributions to Wisconsin's ozone problems with EPA and state environmental officials. In addition, we reviewed the methods EPA uses to measure ozone levels and to evaluate ozone transport. This entailed discussing with EPA modeling experts the strengths and weaknesses of various ozone models.

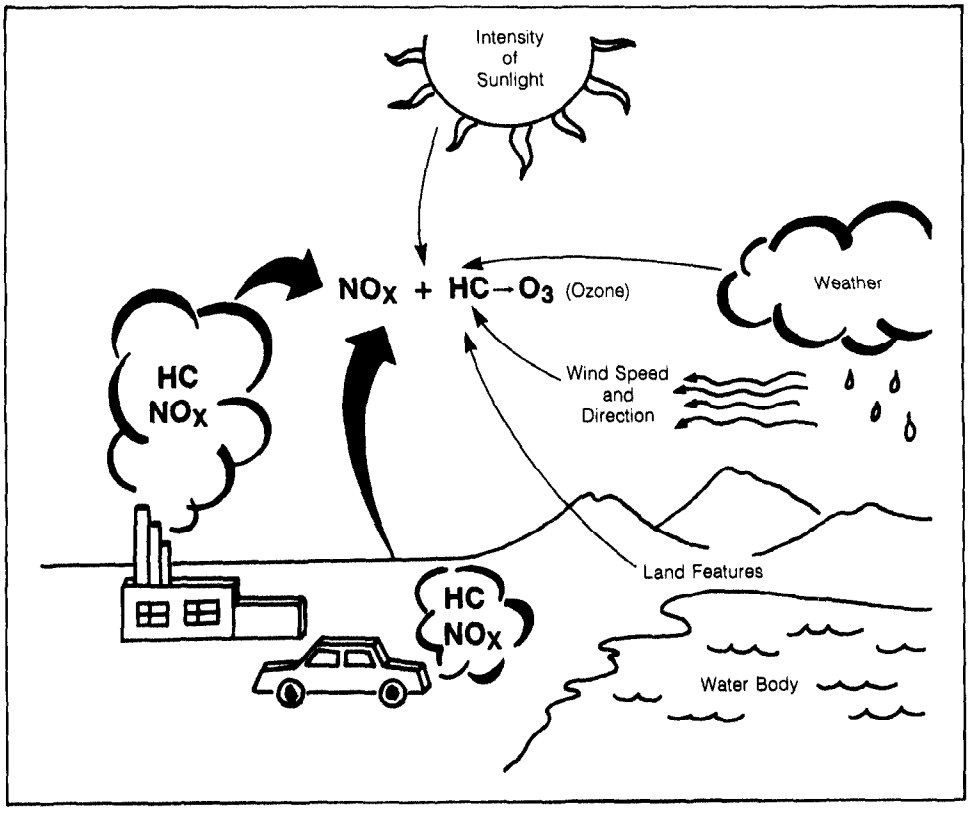
To address the viability of EPA's process for determining ozone violations across state lines, we reviewed the Clean Air Act, as well as EPA's policies and procedures for filing petitions for an EPA finding of interstate air pollution. We discussed these procedures with EPA and state air pollution control officials. We determined the number of petitions filed and obtained EPA's responses. Finally, we discussed the suitability of using various models in the petition process with EPA headquarters and regional officials.

To determine whether EPA uniformly implemented its ozone construction ban nationwide, we identified all areas without approved ozone plans as of January 1987 and determined whether construction bans were in effect in these areas. We reviewed EPA's records on these bans and discussed with officials in EPA's headquarters and regional offices why they instituted the bans. Finally, we updated the data on ozone bans contained in our report, EPA's Sanctions Policy Is Not Consistent With the Clean Air Act (GAO/RCED-85-121, Sept. 30, 1985).

To assess whether factories that emit major amounts of hydrocarbons were built in the three-state area between 1980 and 1986, we spoke with knowledgeable EPA regional and state officials about procedures for constructing and operating facilities that produce hydrocarbons and studied federal and state regulations for issuing permits. To determine whether construction permits were issued in accordance with applicable procedures, we obtained from each state a listing of new construction permits and reviewed two permits in each state. We also discussed with EPA and state officials how violators of federal and state regulations were discovered and examined 26 enforcement case files to determine whether enforcement activities complied with the Clean Air Act's requirements.

We discussed the information contained in this report with state and EPA officials and incorporated their comments as appropriate. Subsequent to these discussions, the Wisconsin Department of Natural Resources submitted written comments expressing its concern about several issues. These comments also are recognized and addressed, as appropriate, in this report. However, as requested by the delegation, we did not obtain written agency comments on a draft of this report. We also did not evaluate EPA's internal controls for ensuring that states were complying with the Clean Air Act's requirements, although we discussed with EPA regional officials their procedures to monitor state programs and to verify data. We conducted this review in accordance with generally accepted government auditing standards.

Figure 2.1: OZONE FORMATION AND MOVEMENT



- OZONE IS FORMED WHEN HYDROCARBONS (HC) AND NITROGEN OXIDES (NOx) REACT IN THE PRESENCE OF SUNLIGHT AND HEAT. ITS MOVEMENT IS AFFECTED BY WEATHER AND GEOGRAPHY.
- TO REDUCE OZONE FORMATION, EPA LIMITS THE AMOUNT OF HYDROCARBONS EMITTED.

SECTION 2

OZONE FORMATION, MOVEMENT, AND CONTROL STRATEGY

Exposure to high concentrations of ozone (a major constituent of smog) may cause respiratory problems in humans and may damage or stunt the growth of crops, forests, and other types of vegetation. Unlike other pollutants, ozone is not emitted directly from automobile tailpipes or industry smokestacks. Rather, it is formed in the atmosphere when hydrocarbons and nitrogen oxides--the majority of which are emitted from industries and motor vehicles--react in the presence of sunlight. Ozone is a seasonal pollutant that reaches its highest concentrations on warm, sunny afternoons, typically between April and October. The amount of ozone formed in the air is a complex function of nitrogen oxide and hydrocarbon concentrations, weather, geography, and sunlight. EPA studies indicate that large bodies of water also affect ozone concentrations.

Wind can transport ozone and its associated chemical compounds for miles both during and after transformation, causing high concentrations in other areas. How far winds can move ozone, however, is uncertain. Therefore, it is very difficult to predict where and to what extent ozone and ozone-forming chemicals will raise ozone levels in specific areas.

