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**AN ECONOMIC EVALUATION
OF THE PROPOSED ILLINOIS
COMPLEX SOURCE REGULATION**

MASTER

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AN ECONOMIC EVALUATION OF THE PROPOSED
ILLINOIS COMPLEX SOURCE REGULATION*

by

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and Robert K. Seyfried†

Energy and Environmental Systems Division

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†Westenhoff and Novick, Inc.

EXECUTIVE SUMMARY

The total cost of the proposed Illinois Complex Source Regulation to individuals and organizations directly involved in the development process was estimated to be \$25.5 million annually.* Of this figure, \$20 million can be attributed to provisions in the proposed Illinois regulation that are not incorporated in the Federal Indirect Source Regulation. These differences are referred to as the screening process, apportionment scheme, last stop, reporting area, and public participation provisions. From Table 1 it is clear that the apportionment scheme is the provision that accounts for most of the cost difference between the state and federal regulations.

Table 1 also indicates that on an absolute basis residential developments will incur the greatest aggregate costs. On a per dollar invested basis, however, regional shopping centers and major sports complexes incur the greatest costs and thus bear the greatest economic burdens. (These results are presented in Table 2.) Because the number of major sports complexes constructed each year is small, it can be concluded that regional shopping centers constitute the most important type of development affected by a complex source regulation.

The case study analysis also indicated that approximately 90 percent of the costs of the regulation are modification costs. Since a major portion of these costs represent roadway modifications, it is reasonable to expect that taxpayers, not developers, will pay the major costs associated with a complex source regulation.

The Gross State Product (GSP) for Illinois in 1973 was estimated to be \$77,585 million.** A comparison of this GSP with the cost of the complex source regulation or the investment dollars required for a major development implies that the regulation will have an extremely small, if any, impact on Illinois economy.

*This estimate was obtained from case study analyses as reported in this document and "An Economic Evaluation of the Federal Indirect Source Regulation" (Cohen and Tschanz, 1974).

**Illinois State and Regional Economic Data Book, Dept. of Business and Economic Development, 1973.

TABLE 1. Summary of the Marginal Costs of the Illinois Regulation by Variations in the Regulations^a

Type of Development	Screening Process	Apportionment Scheme	Last Stop	Reporting Area	Public Participation	Total for State/Yr
(Thousands of Dollars)						
Regional Shopping Centers	9.7	5,040.0	67.9	7.0	2.4	2,160.0
Retail/Commercial Strip	8.5	0.0	0.0	0.0	0.0	375.0
Office, Government, and Misc.	51.6	0.0	0.0	1.4	0.0	470.0
Manufacturing Industry	0.0	0.0	0.0	1.4	0.0	25.9
Residential	0.0	300.0	0.0	2.8	2.4	13,000.0
Recreational, Sports, etc.	17.4	3,950.0	0.0	1.4	0.0	4,000.0
Total for state	751.0	18,900.0	28.1	172.0	130.0	20,000.0 ^b
Percent Total	3.8	94.5	.1	.9	.7	100.0

^aThese cost figures assume a 30% apportionment scheme and a 1975 vehicle mix.

^bResults are presented to only those significant figures, therefore, sums may not agree.

Source: Cohen, A. S., et al., "An Economic Evaluation of the Proposed Illinois Complex Source Regulation," Tables 1-12.

TABLE 2. Relative Cost of the State Regulation for the Case Studies

Type of Development	Total Cost (A)	Total Value (B)	Percent (A/B)100
(Thousands of Dollars)			
Regional Shopping Centers	8,320.0	243,000	3.4
Retail/Commercial Strip	8.5	3,800	.3
Office, Government, and Misc.	74.8	57,400	.1
Manufacturing Industry	44.5	92,800	.0
Residential	369.0	99,700	.4
Recreational/Sports, etc.	4,870.0	29,300	16.6

Source: Cohen, A. S., et al., "An Economic Evaluation of the Proposed Illinois Source Regulation," Table 14 and Cohen A. S. and Tschanz, J. F., "An Economic Evaluation of the Federal Indirect Source Regulation," Table 3.

The cost results presented here were generated using the case study approach. To conduct the analysis the following procedure was followed:

(1) case studies were selected; (2) roadway networks about the development were identified and analyzed; (3) traffic conditions prior to the development were estimated; (4) induced traffic of the development was estimated; (5) air quality estimates were made using the Federal HIWAY dispersion model; and (6) costs of the regulation were estimated.

For the above analysis some assumptions had to be made and some of the more important of these are: (1) the case studies are representative of developments throughout Illinois; (2) the meteorological conditions suggested in the Interim Guidelines* are appropriate; and (3) the definition of reasonable receptor as any residential, outdoor work, recreational, or open space area.

*"Interim Guidelines for the Review of the Impact of Indirect Sources on Ambient Air Quality," U.S. Environmental Protection Agency, Office of Air Quality Planning Standards, July 1974.

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGMENTS	9
ABSTRACT	11
INTRODUCTION	11
COMPARING THE REGULATIONS	31
COST RESULTS	32
Summary of Cost Estimates	32
Parametric Analyses	42
SPECIAL ISSUES	47
SUMMARY AND CONCLUSIONS	48
APPENDIX A -- DETAILED COMPARISON OF THE REGULATIONS	52
The Proposed Illinois Complex Source Regulation	70
The Federal Indirect Source Regulation	88
APPENDIX B -- COST ESTIMATION PROCEDURE AND ASSUMPTIONS	102
Analysis Costs	102
Delay Costs	104
Calculating Delay Times	104
Calculating the Preconstruction Investment	115
Modification Costs	117
Phasing Costs	131
Costs Resulting from the Apportionment Aspect of the Illinois Regulation	131
Costs Resulting from the Continuous Construction Provision	133
Calculating the Marginal Costs of the State Regulation	134
Case Study Cost Estimates	134
Statewide Cost Estimates	136

TABLE OF CONTENTS (Contd.)