EPA's basic strategy for controlling ozone is to reduce hydrocarbon emissions. It has another program that addresses nitrogen oxides. It does not have a formal policy to address ozone transport issues. However, the control strategies for some areas have attempted to recognize transport concerns.

FEDERAL AND STATE RESPONSIBILITIES FOR CONTROLLING OZONE

- EPA IS RESPONSIBLE FOR

  ESTABLISHING A NATIONAL STANDARD TO LIMIT OZONE IN THE ATMOSPHERE,

  PROVIDING INFORMATION FOR STATES TO USE IN DEVELOPING PLANS TO CONTROL AND PREVENT OZONE,

  PROVIDING GUIDANCE TO STATES ON TECHNOLOGIES AVAILABLE TO LIMIT HYDROCARBON EMISSIONS FROM INDUSTRIAL SOURCES,

  ASSISTING STATES IN DEVELOPING THEIR PLANS,

  DEVISING A METHOD TO MEASURE THE AMOUNT OF OZONE IN THE ATMOSPHERE, AND

  APPROVING STATE PLANS.

- STATES ARE RESPONSIBLE FOR

  IDENTIFYING THE GEOGRAPHIC AREA(S) EXCEEDING THE STANDARD,

  DEVELOPING PLANS,

  IMPLEMENTING CONTROLS TO ATTAIN THE STANDARD, AND

  PREVENTING THEIR INDUSTRIAL SOURCES FROM POLLUTING THE AIR OF OTHER STATES.

SECTION 3

FEDERAL AND STATE RESPONSIBILITIES FOR CONTROLLING OZONE

The Clean Air Act, as amended, requires EPA and the states to control harmful air pollution. EPA has established national standards, known as the national ambient air quality standards, to protect the public health and the environment by limiting the amount of various air pollutants, including ozone. EPA has established the standard for ozone at 0.12 parts of ozone per million parts of air (PPM). EPA also provides information for states to use in developing plans to attain the standard, provides guidance to states on technologies reasonably available to control or prevent air pollution from industrial sources, helps states develop plans, reviews and approves the state plans that meet Clean Air Act requirements, and devises methods for measuring whether states are meeting and maintaining the national air quality standard.

States have the primary responsibility for establishing air pollution control programs and meeting and maintaining EPA's standard. They are required to identify all the sources within their boundaries that emit controlled pollutants and develop plans describing the types of controls they will implement to limit or reduce chemical emissions. States are also required to prohibit factories within their boundaries from polluting the air in other states.

STATES REQUIRED TO ATTAIN THE OZONE STANDARD BY 1982 OR 1987

- THE CLEAN AIR ACT GENERALLY REQUIRED STATES TO REACH NATIONAL AIR QUALITY STANDARDS BY 1982.
- CERTAIN AREAS COULD RECEIVE AN EXTENSION FOR OZONE TO 1987.
- TO RECEIVE AN EXTENSION, STATES WERE REQUIRED TO DEVELOP AND SUBMIT TO EPA PLANS TO, AMONG OTHER THINGS,

  CONTROL OR LIMIT SOURCE EMISSIONS,

  IMPLEMENT AUTOMOBILE INSPECTION AND MAINTENANCE PROGRAMS,

  IMPLEMENT ADDITIONAL TRANSPORTATION CONTROL MEASURES, AND

  DEMONSTRATE HOW THE EMISSION REDUCTIONS WOULD ALLOW THE STATES TO ACHIEVE THE STANDARD.

SECTION 4

STATES REQUIRED TO ATTAIN THE OZONE STANDARD BY 1982 OR 1987

The 1977 amendments to the Clean Air Act generally extended the date for states to reach the national ambient air quality standard for ozone to December 1982. However, the amendments allow an extension to December 1987 for areas that, despite the implementation of all reasonably available control technologies, could not attain the ozone standard by December 1982 without severely restricting progress and economic growth.

States needing an extension to either 1982 or 1987 were required to submit revised ozone plans to EPA by January 1979. States needing an extension to 1987 were required to submit additional revised plans by July 1982.

Under EPA regulations, the states had to identify in their 1979 plans the geographic areas not in attainment and demonstrate that they could (or could not) reach the standard by 1982. The plans were to include, among other things,

-- regulations to control, through the application of reasonably available control technology, the emissions of "group one" industrial sources;[1]

-- procedures to control the construction, major modification, and operation of industrial sources;

-- commitments to implement automobile inspection and maintenance programs; and

-- commitments to implement transportation control measures, such as bus and carpool lanes, transit improvements, park-and-ride lots, and traffic flow improvements.

The 1982 plan revisions were to determine, among other things, the level of emission reductions needed to reach the standard by 1987 and demonstrate that the proposed reductions would achieve the

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[1]To aid states in developing these technologies, EPA developed and published control technique guidance informing the states of techniques available to reduce emissions from industrial sources. EPA grouped the industrial sources into four groups and issued guidance for groups one through three over a period of years. Group four included those industrial sources that emit over 100 tons of hydrocarbons annually, for which EPA did not intend to issue guidance.

standard. In addition, the plans were to include regulations to control the emissions of the second group of industrial sources and commitments to adopt regulations for the remaining groups, legislation requiring automobile inspection and maintenance programs, and regulations implementing transportation control measures.

ILLINOIS' AND INDIANA'S CONTRIBUTION TO WISCONSIN'S OZONE PROBLEMS

- ILLINOIS, INDIANA, AND WISCONSIN ARE NOT LIKELY TO MEET THE OZONE STANDARD BY DECEMBER 1987.
- WISCONSIN OFFICIALS CLAIM THAT OZONE FROM THE NORTHWESTERN INDIANA AND CHICAGO AREAS PREVENTS WISCONSIN FROM ATTAINING THE STANDARD.
- ALTHOUGH OFFICIALS AT EPA AND THE STATE ENVIRONMENTAL AGENCIES GENERALLY ACCEPT THAT OZONE MOVES FROM ILLINOIS AND INDIANA INTO WISCONSIN, THE EXTENT OF THE MOVEMENT IS UNCERTAIN.
- THE OFFICIALS ACKNOWLEDGE THAT SOURCES IN ILLINOIS AND INDIANA CONTRIBUTE TO WISCONSIN'S PROBLEM IN AT LEAST TWO WISCONSIN COUNTIES--RACINE AND KENOSHA.
- THE OFFICIALS DISAGREE ON THE EFFECT THAT ILLINOIS AND INDIANA SOURCES HAVE ON THE OZONE LEVELS IN MILWAUKEE COUNTY.
- EPA HAS TECHNOLOGY WHICH CAN, WITH LIMITED ACCURACY, ESTIMATE OZONE MOVEMENT ACROSS STATE LINES; HOWEVER, BECAUSE OF THE EXPENSE, THE TECHNOLOGY HAS NOT BEEN USED IN THE THREE STATES.

SECTION 5

ILLINOIS' AND INDIANA'S CONTRIBUTION TO WISCONSIN'S OZONE PROBLEM

Northeastern Illinois, northwestern Indiana, and southeastern Wisconsin, like many other parts of the nation, are not likely to reach the ozone standard by December 31, 1987. Wisconsin environmental officials claim that they are prevented from attaining the standard in much of Wisconsin's southeastern region because of emissions transported from industrial sources located in the Chicago metropolitan and northwestern Indiana areas.

Disagreement Over Extent of Contribution to Wisconsin's Ozone Problem

Officials at EPA and in all three state environmental agencies acknowledge that industrial sources in Illinois and Indiana contribute to ozone problems in Kenosha and Racine counties in Wisconsin. The extent of the contribution is unknown, however. They agree that ozone and its associated chemical compounds can be transported for miles, that high ozone concentrations tend to occur downwind of the sources, and that winds move ozone northward along Lake Michigan. EPA and Wisconsin officials stated, however, that the two counties should not produce enough emissions to cause the high ozone levels in the two counties.

These officials disagree over the effect that emissions from Illinois and Indiana have on the ozone levels in Milwaukee County. EPA officials said that north of Kenosha County the relationship between Illinois' emissions and high ozone concentrations in Wisconsin is less clear. They said that, while Illinois' emissions would have some effect, the emissions and their effect would tend to dissipate as the distance from the emitting sources increases. They also said that, if high concentrations of ozone in an area are caused solely from transport from another area, one would expect the high concentrations in both areas to occur on or about the same day. However, the monitoring data that they provided showed this was not the case northward from Kenosha.

EPA officials told us that Milwaukee County industrial sources emit enough hydrocarbons to pollute the county's air. As support for their position, the officials point to cities such as Indianapolis and Columbus, which are similar in size and industrial base to Milwaukee, that also experience ozone violations. Wisconsin officials have stated, however, that Milwaukee's ozone violations are caused by sources in Illinois and Indiana.

In their subsequent comments, Wisconsin officials reemphasized their contention that sources in Illinois and Indiana were also major contributors to Milwaukee's ozone problem. They reasoned

that no barriers exist to prevent ozone that is transported into Racine and Kenosha counties from continuing northward. Moreover, according to these officials, the ozone levels in Milwaukee are in excess of levels that might be expected from a city the size and character of Milwaukee when compared to the levels in other larger cities such as Cleveland and Detroit.

In recognition of the ozone transport issue, EPA made Illinois and Indiana responsible for the air quality in Kenosha and Racine counties and Wisconsin responsible for the air in the remainder of the state. EPA required the Illinois and Indiana implementation plans to recognize contributions from Chicago and northwestern Indiana to the ozone levels in the two Wisconsin counties. Illinois and Indiana were required to include ozone levels measured on the Kenosha and Racine counties' monitors to determine their compliance with the ozone air quality standard. Further, to ensure that the monitors would reach the standard, Illinois and Indiana were required to reduce their areas' emissions by 46 percent. Wisconsin was required to reduce emissions 33.6 percent, including emissions in the Racine and Kenosha areas.

EPA Models Could Help Estimate Out-of-State Pollution

Although neither EPA nor the states have determined the extent of Illinois' and Indiana's contribution to Wisconsin's ozone problem, EPA has developed computerized air models that could provide some estimates of this contribution. However, these models have not been used, primarily because of their high operating costs.

The Urban Airshed Model considers complex meteorological conditions, predicts differences in air quality in a given area, and tracks changes in ozone levels over time and distance from one urban area to another. Although its reliability has not been fully tested, EPA officials consider it one of their more reliable models for predicting transport. Because of the data input, data validation, and computer capacity required, it costs from $300,000 to $500,000 to run the model. Consequently, it has not been widely used.

The Regional Oxidant Model, which EPA considers its most sophisticated model, can evaluate the effectiveness of emission control and transport strategies on a multistate scale. According to EPA officials, results of its use in the Northeast Corridor show that it can estimate long-range transport. However, EPA estimated that it costs between $3 million and $5 million to run; as a result, it also has not been widely used.

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ILLINOIS' AND INDIANA'S IMPLEMENTATION PLANS NOT APPROVED

- WISCONSIN'S PLAN HAS BEEN FULLY APPROVED; EPA HAS PROPOSED TO APPROVE PORTIONS OF THE ILLINOIS AND INDIANA PLANS.
- ALL THREE STATES HAVE MADE SOME PROGRESS IN REDUCING EMISSIONS.
- MANY FACTORS ACCOUNT FOR DELAYS IN APPROVING ILLINOIS' AND INDIANA'S PLANS, SUCH AS

  EPA POLICY CHANGES,

  STATES' DELAYS IN IMPLEMENTING PROGRAMS, AND

  ILLINOIS' LENGTHY PROCESS FOR IMPLEMENTING ENVIRONMENTAL LEGISLATION.

- EPA PROPOSED TO DISAPPROVE ILLINOIS' AND INDIANA'S OVERALL PLANS BECAUSE THEY DO NOT ADEQUATELY DEMONSTRATE ATTAINMENT OF THE OZONE STANDARD BY DECEMBER 31, 1987.

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SECTION 6

ILLINOIS' AND INDIANA's IMPLEMENTATION PLANS NOT APPROVED

Wisconsin is the only one of the three states with a fully approved implementation plan for ozone control, but Illinois and Indiana have made progress toward developing approvable plans. The states have implemented many of the required controls, and EPA has proposed to approve portions of their plans. All three states also have made some progress in controlling emissions.