	<u>Page</u>
APPENDIX C -- TRAFFIC ANALYSES, PROCEDURES, AND ASSUMPTIONS . . .	141
Traffic Generations	142
Trip Assignment	142
Traffic Volumes	143
Average Speeds	143
Control Option Cost Estimates	143
APPENDIX D -- AIR QUALITY ANALYSES, PROCEDURES, AND ASSUMPTIONS .	145
Geometry of Critical Receptor Sites	146
Roadway Line Emission Factors	148
CO Concentration Calculations	150
General Assumptions for Total CO Concentrations	153

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
1	Receptor Locations for Ford City	17
2	Receptor Locations for Hillside	18
3	Receptor Locations for Oak Brook	19
4	Receptor Locations for River Oaks	20
5	Receptor Locations for Town & Country	21
6	Receptor Locations for Howard & Western	22
7	Receptor Locations for Allstate	23
8	Receptor Locations for DuPage County	24
9	Receptor Locations for Evanston Parking Garage and the State National Bank	25
10	Receptor Locations for Chrysler Plant	26
11	Receptor Locations for Four Lakes Village	27
12	Receptor Locations for Sandburg Village	28
13	Receptor Locations for Arlington Park	29
14	Receptor Locations for Oakton Skating Rink	30
APPENDIX A		
A-1	Criteria to Determine Which Proposed Indirect Sources Are Subject to Federal Regulations	55
A-2a	Criteria for Determining Applicability of Proposed Illinois Complex Source Regulations	56
A-2b	Criteria for Determining Applicability of Proposed Illinois Complex Source Regulations	57
A-2c	Criteria for Determining Applicability of Proposed Illinois Complex Source Regulations	58
APPENDIX B		
B-1	The Preconstruction Development Process Without A Complex Source Regulation	105
B-2	The Preconstruction Development Process With the Federal Complex Source Regulation	107

LIST OF FIGURES (Contd.)

<u>FIGURE</u>		<u>PAGE</u>
B-3	The Preconstruction Development Process With the State Complex Source Regulation	108
B-4	Delay Times of the Federal Regulation	112
B-5	Delay Times of the Illinois Regulation	113
B-6	Marginal Delay Times	114
APPENDIX D		
D-1	CO Emission Factors	149
D-2	Calculated CO Concentrations	151
D-3	Comparison Between HIWAY and Federal EPA Guidelines	152

LIST OF TABLES

<u>TABLE</u>		<u>PAGE</u>
1	Marginal Costs of the Illinois Regulation, Regional Shopping Center, Type of Cost	33
2	Marginal Costs of the Illinois Regulation, Regional Shopping Center, Variations in the Regulations	33
3	Marginal Costs of the Illinois Regulation, Retail/Commercial Strip, Type of Cost	34
4	Marginal Costs of the Illinois Regulation, Retail/Commercial Strip, Variations in the Regulations	34
5	Marginal Costs of the Illinois Regulation, Office, Government, and Miscellaneous, Type of Cost	35
6	Marginal Costs of the Illinois Regulation, Office, Government, and Miscellaneous, Variations in the Regulations	35
7	Marginal Costs of the Illinois Regulation, Manufacturing Industry, Type of Cost	36
8	Marginal Costs of the Illinois Regulation, Manufacturing Industry, Variations in the Regulations	36
9	Marginal Costs of the Illinois Regulation, Residential, Type of Cost	37
10	Marginal Costs of the Illinois Regulation, Residential, Variations in the Regulations	37
11	Marginal Costs of the Illinois Regulation, Recreation, Amusement, Sports, and Entertainment, Type of Cost	38
12	Marginal Costs of the Illinois Regulation, Recreation, Amusement, Sports, and Entertainment Variations in the Regulations	38
13	Summary, Marginal Costs of the Illinois Regulation, 30% Apportionment, 1975 Vehicle Mix	40

LIST OF TABLES (Contd.)

<u>TABLE</u>		<u>PAGE</u>
14	Relative Marginal Cost of the State Regulations.	41
15	Parametric Analysis 1, Marginal Costs of the Illinois Regulation, 60% Apportionment.	43
16	Parametric Analysis 2, Marginal Costs of the Illinois Regulation, 30% Apportionment.	44
17	Parametric Analysis 3, Marginal Costs of the Illinois Regulation, 60% Apportionment.	45
18	Complex Sources Requiring Permit Review	46
B-1	Data Used To Estimate PreConstruction Costs.	116
R-2	Alternative Control Option	117
B-3	Control Options Used in the Analyses	118
B-4	Road Modification Cost Coefficients.	118
B-5a	Expressway and Freeway Land Costs	119
B-5b	Arterial Land Costs.	121
B-5c	Expressway and Freeway Construction Costs.	122
B-5d	Arterial Construction Costs.	123
B-6	Air Quality Improvements Required at the First Receptor. . .	126
B-7	Air Quality Improvements Required at the Second Receptor . .	127
B-8	Air Quality Improvements Required at the Third Receptor. . .	128
B-9	Air Quality Improvements Required at the Fourth Receptor . .	129
B-10	Roadway and Intersection Improvements For Each Case Study. .	130
B-11	Maximum 8-hr Carbon Monoxide Concentrations at Receptor R3 ^a (ppm)	132
B-12	Maximum 8-hr Carbon Monoxide Concentrations at Receptor R3 ^a (ppm)	133
B-13	Absolute Cost Estimates.	135
B-14	Estimated Number of Developments Requiring Complex Source Permits per Year.	137
B-15	Marginal Cost Coefficients	138
B-16	Statewide Marginal Cost Estimates.	139
D-1	Receptor Locations Beyond a Quarter Mile Radius of a Complex Source	147

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ABSTRACT

This report compares the costs of the federal indirect source and the proposed Illinois complex source regulations. The analysis, delay, modification, and phasing costs associated with the regulations are discussed, and all but the phasing costs are quantified. The report shows that the modification costs are the most important and that regional shopping centers incur the largest relative costs. Various parametric analyses are conducted to determine the sensitivity of the cost estimates to the apportionment scheme used in the regulation and to the federal new-car emission standards.

INTRODUCTION

This report compares the costs of the federal indirect source and the proposed Illinois complex source regulations.* The cost estimates were limited to the direct costs of the regulations, i.e., those costs that would be paid for by "the developer." In the context of this report, the term "the developer" is a collective term that refers to any party directly involved in the development process, such as land speculators and sellers; building contractors; industrial, retail, and commercial business; and government agencies (taxpayers); as well as the developer. No attempt was made to allocate the costs to each of these special interest groups.

The evaluation of the economic consequences to developers of the Illinois complex source regulation was conducted using the case studies approach. To conduct the analysis, the following procedure was used: (1) the case studies were selected; (2) the roadway networks about the development were identified and analyzed; (3) traffic conditions prior to the development were estimated; (4) the induced traffic of the development was estimated;** (5) the costs of the federal and state regulations were estimated on the assumption that each was in effect before the development was constructed; and (6) the marginal cost (i.e., the cost of the state regulation minus the cost of the federal regulation) of the regulations was estimated.

This procedure has two important advantages over a method in which costs are synthetically estimated on the basis of hypothetical developments. First of all, the case studies are actual developments, and are, therefore, representative of the developments that occur in Illinois. Similarly, the existing road conditions are representative of those found throughout the

*"Air Programs, Approval and Promulgation of Implementation Plans -- Reviews of Indirect Sources," Federal Register, Vol. 39, No. 132, Part II, July 9, 1974, pp 35292-25301. Proposed Part IX: Complex Source Regulations (with Amendments as of 3/6/74), Rule 901-914. See Appendix A for copies of these regulations.

**The traffic and roadway modification analyses were conducted by Westenhoff and Novick, Inc.

state. Because of these advantages, the results generated for the case studies can be used to make estimates of the marginal costs of the state regulations on a statewide basis.*

In order to make inferences from the case studies about developments throughout the state, it was necessary to select many types of developments of various sizes. Although some of the smaller case studies would not require a permit review, it was important to establish the smallest size development that might incur costs as a result of the regulation. Furthermore, regional differences in road conditions, carbon monoxide levels, and other locational parameters made it necessary to select case studies that include urban and suburban sites as well as developments in various sectors of the state. In addition to obtaining a representative and diverse sample, it was equally important that adequate information existed to conduct each case study.

In summary, the criteria for selection were that the case studies must:

- 1) represent developments throughout the state;
- 2) be diverse in type and size;
- 3) include geographical variations, including urban-suburban and statewide coverage; and
- 4) provide adequate data.

Using these criteria, the following set of case studies was selected.

*The case studies analyzed do not represent a statistically significant sample. Therefore, the results presented provide order of magnitude estimates rather than expected value estimates. These are useful for identifying potentially unwarranted (non-economical) provisions in a regulation and to determine the sensitivity of costs to various assumptions.

REGIONAL SHOPPING CENTERS

1. Ford City Shopping Center, Chicago
2. Hillside Shopping Center, Hillside
3. Oak Brook Shopping Center, Oak Brook
4. River Oaks Shopping Center, Calumet City
5. Town and Country Shopping Center, Springfield
6. Northwood Shopping Center, Peoria*

RETAIL/COMMERCIAL STRIP

7. Howard and Western Convenience Center, Chicago
8. McDonalds, Evanston
9. 7/11 Convenience Center, Chicago

OFFICE, GOVERNMENT, AND MISCELLANEOUS

10. Allstate Office Complex, Northbrook
11. DuPage County Civic Center, Wheaton
12. Oak Lawn High School, Oak Lawn*
13. Parking Garage, Evanston
14. State National Bank, Evanston

INDUSTRIAL

15. Caterpillar Tractor Plant, Peoria*
16. Chrysler Plant, Belvidere

RESIDENTIAL

17. Four Lakes Village, Lisle
18. Sandburg Village, Chicago

RECREATION, AMUSEMENT, SPORTS, AND ENTERTAINMENT

19. Arlington Park Raceway, Arlington Heights
20. Oakton Skating Rink, Park Ridge

*These case studies were not completed because all of the data needed was not obtained.

One note of caution is made about the case study approach. During the course of the study, some assumptions had to be made concerning roadway designs, the costs of the developments, the feasibility of control options, and other parameters affecting the results.* These assumptions should be evaluated on their representativeness for developments throughout the state rather than their exactness for a given case study. Finally, it is emphasized that this project was designed to identify the economic consequences of the proposed Illinois Complex Source regulation (assuming that the federal regulation is given) and not to determine explicit actions and costs that would have been required by each case study. To conduct the latter analyses would have required a considerably larger effort.

For each of these case studies a number of costs resulting from a complex source regulation were identified. These are analysis, delay, modification, and phasing costs. The analysis costs include data acquisition, technical evaluation, field studies, and legal services required to obtain a permit. Although many of these activities are not specifically required by either regulation, a developer would conduct these studies to reduce the risk of not having a permit granted. Delay costs may result if the need to go through the permit process delays the completion of the development. Costs are incurred because moneys that might otherwise be earning interest or returning a profit are tied up. Modification costs are the "control costs" of complying with the regulations. These might include the cost of installing traffic signal, widening a roadway, or reducing the size of the development. Phasing costs deal with the timing of developments in an area. Since the case studies approach does not address itself specifically to timing issues, quantitative estimates were not made. A more detailed discussion of the analysis, delay, modification, and phasing costs and the assumptions used to estimate them are provided in Appendix B.

For each case study the busiest and second busiest roadways within a mile radius of the development were analyzed. In addition, the two roadways that receive the heaviest induced traffic from the development were analyzed. Peak roadway conditions were coupled with the expected induced

*The assumptions were necessary because the actual data was not made available to us or because there was insufficient time to obtain the actual data.

traffic levels during the peak period. Similarly, peak-induced traffic conditions were coupled with the expected roadway conditions occurring at the time of the induced peak. Although this approach does not guarantee that the worst case will be identified, it does provide a practical means of analyzing many developments in a short period of time.

The air quality analysis was conducted using the federal HIWAY model. The meteorological conditions used in the analysis are consistent with those used in the federal guidelines.* These are a 1-m/sec wind speed, 2500-ft mixing height (1500 ft in the winter), and a neutral stability class (i.e., 4 or D). The wind direction was selected to obtain the worst impact of the roadway system on a given receptor. For the 8-hr-standard analysis, the model results were multiplied by .6 to account for variations in the meteorological condition over an 8-hr period.** (See Appendix D for more details on the air quality analysis.)

An extremely important element of the analysis was the identification of receptor locations. The federal guidelines refer to "reasonable receptors." These are locations where a person could reasonably be expected to stay for the duration of the standard period (e.g., eight hours when the 8-hr standard is being considered). In addition, the distinction between indoor and outdoor air quality levels had to be considered. For the purpose of this analysis, reasonable receptor locations were defined as any residential, outdoor work, recreational, or open space areas.*** (Open space areas were selected to account for future growth.) The distance to the receptor from the roadway was measured to a selected point within a residential, recreational, or open space area, and to the lot line of outdoor work areas. If the lot lines were not known, the receptor was placed 50 ft from the edge of the roadway for residential and outdoor work areas and 100 ft from the roadway for recreational and open space areas. Figures 1-14 show the locations of the receptors considered for each case study.

*U.S. Environmental Protection Agency, "Interim Guidelines for the Review of the Impact of Indirect Sources on Ambient Air Quality," Research Triangle Park, N.C., July 1974.

**Ibid, Sec. 1.4.2, p 40.

***In lieu of a precise definition of a reasonable receptor by either the federal or state EPA, we settled on this definition. Note that our use of this definition does not imply that we recommend that it be used by the federal or state EPA.

It should also be mentioned that in the analysis, it was always assumed that the case studies were new developments. Therefore, the results presented do not pertain to modifications made to existing sources. Furthermore, the economic impact of the regulations on highway and airport construction projects was not analyzed.