Although EPA had previously proposed approval of portions of their plans, in July 1987, EPA proposed to disapprove the overall implementation plans for Illinois and Indiana because the plans as a whole did not adequately demonstrate attainment of the ozone standard by the December 31, 1987, deadline.

Illinois' and Indiana's Efforts to Develop Plans

Neither Illinois nor Indiana has completed all the requirements for EPA's approval of its ozone control plan. However, both states have been working with EPA to develop approvable plans. Both states have enacted much of the required legislation, and EPA has proposed to approve portions of their plans.

Illinois and Indiana have, for example, implemented transportation control measures and automobile inspection and maintenance programs. EPA has proposed to approve the states' transportation control measures and has stated that Illinois' automobile inspection plan appears to be approvable. EPA has proposed to approve Indiana's inspection plan, except for the portion addressing funding for program enforcement.

Both states have also implemented regulations to control emissions from some of their industrial sources. Indiana has received EPA approval of its regulations, except for one industry. Illinois, however, has lagged behind in obtaining EPA approval of its regulations. EPA has fully approved Illinois' regulations for only one group of industrial sources and has proposed to approve regulations controlling four of nine sources in another group. Illinois' regulations for the remaining industrial sources are in various stages of development and adoption.

Many Factors Delayed Full Approval of State Plans

A number of factors have delayed Illinois and Indiana in obtaining full approval of their ozone plans, including changing

EPA policies and the states' not implementing requirements in a timely manner. For example, EPA originally approved state plans such as Wisconsin's on the basis of, among other things, a commitment to developing regulations to control certain industrial sources. According to EPA officials, EPA subsequently changed its policy to require states without approved plans to adopt all of the required regulations before their plans could be approved.

Illinois and Indiana also added to the delays by not implementing required programs in a timely manner. Even though Illinois and Indiana committed to automobile inspection and maintenance programs in their 1979 plans, they did not include such programs as part of their 1982 plan revisions. The states passed the laws required to implement the programs only after EPA's threat of sanctions.

Illinois' lengthy process for passing environmental legislation and regulations also has contributed to the delay in getting its plan approved. Regulations are proposed by the Illinois Environmental Protection Agency and promulgated by the Illinois Pollution Control Board. The process can take up to three years. Further, the Board is a separate and independent entity that holds hearings and allows testimony on the proposed rules, sometimes using information gained during hearings to modify the rules and grant variances. In 1982, for example, it adopted rules that did not comply with EPA's guidance for five of nine sources in one group of industrial sources. Proposals to correct these identified deficiencies and control other industrial sources are before the Board and in various stages of adoption.

Progress in Controlling Emissions

According to state reports, all three states have made some progress in controlling their emissions of ozone-forming pollutants. For example, by 1985 Illinois and Wisconsin had reduced emission levels by 35 percent and 31 percent, respectively (see app. II). Furthermore, between 1983 and 1986, both the number of days that the ozone standard was exceeded and the ozone levels decreased. In 1987, however, these figures increased (app. III and IV). According to EPA officials, these increases were primarily caused by the high temperatures experienced in the area.

EPA Proposed to Disapprove Plans

Although EPA had previously proposed approval of portions of Illinois' and Indiana's plans, it concluded that the plans as a whole did not adequately demonstrate attainment of the ozone standard by the December 31, 1987, deadline and therefore proposed by Federal Register notice dated July 14, 1987, to disapprove Illinois' and Indiana's overall plans. On the basis of its finding that the plans do not meet the requirements of the act, EPA also

proposed to impose a ban on the construction or modification of major sources of pollution in these states. The notice also states that once the ban is in place, EPA would lift it only upon final approval of a revised ozone plan.[1]

A construction ban has already been imposed in eight Illinois areas because a federal court invalidated Illinois' rules for building or modifying factories that emit controlled chemicals (see section 9). Therefore, according to EPA, the effect of the proposed ban on Illinois would be to add another prerequisite--the submission of a plan to assure attainment--to removing the existing ban.

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[1]On December 22, 1987, legislation was enacted (P.L. 100-202) that prohibits EPA from taking action to impose economic sanctions under the Clean Air Act in ozone and carbon monoxide areas until August 31, 1988.

EPA HAS NOT DEVELOPED AND ISSUED OZONE PLANS FOR ILLINOIS AND INDIANA

- THE CLEAN AIR ACT STATES THAT EPA SHOULD PROMPTLY PREPARE AND PUBLISH REGULATIONS ESTABLISHING IMPLEMENTATION PLANS IF A STATE

  FAILS TO SUBMIT A PLAN THAT MEETS THE REQUIREMENTS OR

  FAILS TO REVISE THE PLAN WHEN NOTIFIED OF DEFICIENCIES.

- SOME COURTS HAVE DECLINED TO REQUIRE A FEDERAL PLAN BEFORE FINAL DISAPPROVAL OF THE STATE PLAN.

- EPA PREFERS NOT TO PROMULGATE IMPLEMENTATION PLANS BECAUSE

  STATES HAVE ALREADY DEVELOPED AND IMPLEMENTED MANY OF THE REQUIRED REGULATIONS;

  THIS WOULD REQUIRE USING STATE ENVIRONMENTAL GRANT FUNDS, WHICH WOULD NEGATIVELY AFFECT STATE AGENCIES' ABILITY TO CARRY OUT AIR POLLUTION CONTROL PROGRAMS IN THE FUTURE;

  EPA WOULD HAVE TO HIRE A CONTRACTOR TO DEVELOP THE PLANS SINCE ITS OWN PERSONNEL IS BUSY REVIEWING AND ACTING ON PLAN REVISIONS; AND

  THE FEDERAL GOVERNMENT CANNOT EFFECTIVELY ENFORCE ALL OF THE PLANS' REQUIREMENTS.

- EPA HAS USED SANCTIONS TO ENCOURAGE STATES TO IMPLEMENT PLANS.

- WISCONSIN CONTENDS THAT EPA SHOULD DEVELOP AND PROMULGATE OZONE PLANS FOR ILLINOIS AND INDIANA.

SECTION 7

EPA HAS NOT DEVELOPED AND ISSUED OZONE PLANS FOR ILLINOIS AND INDIANA

The Clean Air Act states that EPA should promptly prepare and publish regulations establishing implementation plans if states do not submit plans meeting the act's requirements or do not revise plans when notified of deficiencies. Some courts, however, have declined to require a federal plan before final disapproval of a state plan, and EPA prefers to work with the states to resolve deficiencies and develop approvable plans rather than issue federal plans. Although neither Illinois nor Indiana has fully approved plans, both states have been working cooperatively with EPA to develop them.

The Clean Air Act states that EPA must promulgate a federal plan when a state does not submit an adequate plan. However, in several cases in which EPA had conditionally approved state plans, requiring the states to make further revisions to satisfy the conditions before final approval, the Second and Fifth Circuit Courts of Appeals ruled that EPA could give states an opportunity to correct minor deficiencies in their plans. The courts found it "unlikely that Congress intended the imposition of a federal plan to be preferred to a commitment by the state to make the needed modifications."[1] However, EPA's disapproval of all or a portion of a state's implementation plan, and the state's failure to correct the deficiency, may trigger its duty to begin federal rulemaking.[2]

EPA has not developed federal plans for ozone since the 1979 plans were submitted. According to EPA officials, development of a federal plan could be counterproductive. Because EPA personnel are occupied with reviewing and acting on state implementation plan revisions, the agency would have to hire contractors to develop the federal plans using the federal grant funds normally provided to the states to operate their pollution control programs. According to these officials, this could disrupt the states' pollution control programs and adversely affect their ability to carry out such programs.

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[1]City of Seabrook v. United States Environmental Protection Agency, 659 F.2d 1349,1356 (5th Cir. 1981); accord Connecticut Fund for the Environment v. Environmental Protection Agency, 672 F.2d 998,1011 (2d Cir.), cert. denied, 459 U.S. 1035 (1982).

[2]See Citizens for a Better Environment v. Costle, 610 F. Supp. 106,111 (N.D. Ill. 1985).

As an example, EPA cited its implementation of a sulfur dioxide plan in Ohio. EPA officials said that they withheld only limited grant funds, using their own staff to develop and implement the plan. Nevertheless, Ohio's program was disrupted. Because EPA took over this program, Ohio laid off some of its environmental personnel. When the program was returned to Ohio, it had to rehire and retrain its staff.

These officials also said that developing and implementing an ozone plan is harder than developing and implementing a sulfur dioxide plan. Because sources emitting ozone-forming pollutants are usually more diversified and smaller than are sulfur dioxide-emitting sources, they are harder to identify and monitor. Implementing an ozone plan would, therefore, require more contractor involvement and the use of more grant funds.

EPA officials added that the federal government cannot effectively implement all plan requirements. Effective implementation of an automobile inspection program, for example, would require the facilities and staff to conduct inspections and the establishment of a mechanism, such as withholding vehicle registration and driver licenses, to ensure program compliance. As a consequence, the federal government would have to hire contractors to establish and operate inspection facilities and coordinate with the states in revoking driving privileges. Furthermore, EPA officials consider the states to be better equipped to develop their own plans. They have more in-depth knowledge of the types of industrial and automotive emission sources within their boundaries and are better able to pass and enforce the laws needed to carry out the act's requirements.

EPA has, therefore, adopted a policy of working with the states and, when necessary, applying the sanctions authorized by the act to ensure plan development and implementation. The sanctions include withholding highway, sewer, and air pollution funds and instituting construction bans. EPA has used the threat of withholding highway funds to get Illinois and Indiana to adopt automobile inspection and maintenance legislation.

Despite this policy, in June 1987 EPA proposed to issue rules for Illinois for building and modifying factories that emit major amounts of controlled chemicals (52 Fed. Reg. 24036 (1987)). In this case, however, the rules EPA proposed to issue were developed by the Illinois environmental agency. According to EPA, the state had requested EPA to issue the regulations and had agreed to accept the responsibility for implementing them. The state simultaneously is processing these rules. If the rules finally adopted by the state are found acceptable to EPA, EPA will approve the state's rules and discontinue the promulgation of federal rules.

Although recognizing that Illinois and Indiana had implemented some control regulations, Wisconsin did not consider these actions

adequate. Wisconsin officials contended that EPA should promulgate plans for the states because the states had received EPA's final approval of only limited portions of their plans and they lagged behind in developing required regulations. Accordingly, in April 1987, Wisconsin filed a lawsuit to require EPA to develop and promulgate federal ozone plans for the states.

EPA'S PROCESS FOR DETERMINING OUT-OF-STATE POLLUTION SOURCES IS NOT VIABLE FOR OZONE

- THE CLEAN AIR ACT PERMITS STATES OR POLITICAL SUBDIVISIONS TO PETITION EPA FOR RELIEF WHEN MAJOR INDUSTRIAL SOURCES IN ANOTHER STATE ARE INTERFERING WITH THEIR AIR POLLUTION CONTROL PROGRAMS.
- NEITHER EPA NOR THE STATES CAN IDENTIFY SPECIFIC SOURCES CAUSING THE OZONE FORMATION.
- NO INTERSTATE OZONE POLLUTION PETITIONS HAVE BEEN FILED WITH EPA.
- THE PETITION PROCESS DOES NOT APPEAR TO BE VIABLE FOR OZONE.

SECTION 8

EPA'S PROCESS FOR DETERMINING OUT-OF-STATE POLLUTION SOURCES IS NOT VIABLE FOR OZONE

Recognizing that interstate air pollution is a serious problem, the Congress amended the Clean Air Act in 1977 to require states to prevent their industries from interfering with the maintenance of air quality in another state. The act allows a state or political subdivision to petition EPA for assistance when the state suspects major industrial source(s) in other states of preventing it from achieving or maintaining an air quality standard.

In 1981, EPA developed criteria to assist a state or political subdivision in filing these petitions. The criteria require the petitioning state to demonstrate

-- the geographic boundaries of the area(s) in which the pollution is occurring,

-- specifically identified out-of-state sources preventing the achievement of the state's air quality standards, and

-- adequate control of its own pollution sources.

As of July 1987, EPA had received nine petitions from states claiming that their air quality deteriorated because of pollution from other states. The petitions cited sulfur dioxide and suspended particulate matter pollutants, not ozone. EPA denied four of the petitions, four were resolved through implementation plan revisions, and one was resolved by state enforcement actions.