Fig. 1. Receptor Locations for Ford City

Fig. 2. Receptor Locations for Hillside

Fig. 3. Receptor Locations for Oak Brook

Fig. 4. Receptor Locations for River Oaks

Fig. 5. Receptor Locations for Town & Country

Fig. 6. Receptor Locations for Howard & Western

Fig. 7. Receptor Locations for Allstate

1" = 800'

Fig. 8. Receptor Locations for DuPage County

Fig. 9.. Receptor Locations for Evanston Parking Garage and the State National Bank

Fig. 10. Receptor Locations for Chrysler Plant

Fig. 11. Receptor Locations for Four Lakes Village

Fig. 12. Receptor Locations for Sandburg Village

Fig. 13. Receptor Locations for Arlington Park

Fig. 14. Receptor Locations for Oakton Skating Rink

Comparing The Regulations

The Illinois regulation was compared with the federal regulation to identify differences that could affect the costs of compliance. (A detailed comparison of the regulations is presented in Appendix A.) Six important variations between the regulations were identified. These are: (1) the screening process to determine which developments must submit a permit; (2) the portion of the available air space that can be used up by each development; (3) the time when a permit application can be filed; (4) the size of the reporting area; (5) the requirements for public participation; and (6) the treatment of phased developments. The contribution of each of these differences to the total marginal cost of the state regulation was determined. This cost breakdown is useful for identifying the aspects of the proposed state regulation that are the most costly. The methods for estimating the costs of each of these differences are discussed below.

The screening process used in the state regulation is based on induced traffic and the federal regulation is based on parking lot size. As a result of this difference, some developments are required to apply for a permit under one regulation but not the other. In this comparative study when this occurred, all of the expenditures made by the developer to comply with the regulation were attributed to the screening process. This allocation rule overstates the costs associated with the screening process because it does not take into account the 30-percent apportionment rule that is also incorporated into the state's screening process. Some parametric analyses were conducted to try to separate these two effects.

The costs attributed to the 30-percent apportionment rule are the modification cost differences if both regulations would require the developer to submit a permit. For the reasons stated above, these estimates are understated.

Under the state regulation, a permit application cannot be submitted until all other site-related permits and/or approvals are granted. This will be referred to as the "last-stop provision." The costs of the last-stop provision are the marginal delay costs of the state regulation for those developments that must apply for a permit under both regulations.

The reporting area and the public participation costs are referred to as the data acquisition and legal costs, respectively. Since the state regulation requires the applicant to submit information for a reporting area with a one-mile radius and the federal regulation requires a reporting area with only a quarter-mile radius, the cost of supplying this information is greater for the state regulation. The legal costs for the state regulations are also higher because a public hearing may be required under the state regulation, whereas only written testimony is allowed with the federal regulation. Since public hearings involve more legal services than written testimony, the costs are higher. Since the analysis costs were disaggregated into data acquisition, legal, and air quality and traffic analyses, the costs of the reporting area and public participation provisions of the regulation were easily obtained.

Because the liability of a development is not limited to the reporting area specified in each regulation, it was assumed that a developer would conduct the same air quality and traffic analyses for both regulations. Therefore, when a permit is required by both regulations, the marginal cost of the traffic and air quality analyses is zero. When only one regulation requires a permit, these analysis costs are included as screening process costs.

Finally, there would be a direct correspondence between the phasing costs and the continuous construction requirements of each regulation. (The state regulation requires continuous construction while the federal regulation allows for phased, i.e., non-continuous, construction.) For reasons stated previously, these costs were not quantified. However, it is known that this difference in the regulations will tend to reduce the marginal cost estimates made in this study (see Appendix B).

Cost Results

Summary of Cost Estimates

The marginal cost estimates for the state regulation are presented in Tables 1 through 12. (These costs assume a 1975 national vehicle mix.) The costs have been disaggregated in a number of ways. First of all, the costs are presented for each type of development: regional shopping centers; retail/commercial strips; office, government, and miscellaneous developments; and recreational, amusement, sports, and entertainment establishments.

TABLE 1. Marginal Costs of the Illinois Regulation,
Regional Shopping Center, Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marginal Costs
Ford City	1.4	18.2	2200.0	2220.0
Hillside	1.4	7.2	52.1	60.7
Howard and Western ^b	8.5	1.2	0.0	9.7
Oak Brook	1.4	18.5	1670.0	1690.0
River Oaks	1.4	17.7	939.0	958.0
Town and Country	3.8	6.3	207.0	217.0
Total Case Studies	17.9	69.1	5070.0	5160.0 ^c
Total for the State per year	35.4	27.6	2100.0	2170.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

^bUsed to represent smaller regional shopping centers.

^cResults presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 2. Marginal Costs of the Illinois Regulation,
Regional Shopping Centers, Variations in the
Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Reporting Area	Public Partici- pation	Total Marg. Costs
Ford City	0.0	2200.0	18.2	1.4	0.0	2220.0
Hillside	0.0	19.1	7.2	1.4	0.0	27.7
Howard and Western ^b	9.7	0.0	0.0	0.0	0.0	9.7
Oak Brook	0.0	1670.0	18.5	1.4	0.0	1690.0
River Oaks	0.0	939.0	17.7	1.4	0.0	958.0
Town and Country	0.0	207.0	6.3	1.4	2.4	217.0
Total Case Studies	9.7	5040.0	67.9	7.0	2.4	5120.0
Percent of Total	.2	98.1	1.3	.1	<.1	100.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

^bUsed to represent smaller regional shopping centers.

TABLE 3. Marginal Costs of the Illinois Regulation,
Retail/Commercial Strip, Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marginal Costs
Howard & Western	8.5	0.0	0.0	8.5
McDonalds	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0
Total Case Studies	8.5	0.0	0.0	8.5 ^b
Total for State per year	275.0	0.0	0.0	275.0

^aThese cost figures assume a 30% apportionment scheme and a 1975 vehicle mix.

^bResults presented to only three significant figures, therefore sums may not agree. Values less than \$100 are set equal to zero.

TABLE 4. Marginal Costs of the Illinois Regulation,
Retail/Commercial Strip, Variations in the
Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Reporting Area	Public Partici- pation	Total Marg. Costs
Howard & Western	8.5	0.0	0.0	0.0	0.0	8.5
McDonalds	0.0	0.0	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0	0.0	0.0
Total Case Studies	8.5	0.0	0.0	0.0	0.0	8.5
Percent of Total	100.0	0.0	0.0	0.0	0.0	100.0

^aThese cost figures assume a 30% apportionment scheme and a 1975 vehicle mix.

TABLE 5. Marginal Costs of the Illinois Regulation,
Office, Government, and Miscellaneous,
Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marg. Costs
Allstate Office Complex	1.4	0.0	0.0	1.4
DuPage County Civic Ctr	8.5	4.3	0.0	12.8
Evanston Parking Garage	16.7	1.6	0.0	18.3
State National Bank	16.7	3.8	0.0	20.5
Total Case Studies	43.3	9.7	0.0	53.0 ^b
Total for the State per Year	356.0	114.0	0.0	470.0

^a These cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

^b Results presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 6. Marginal Costs of the Illinois Regulation,
Office, Government, and Miscellaneous,
Variations in the Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Report- ing Area	Public Partici- pation	Total Marg. Costs
Allstate Office Complex	0.0	0.0	0.0	1.4	0.0	1.4
DuPage County Civic Ctr	12.8	0.0	0.0	0.0	0.0	12.8
Evanston Parking Garage	18.3	0.0	0.0	0.0	0.0	18.3
State National Bank	20.5	0.0	0.0	0.0	0.0	20.5
Total Case Studies	51.6	0.0	0.0	1.4	0.0	53.0
Percent of Total	97.0	0.0	0.0	3.0	0.0	100.0

^a These cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

TABLE 7. Marginal Costs of the Illinois Regulation, Manufacturing Industry, Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marg. Costs
Chrysler Plant	1.4	0.0	0.0	1.4
Total for state per year	25.9	0.0	0.0	25.9

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

TABLE 8. Marginal Costs of the Illinois Regulation, Manufacturing Industry, Variations in the Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Report- ing Area	Public Partici- pation	Total Marg. Costs
Chrysler Plant	0.0	0.0	0.0	1.4	0.0	1.4
Percent of Total	0.0	0.0	0.0	100.0	0.0	100.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

TABLE 9. Marginal Costs of the Illinois Regulation,
Residential, Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marg. Costs
Four Lakes Village	1.4	0.0	0.0	1.4
Sandburg Village	3.8	0.0	300.0	304.0
Total Case Studies	5.2	0.0	300.0	305.0
Total for State per year	713.0	328.0	12,000.0	13,000.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.
^bResults presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 10. Marginal Costs of the Illinois Regulation,
Residential, Variations in the Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Report- ing Area	Public Partici- pation	Total Marg. Costs
Four Lakes Village	0.0	0.0	0.0	1.4	0.0	1.4
Sandburg Village	0.0	300.0	0.0	1.4	2.4	304.0
Total Case Studies	0.0	300.0	0.0	2.8	2.4	305.0
Percent of Total	0.0	98.0	0.0	1.0	1.0	100.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

TABLE 11. Marginal Costs of the Illinois Regulation, Recreation, Amusement, Sports, and Entertainment, Type of Cost^a

Case Study (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marg. Costs
Arlington Park Raceway	3.8	0.0	3950.0	3950.0
Oakton Pool/Skating Rink	16.7	0.7	0.0	17.4
Total Case Studies	20.5	0.7	3950.0	3970.0 ^b
Total for State per year	53.9	2.1	3950.0	4000.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.
^bResults presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 12. Marginal Costs of the Illinois Regulation, Recreation, Amusement, Sports, and Entertainment, Variations in the Regulations^a

Case Study (\$10 ³)	Screening Process	Apportion- ment Scheme	Last Stop	Report- ing Area	Public Partici- pation	Total Marg. Costs
Arlington Park Raceway	0.0	3950.0	0.0	1.4	0.0	3950.0
Oakton Pool/ Skating Rink	17.4	0.0	0.0	0.0	0.0	17.4
Total Case Studies	17.4	3950.0	0.0	1.4	0.0	3970.0
Percent of Total	0.4	99.6	0.0	< .1	0.0	100.0

^aThese cost figures assume a 30%-apportionment scheme and a 1975 vehicle mix.

For each of these types of developments the analysis, delay, and modification costs are provided. Finally, the costs associated with each difference in the regulations are provided. These are the screening process, apportionment scheme, last-stop, reporting area, and public participation provisions.

Statewide totals are provided for the analysis, delay, and modification costs. A summary of these costs is presented in Table 13. From this summary table it is quite apparent that the major costs of the regulation are due to the required modifications. However, for all sources other than regional shopping centers and major sports complexes, the analysis costs are the most important. These results imply that the apportionment scheme is the most important variation between the regulations, while the screening process is the second most important provision. The latter is particularly true for smaller developments. Although the last-stop or the delay costs are relatively small, it is important to note that in periods of tight money or rising interest rates, delay costs may be significantly higher. The last-stop provision was included in the state regulation to avoid having the state EPA usurping local zoning decisions. If this is not a real concern, then this provision would not be economically justified.

On a statewide basis, residential developers incur the most costs. These costs seem to be significantly greater than those incurred by other types of developments. The other developments are affected in decreasing order as follows: major sports complexes, regional shopping centers; office, government, and miscellaneous buildings; retail/commercial strip developments; small recreation, amusement, sports and entertainment establishments; and manufacturing (industrial) plants. Both the costs per source and the number of sources expected annually to require a permit review affect these results. (See appendix B on the method used to estimate statewide totals).

The annual estimated marginal cost of the state regulation is \$20 million. This cost estimate by itself has very little meaning. Costs must be stated in relative terms. One such comparison is to relate the marginal costs of the state regulation to the total dollars invested in development projects. Such a comparison was made for the case studies and the results are presented in Table 14. These results indicate that small relative cost increases occur for all developments except regional shopping centers and major sports complexes, which experience higher relative costs. Since the number of major

TABLE 13. Summary, Marginal Costs of the Illinois Regulation,
30%-Apportionment, 1975 Vehicle Mix

Case Studies (\$10 ³)	Analysis Costs	Delay Costs	Modification Costs	Total Marginal Costs
Ford City	1.4	18.2	2200.0	2220.0
Hillside	1.4	7.2	52.1	60.7
Oak Brook	1.4	18.5	1670.0	1690.0
River Oaks	1.4	17.7	939.0	958.0
Town & Country	3.8	6.3	207.0	217.0
Howard & Western	8.5	0.0	0.0	8.5
McDonalds	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0
Allstate Office Complex	1.4	0.0	0.0	1.4
DuPage County Civic Ctr	8.5	4.3	0.0	12.8
Evanston Parking Garage	16.7	1.6	0.0	18.3
State National Bank	16.7	3.8	0.0	20.5
Chrysler Plant	1.4	0.0	0.0	1.4
Four Lakes Village	1.4	0.0	0.0	1.4
Sandburg Village	3.8	0.0	300.0	4.0
Arlington Park Raceway	3.8	0.0	3950.0	3950.0
Oakton Pool/Skating Rink	16.7	0.7	0.0	17.4
Total Case Studies	88.3	78.3	9320.0	9480.0 ^a
Total for State per year	1460.0	522.0	18,100.0	20,000.0

^a Results presented to only three significant figures, therefore sums may not agree. Values less than \$100 are set equal to zero.

sports complexes constructed each year is very small,* it can be concluded that regional shopping centers are the most important type of development affected by the regulation. The average cost increase per development resulting from the state regulation is estimated to be 2.1%. However, the range for the case studies is 4.0% for Ford City and .3% for Hillside.