EPA's petition process does not appear to be viable for resolving interstate pollution claims relating to ozone. Ozone is a secondary pollutant that is not emitted directly from factory smokestacks or automobile tailpipes but is created in the atmosphere, often miles from the emitting sources. Consequently, ozone's formation cannot be traced to exact sources. Therefore, one EPA criterion for a successful petition--the identification of the exact source(s) causing ozone--cannot be met. In this regard, EPA and state officials said that it is almost impossible to file a successful ozone petition.

EPA'S IMPLEMENTATION OF THE CONSTRUCTION BAN

- THE CLEAN AIR ACT PROVIDES FOR EPA TO IMPLEMENT CONSTRUCTION BANS IN STATES THAT DO NOT COMPLY WITH CERTAIN REQUIREMENTS OF THE ACT.
- EPA IMPOSED THE CONSTRUCTION BANS IN MANY AREAS NATIONWIDE FOR ONE OR MORE POLLUTANTS.
- NATIONWIDE, 10 BANS ARE IN EFFECT FOR OZONE--2 IN KENTUCKY AND 8 IN ILLINOIS.

SECTION 9

EPA'S IMPLEMENTATION OF THE CONSTRUCTION BAN

The Clean Air Act provides for the imposition of a construction ban in states that fail either to prepare an adequate state plan or to implement approved plan provisions. EPA's construction ban prohibits the construction of large factories that emit 100 tons or more of pollutants per year. It also prohibits modifying these existing facilities if the modification increases the annual emission of pollutants causing ozone by 40 tons or more. EPA has imposed the ban in various nonattainment areas across the United States.

In 1978 EPA designated over 400 areas as nonattainment areas for one or more air pollutants. The states were to have EPA-approved plans to control the pollutants in these areas by July 1, 1979. By that date, however, only a few states had plans that met the act's requirements. On July 2, 1979, EPA imposed a construction ban in each of the areas not meeting the requirements. Since that date, many of the bans have been lifted, and additional bans have been imposed. EPA, however, has not maintained a complete record showing where and why the bans were imposed or lifted.

In September 1985, we reported that as of April 1985, about 75 areas were operating under construction bans for violating requirements for one or more pollutants. Ten of those bans were for ozone--eight in Illinois and two in Indiana. Illinois' eight construction bans were imposed in May 1981 when the Seventh Circuit Court of Appeals declared invalid Illinois' rules for building or modifying factories that emit controlled chemicals in its nonattainment areas. The court invalidated the rules because they were issued by the state's environmental protection agency instead of the Illinois Pollution Control Board, as required by Illinois statute. Indiana's ban was imposed because it did not originally consider Elkhart and St. Joseph counties as nonattainment areas and did not submit plans for them.

As of January 1987, six states that were required to submit revised implementation plans in 1982 did not have fully approved plans for ozone. EPA had imposed construction bans in 10 areas within 2 of the states. None of the bans was imposed for lack of fully approved plans. Eight were in Illinois (those previously mentioned), and two bans were in Kentucky. The two in Kentucky were imposed because the state had not implemented an automobile inspection and maintenance program, as required by the act. The remaining states with unapproved plans had implemented the required automobile inspection and maintenance programs and rules for building and modifying factories. As of July 1987, the construction bans remained in effect in the two states.

FEW FACTORIES BUILT OR MODIFIED EMIT MAJOR AMOUNTS OF HYDROCARBONS

- THE CLEAN AIR ACT REQUIRES STATES TO DEVELOP PROGRAMS TO CONTROL THE CONSTRUCTION AND MODIFICATION OF FACTORIES THAT EMIT MAJOR AMOUNTS OF CONTROLLED POLLUTANTS.
- ALL THREE STATES HAVE IMPLEMENTED PROGRAMS; HOWEVER, ILLINOIS' PROGRAM HAS NOT BEEN APPROVED BY EPA.
- BETWEEN 1980 AND 1986, THE STATES ISSUED FEW CONSTRUCTION PERMITS, AND FEW FACTORIES WERE BUILT OR MODIFIED.
- STATES AND EPA INSPECT COMPANIES TO IDENTIFY VIOLATIONS AND TAKE ENFORCEMENT ACTIONS.

SECTION 10

FEW FACTORIES BUILT OR MODIFIED EMIT MAJOR AMOUNTS OF HYDROCARBONS

The Clean Air Act requires states to develop programs to control the construction and modification of major industrial sources. Major sources are those that emit 100 tons or more of controlled chemicals annually. The states are also required to notify neighboring states when such sources of pollution are constructed. State records showed that from 1980 to 1986, three such facilities were constructed and seven modifications were made in northeastern Illinois, northwestern Indiana, and southeastern Wisconsin. The states did not always notify neighboring states of the construction, however.

Illinois, Indiana, and Wisconsin have developed and implemented programs to control the construction and modification of both major and minor sources of controlled chemicals, although, as discussed in section 9, Illinois' program has not been approved by EPA. Under these programs, states issue operating permits to operate existing facilities and construction permits to build new facilities that emit 100 tons or more of controlled chemicals annually or to modify such facilities if annual emissions increase by at least 40 tons. States also conduct periodic inspections to ensure that facilities comply with the act's requirements. States and EPA take enforcement actions when violators are identified. Although the act does not require the control of minor sources of pollution, all three states have included some controls of minor sources in their programs.

State records showed that between 1980 and 1986, the three states issued six construction permits to major facilities. Two were to build factories that emit major amounts of controlled chemicals, and four were to modify factories in the states' ozone nonattainment areas. In addition, one company built a new facility and made three modifications without obtaining permits.

One factory was built and one was modified in northeastern Illinois, but their permits were approved before the construction ban became effective. In addition, an existing company modified its facility without obtaining appropriate permits. An EPA official told us that this modification did not exceed emissions allowable under the construction ban. The modification, therefore, was not considered a major modification. (However, EPA is in the process of taking enforcement actions against the company for violating other requirements of the Clean Air Act.) EPA and Illinois have not identified any companies that built or modified facilities in violation of Illinois' construction ban.

In the southeastern Wisconsin nonattainment area, one new facility was constructed and three modifications were made for which the state issued permits. In addition, one factory was built without a permit. This factory also made three modifications without obtaining the appropriate permits. Wisconsin is now taking enforcement actions against the company.

No facilities were built or modified in the northwestern Indiana nonattainment areas.