TABLE 14. Relative Marginal Cost of the State Regulations

	Marginal Cost A (\$10 ³)	Total Value B (\$10 ³)	Percent (A/B) 100
Regional Shopping Centers	5,160.0	243,000.	2.1
Retail/Commercial Strip	8.5	3,800.	.3
Office, Government and Misc.	53.0	57,400.	.1
Manufacturing Industry	1.4	92,800.	~0
Residential	305.0	99,700.	.3
Recreation, Sport, etc.	3,970.0	29,300.	13.5

Ideally, the costs of a regulation should be compared to the dollar value of its benefits. Since estimating the benefits of the regulation was beyond the scope of this study, such a comparison will not be presented. However, a few general observations can be made. First of all, any complex source regulation that does not result in any modification costs would not be a good regulation. A regulation that does not require any modification of existing practices cannot be justified since benefits can be derived only from change. Without these changes, the administration and enforcement costs borne by the taxpayer and the analysis and delay costs borne by the developer would, by themselves, exceed the benefits of improved air quality.**

* When making statewide totals, forecasted developments were increased to the nearest whole number. Therefore, a major sports complex was assumed to be built each year when, in fact, the actual number may be much smaller, e.g., one every ten years.

** This argument does not imply the converse, i.e., the regulation will be justified if modifications occur.

On the other hand, if the regulation causes excessive modifications, the costs of the regulations may also exceed their benefits. In lieu of any benefit estimates it is imperative that alternative regulation schemes are analyzed to determine their costs and effectiveness. The parametric analysis discussed in the next section is provided to help in making this comparison.

Parametric Analyses

Two parametric analyses were conducted: one to estimate the reductions in costs by altering the apportionment scheme from 30% to 60% and one to determine the effects of the federal new car standards on the costs of the complex source regulation.* The results of these parametric analyses are presented in Tables 15 through 18.

From Table 15 it is apparent that considerable savings in all of the cost components can be achieved by altering the apportionment scheme. Of particular importance is the reduction in the number of sources requiring a permit review** and the cost of modifications. Table 18 shows the change in the number of sources requiring permit reviews should the apportionment scheme be altered. Note that none of the sources that needed a permit with the 30%-apportionment scheme and didn't need one with the 60% limit required modifications with the 30% apportionment. In addition to those sources that would no longer require a permit review with a 60% apportionment, the State National Bank and the Chrysler Plant were very close to being eliminated from the review process. Neither of these sources needed a modification.

Tables 16 and 17 show the impacts of using a 1978 vehicle mix rather than a 1975 vehicle mix to determine the level of control required. This change has the impact of reducing modification costs only. The emission reduction occurs by controlling automobiles rather than modifying the road network. If the federal new car standards are as effective as expected (i.e., their efficiencies will not decay rapidly) and people buy new cars at the same rate as they do now, then the costs of the complex source regulation can be significantly reduced. More importantly, the number of sources requiring modification will also be reduced. This implies that a screening process that is sensitive to the levels of controls placed on automobiles would be more economical than a fixed screening process.

*Data is presented in Appendix B for looking at a 90%-apportionment scheme.

**For this analysis, the change in the apportionment scheme was also reflected in the screening process. The modification cost changes reflect the change in the apportionment scheme, while the analysis and delay cost changes reflect the change in the screening process.

TABLE 15. Parametric Analysis 1, Marginal Costs
of the Illinois Regulation,
60% Apportionment, 1975 Vehicle Mix

Case Studies (\$10 ³)	Analysis Cost	Delay Cost	Modification Cost	Total Cost
Ford City	1.4	18.2	799.0	819.0
Hillside	1.4	7.2	15.5	24.1
Oak Brook	1.4	18.5	1160.0	1180.0
River Oaks	1.4	17.7	0.0	19.1
Town & Country	3.8	6.3	105.0	115.0
Howard & Western	8.5	0.0	0.0	8.5
McDonalds	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0
Allstate Office Complex	-12.6	-9.2	0.0	-21.8
DuPage County Civic Center	0.0	0.0	0.0	0.0
Evanston Parking Garage	0.0	0.0	0.0	0.0
State National Bank	16.7	3.8	0.0	20.5
Chrysler Plant	1.4	0.0	0.0	1.4
Four Lakes Village	-12.6	-11.5	0.0	-24.1
Sandburg Village	3.8	0.0	33.0	36.8
Arlington Park Raceway	3.8	0.0	2560.0	2560.0
Oakton Pool/Skating Rink	0.0	0.0	0.0	0.0
Total Case Studies	18.4	51.0	4570.0	4740.0 ^a

^aResults presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 16. Parametric Analysis 2, Marginal Costs
of the Illinois Regulation,
30% Apportionment, 1978 Vehicle Mix

Case Studies (\$10 ³)	Analysis Cost	Delay Cost	Modification Cost	Total Cost
Ford City	1.4	18.2	505.0	525.0
Hillside	1.4	7.2	0.0	8.6
Oak Brook	1.4	18.5	1160.0	1180.0
River Oaks	1.4	17.7	237.0	256.0
Town & Country	3.8	6.3	1930.0	1940.0
Howard & Western	8.5	0.0	0.0	8.5
McDonalds	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0
Allstate Office Complex	1.4	0.0	0.0	1.4
DuPage County Civic Center	8.5	4.3	0.0	12.8
Evanston Parking Garage	16.7	1.6	0.0	18.3
State National Bank	16.7	3.8	0.0	20.5
Chrysler Plant	1.4	0.0	0.0	1.4
Four Lakes Village	1.4	0.0	0.0	1.4
Sandburg Village	3.8	0.0	33.0	36.8
Arlington Park Raceway	3.8	0.0	3520.0	3520.0
Oakton Pool/Skating Rink	16.7	0.7	0.0	17.4
Total Case Studies	88.3	78.3	7350.0	7550.0 ^a

^aResults presented to only three significant figures, therefore, sums may not agree. Values less than \$100 are set equal to zero.

TABLE 17. Parametric Analysis 3, Marginal Costs
of the Illinois Regulation,
60% Apportionment, 1978 Vehicle Mix

Case Studies (\$10 ³)	Analysis Cost	Delay Cost	Modification Cost	Total Cost
Ford City	1.4	18.2	0.0	19.6
Hillside	1.4	7.2	0.0	8.6
Oak Brook	1.4	18.5	0.0	19.9
River Oaks	1.4	17.7	237.0	256.0
Town & Country	3.8	6.3	140.0	150.0
Howard & Western	8.5	0.0	0.0	9.7
McDonalds	0.0	0.0	0.0	0.0
7/11 Convenience	0.0	0.0	0.0	0.0
Allstate Office Complex	-12.6	-9.2	0.0	-21.8
DuPage County Civic Center	0.0	0.0	0.0	0.0
Evanston Parking Garage	0.0	0.0	0.0	0.0
State National Bank	16.7	3.8	0.0	20.5
Chrysler Plant	1.4	0.0	0.0	1.4
Four Lakes Village	-12.6	-11.5	0.0	-24.1
Sandburg Village	3.8	0.0	0.0	3.8
Arlington Park Raceway	3.8	0.0	873.0	877.0
Oakton Pool/Skating Rink	0.0	0.0	0.0	0.0
Total Case Studies	18.4	51.0	1250.0	1320.0 ^a

^aResults presented to only three significant figures, therefore, may
may not agree. Values less than \$100 are set equal to zero.

TABLE 18. Complex Sources Requiring Permit Review

	Permit Required				Federal
	30% ALLOWANCE	60% ALLOWANCE	90% ALLOWANCE	100% ALLOWANCE	
HILLSIDE SHOPPING CENTER HILLSIDE	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
NORTHWOODS SHOPPING CENTER PEORIA	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
TOWN & COUNTRY SHOPPING CENTER SPRINGFIELD	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
OAK BROOK SHOPPING CENTER OAK BROOK	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
FORD CITY SHOPPING CENTER CHICAGO	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
RIVER OAKS SHOPPING CENTER CALUMET CITY	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
HOWARD B WESTERN CENTER CHICAGO	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
7/11 CONVENIENCE CENTER CHICAGO	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED
MCDONALD'S EVANSTON	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED
CHRYSLER PLANT BELVIDERE	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
CATERPILLAR TRACTOR PLANT PEORIA	*	-	-	-	-
STATE NATIONAL BANK EVANSTON	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
PARKING GARAGE EVANSTON	PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED
ARLINGTON PARK RACEWAY ARLINGTON HEIGHTS	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
SKATING RINK PARK RIDGE	PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED
DUPAGE CO. CIVIC CENTER WHEATON	PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED
SANDBURG VILLAGE CHICAGO	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED
FOUR LAKES VILLAGE LISLE	PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	PERMIT REQUIRED
ALLSTATE OFFICE COMPLEX NORTHBROOK	PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	NO PERMIT REQUIRED	PERMIT REQUIRED
OAK LAWN HIGH SCHOOL OAK LAWN	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	PERMIT REQUIRED	NO PERMIT REQUIRED
Total Number of Permits Required	17	12	9	9	11

*Data was not made available to conduct this part of the analysis.

Special Issues

The cost estimates provided in this report are highly sensitive to two assumptions: (1) the definition of reasonable receptor and (2) the meteorological conditions used. Some of the implications of these assumptions are discussed in this section.

The concept of a reasonable receptor is very difficult to define. Some people may argue that a point 10 feet from any major intersection is a reasonable receptor because it is conceivable that a person could stand or sit near the corner for the duration of either standard (one or eight hours). Such a definition would almost assuredly require modifications for all the case studies needing a permit review.

On the other hand, some people may argue that there are no economical "reasonable receptors." Because the number of people benefited at any one location from reduced CO concentration would be small (e.g., the number of people on a ballfield or those who spend eight hours in their yards), the economic costs would certainly outweigh the economic benefits. When a large number of people are affected, then the benefits would exceed the costs and the regulation would be justified.

The approach used in this analysis was to select receptor locations where most people spend most of their time over an extended period of time (month, year). In this way general exposure levels of all persons will be reduced, thus providing for potentially large benefits.

Given this philosophy for defining a reasonable receptor, there still remains to be considered the problem of specifying distances from the roadway. Because high carbon monoxide levels tend to be concentrated close to roadways (primarily intersections) distances are extremely important. To demonstrate the effect of distances, consider receptor number 1 at Oak Brook. This is a ballfield on the northwest corner of the Rte. 83 and 22nd Street intersection. We assumed a distance of 150 ft from the roadway. Moving the receptor closer to the roadway by 100 ft increases the cost by \$300,000 or by 18%. With this type of variation in the cost estimates, it is obvious that a great deal of effort should be given to defining reasonable receptors.

An issue related to both reasonable receptors and meteorological conditions is the fact that shopping center peaks occur during the winter

months (around Christmas) when outdoor activities are usually reduced. This might mean that a different definition of reasonable receptor would be needed for each season. For example, consider again receptor 1 at Oak Brook. Using this receptor as a winter receptor would require a modification cost of \$1,690,000. If this was considered as a summer receptor, the modification would cost only \$300,000.

The air quality analysis in this report assumes worst case meteorological conditions. A factor of .6* is used to account for variations in wind speeds and directions over an 8-hr period. Not only are the modification cost results sensitive to this assumption, but no account was made to determine the probability of the worst case conditions occurring during peak periods. If the probability of occurrence is greater than once per year, then the estimates provided will not be affected. On the other hand, a smaller probability would lower the costs.

Summary and Conclusions

The comparison of the costs associated with the state and federal complex source regulations has shown that:

- Regional shopping centers incur the largest economic impacts. The total cost of these developments is expected to increase by 2.1%.
- Relaxing the apportionment scheme from 30% to 60% significantly reduces the marginal costs of the state regulation.
- If the issuance of a complex source permit will not usurp local siting (zoning) decisions, then the last-stop provision of the state regulation is not justified.
- Considerable effort should be made to precisely define "reasonable receptors." Possibly this definition may change, based on seasons.
- If actual meteorological conditions, rather than a hypothetical worst case situation, are used to evaluate the impact of a development on air quality, then the costs of the regulation would most likely be reduced.

*See Appendix D for more details.

Some additional observations were made during the course of the analysis, which were not discussed earlier. These are:

- Most modifications were required because roadway networks are not based on peak periods while air quality standards are based on them.
- In areas where the air quality already violates a standard, the modification costs for both regulations will be the same for any source requiring both permits. This situation occurred in Sandburg Village, where Lake Shore Drive emissions cause violations of the standard in neighboring beaches and parks. (In the case study analysis, Lake Shore Drive was not considered.) For situations like this, additional controls will be required to bring the area into compliance, which may include a temporary ban on development in the area.
- Paradoxically, using any apportionment scheme, it is possible that a modification would not be required for a prevailing wind direction that results in poor air quality (but below the standard) at a particular receptor location, while a modification would be required for a different wind direction that results in better air quality at the same location. This situation might occur if the emission contribution of the induced traffic were relatively small for the first wind direction and relatively large for the second.

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APPENDIX A

Detailed Comparison of the Regulations

APPENDIX A. Detailed Comparison of the Regulations

Comparison of the proposed Illinois and Federal Complex Source Regulation was made to identify points of difference that might result in different costs of compliance with the regulations. The principal differences and their relative economic impacts are described earlier in this report.

Six general subject areas within the regulations were chosen as a means of organizing the comparison. The portions of the two regulations relating to a subject heading are presented on the following pages with similar elements in the two regulations aligned in parallel columns. The sequence of items under a subject heading follows primarily the pattern established in the Federal Regulation, with the Illinois Regulation reordered, where necessary, to bring similar items together. Where one regulation has an element that does not appear to exist in the other, the element is described with an accompanying notation in the other column.

In some instances the portions of the regulations contained in the following comparison have not been included in their entirety or have been reworded to facilitate comparison. Some explanatory material has also been inserted to provide connection between the elements brought together. It is considered that the intent of the regulations has not been misrepresented in this process of bringing the two together for comparison. The paragraph heading of each item in the original is included in the comparison, and copies of the two sets of regulations are included for reference to precise wording.