To help ensure the effectiveness of the control programs, the act requires EPA and states to take actions against companies violating the act's provisions. It holds EPA primarily responsible for enforcement actions, but allows EPA to delegate enforcement authority to the states when it determines that their enforcement procedures are adequate. EPA made such determinations for all three states. EPA does, however, work cooperatively with the states to identify violators and take enforcement actions. Each month EPA enforcement officials conduct a telephone conference with state officials to discuss and follow up on the status of suspected violators.

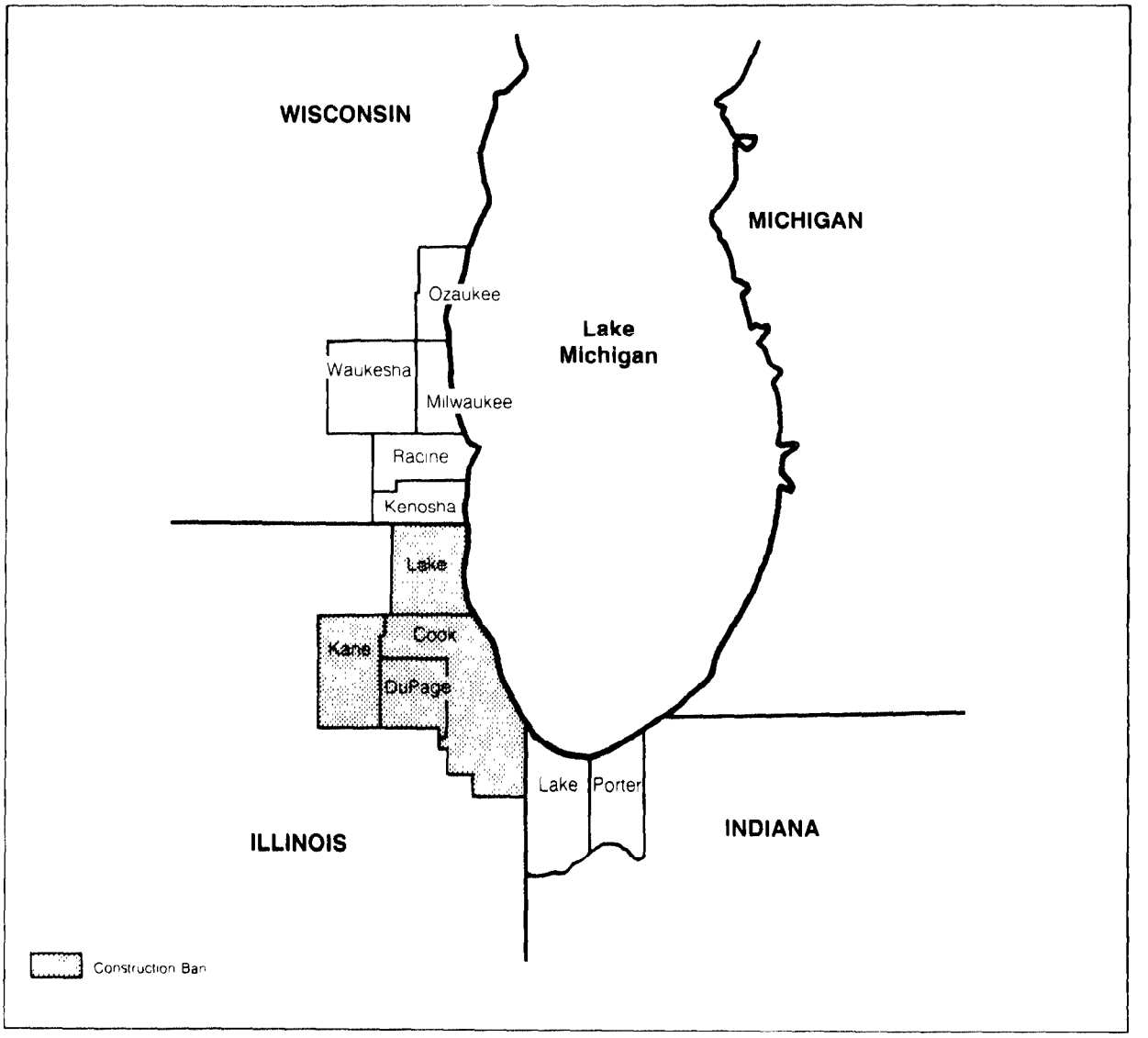
To identify violators, EPA and the states inspect industrial sources, review trade journals, review telephone directories, and follow up on citizens' and competitors' referrals. According to state officials, between January and July 1987, states identified 104 companies that were violating Clean Air Act requirements (71 in Illinois, 7 in Indiana, and 26 in Wisconsin). They sent these companies letters notifying them of violations and requesting corrective actions. If companies do not make corrections as a result of the letters, further actions will be taken.

To understand EPA and state enforcement efforts better, we reviewed 26 federal and state hydrocarbon enforcement cases--16 in Illinois, 6 in Indiana, and 4 in Wisconsin. We had received information that five of the federal cases may have violated the construction ban in Illinois. However, our review of Illinois and EPA records and discussions with EPA and Illinois state officials showed that none of the five cases violated the construction ban, although they may have violated other requirements of the act. Additionally, both the federal and state cases generally complied with the act's enforcement requirements. In some instances, however, enforcement actions did not meet EPA's timeliness guidance.

All three states had adopted procedures for notifying neighboring states of proposed construction. However, according to state officials, they did not always do so. Between 1980 and 1986, Wisconsin notified Illinois of only one proposed facility, and Illinois did not notify the neighboring states of any of the proposed construction. As noted, Indiana did not construct or modify any facilities in its northwestern nonattainment area.

APPENDIX I

GEOGRAPHIC AREAS WITHIN THREE STATES COVERED BY AUDIT



Note: Also included in our audit were Walworth and Washington counties in southeastern Wisconsin and McHenry and Will counties in northeastern Illinois. These counties were in attainment. Labeled counties are in nonattainment.

APPENDIX II

COMPARISON OF BASE YEAR EMISSIONS AND 1985 ACTUAL EMISSIONS

State	Base year emissions[a]	Reductions needed to reach standard		1985 actual emissions	Amount of reduction by 1985	
	(kilograms)	(percent)	(kilograms)	(kilograms)	(percent)	(kilograms)
Wisconsin	294,874	33.6	99,078	203,285	31	91,589
Illinois	1,298,087	46.0	597,120	849,981	35	448,106
Indiana	257,176	46.0	118,301	185,721	28	71,455

Note: Emissions are in kilograms for an average or typical summer weekday. The latest data available are for 1985.

[a]Base year emissions are the hydrocarbon emissions at the time EPA and the states determined the reductions needed to reach the ozone standard by 1987. Figures shown represent 1979 data for Illinois and Indiana and 1980 data for Wisconsin.

Source: Reasonable Further Progress Report for 1985 and Indiana environmental officials.

DAYS OZONE STANDARD EXCEEDED IN SELECTED AREAS IN ILLINOIS, INDIANA, AND WISCONSIN--1983 THROUGH AUGUST 1987

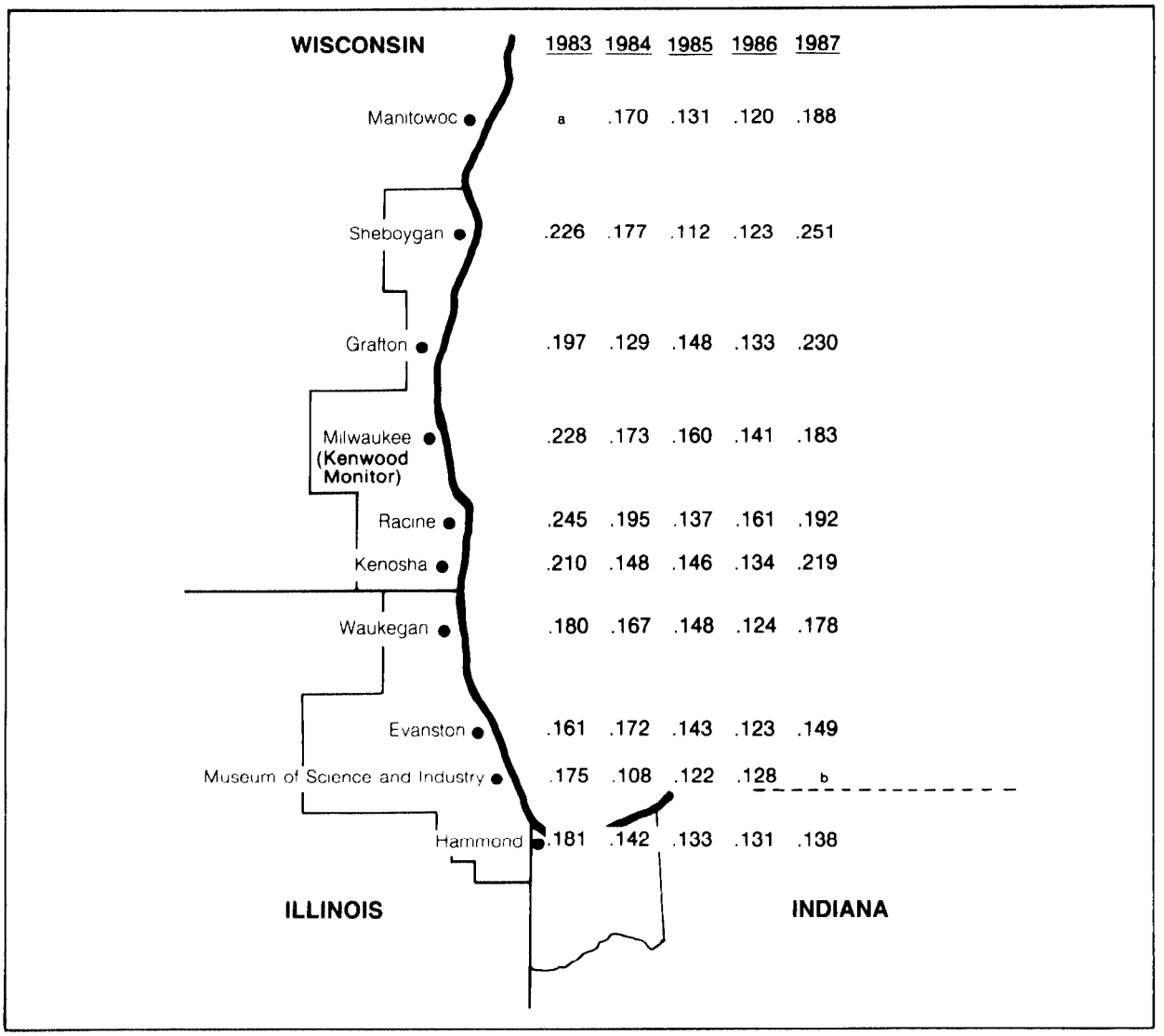
	1983	1984	1985	1986	1987
Illinois' Chicago area (Cook, DuPage, Kane, Lake, McHenry, and Will counties)	15	7	7	1	12
Indiana (Lake and Porter counties)	8	9	2	4	1
Southeastern Wisconsin area (Kenosha, Racine, Waukesha, Milwaukee, Ozaukee, Walworth, and Washington counties)	16	8	7	8	19

Note: Areas are considered to have exceeded standard if the hourly ozone reading is greater than 0.12 PPM.

Source: Reasonable Further Progress Reports for 1985 and 1986; state environmental officials for 1987 data.

APPENDIX IV

HIGHEST ANNUAL OZONE MONITOR READINGS IN SELECTED COUNTIES IN WISCONSIN, ILLINOIS, AND INDIANA BETWEEN 1983 AND 1987



	1983	1984	1985	1986	1987
Manitowoc	[a]	.170	.131	.120	.188
Sheboygan	.226	.177	.112	.123	.251
Grafton	.197	.129	.148	.133	.230
Milwaukee (Kenwood Monitor)	.228	.173	.160	.141	.183
Racine	.245	.195	.137	.161	.192
Kenosha	.210	.148	.146	.134	.219
Waukegan	.180	.167	.148	.124	.178
Evanston	.161	.172	.143	.123	.149
Museum of Science and Industry	.175	.108	.122	.128	[b]
Hammond	.181	.142	.133	.131	.138

[a]Monitor not in operation.
[b]Use of monitor discontinued in 1987.

Source: Reasonable Further Progress Reports for 1985 and 1986; state environmental officials for 1987 data.

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