1. Criteria to determine sources subject to the regulations

Federal

Indirect sources subject to the federal regulations (by the criteria below) and for which construction or modification commences after December 31, 1974, require prior approval. (paragraph (b)(3))

Criteria to be applied to indirect sources commenced after December 31, 1974 (paragraph (b)(2)):
Approval must be sought for these projects.

1) Non-airport projects

i. within an SMSA

non-highway projects

new: associated parking area

cap. > 1000 cars

modified: increased associated

parking cap. > 500 cars

highway projects

new: ADT (annual basis)

> 20,000 cars

modified: increased ADT

(annual basis) > 10,000 cars

(anticipated ADT volumes for 10 years following completion are to be considered)

ii. outside an SMSA

non-highway projects

new: associated parking area

cap. > 2000 cars

modified: increased associated

parking cap. > 1000 cars

highway projects

no approval required

2) Airports (activity levels within 10 years of completion)

New airport. either scheduled air carrier operations

> 50,000/year or, passenger

level > 1,600,000/year

Modified airport. increased

activity of > 50,000

scheduled air carrier operations per year, or

> 1,600,000 passengers per

year.

Illinois

Permits must be sought for all complex sources except those specifically exempted (in Rule 912) from the provisions of these regulations. (Rule 902)

Exemptions detailed in Rule 912:

1) Commencement: Projects commenced

(contractual obligation to perform physical work which does begin within 12 months) prior to effective date of regulations (60 days after their promulgation - Rule 913) are exempt from the regulations.

2) Expected Vehicle Attraction

New projects (within 10 years of construction) with maximum one hour volume (at any time) < 480 vehicles and maximum eight hour volume (at any time) < 1000 vehicles are exempt from the regulations.

Modification projects (within 10 years of modification) which increase vehicle volumes < 240 vehicles during maximum one hour period (at any time) and < 500 vehicles during maximum eight hour period (at any time) are exempt from the regulations.

3) For all other proposed complex sources, the procedures contained in Appendix A to the regulations are used to determine whether a permit application is required. The procedures are diagrammed in Figure A-1.

FederalIllinois

- 3) Incremental projects (of any kind)
Where an indirect source is constructed or modified in increments which individually are not subject to review by the above criteria and which are not part of a program of construction or modification in planned incremental phases approved by the Administrator, all such increments commenced after December 31, 1974, or after the latest indirect source approval, whichever date is most recent, shall be added together for determining the applicability of the indirect source regulations
- 4) The Administrator shall conduct the indirect source review for any indirect source owned or operated by the United States Government.

Rule 911 prevents patterns of ownership or development that would circumvent the requirements of these regulations.

No counterpart in Illinois regulations.

Fig. A-1. Criteria To Determine Which Proposed Indirect Sources Are Subject to Federal Regulations 40 CFR 52.22 (b)

Rule 902

Rule 912
(a) (b)
Appendix

Step 1

Fig. A-2a. Criteria For Determining Applicability Of Proposed Illinois Complex Source Regulations

Fig. A-2c. Criteria For Determining Applicability Of Proposed Illinois Complex Source Regulations

7. Information that must be submitted with a complex source application.

Federal
paragraph (b) (3)

Illinois
Rule 903

Actual application procedures shall be prescribed by the Administrator. Whatever the final explicit application forms, an application shall include a copy of any draft or final environmental impact statements made pursuant to federal law (NEPA). If not included in such an EIS, the Administrator may request the following information:

- (i) Sources other than highways
- b. site map of the vicinity with topography
- c. description of use of site - activities and hours
- d. site plan of the indirect source with location and height of the buildings on the site, parking areas, and motor vehicle ingress and egress points included.
- e. principal access roads, highways, and intersections used by motor vehicles moving to or from the indirect source.

Not required by Federal regulations

- a) (7) While copies of any environmental impact statements prepared pursuant to the requirements of NEPA are required to be filed with the application, it is not specifically allowed that information in the EIS stand in lieu of similar information required by other sections of this Rule.

All Sources

- (5) diagrams or maps covering the area extending 1 mile beyond complex source property line
- (5)(C) including surrounding land uses
- (5)(G) and topography of the area
- (3) opening, closing, and shift changes for days having peak 1-hour and peak 8-hour periods, with the specific time of occurrence of peaks
- (4) number of patrons and employees at the complex source during the days of the 1-hour and 8-hour peaks, as identified in paragraph (2) (below).
- (1) a site plan of the location, including height and location of buildings, vehicle access and egress point, parking area design, internal traffic circulation patterns and volumes, and traffic control devices utilized at the complex source.
- (5)(A) a map showing interstate, freeways, arterial and collector public roads and highways within one mile of the complex source, as well as, (5)(B), the local roads that serve as direct access to the complex source.
- (5)(D) existing traffic conditions specifying average daily traffic and maximum daily traffic; estimates of vehicle speeds for average and maximum traffic volumes; roadway capacity; lane, median, and shoulder width; and traffic control devices for the public roads and highways identified in (5)(A) and (B).

Federal

Not required by Federal regulations

- f. An estimate, as of the first year after the date the indirect source will be substantially complete and operational, of the average daily traffic volumes, maximum traffic volumes for one-hour and eight-hour periods, and vehicle capacities of the principal roads, highways, and intersections identified in (e) and located within one-fourth mile of all boundaries of the site.
- g. availability of existing and projected mass transit to service the site.
- h. Where approval is sought for indirect sources to be constructed in incremental phases, the information required shall be submitted for each phase of the construction project.
- i. Any additional information deemed necessary by the Administrator to determine the air quality impact of the indirect source.

Illinois

- (2) expected traffic attracted by the complex source, i.e., the number and types of vehicles for the busiest one-hour and eight-hour period during each year of the 10 years immediately following source construction or modification. (Times of occurrence of peaks specified in (3) above.)
 - (5)(E) anticipated impact of the attracted traffic of the complex source on the existing one-hour and eight-hour peak volumes and on the existing average vehicle speeds during the one-hour and eight-hour peak volume conditions for the public roads and highways identified in (5)(A) and (5)(B).
 - (5)(F) existing public transportation systems operating in the vicinity of the complex source, specifying current capacity, present utilization, and schedules relevant to the days of operation of the complex source.
- Phased construction not covered by Illinois regulations.
- c) allows the Agency to waive the submission by the applicant of portions of the required data and information.
 - d) provides for the adoption of procedures which require additional data and/or information to be submitted.

Federal(ii) Airports

In addition to the above materials, the following information may be requested:

- a. average and maximum daily aircraft operations (by aircraft type) during the first, fifth, and tenth years after the date of expected completion.
- b. A description of the commercial, industrial, residential, and other development that the applicant expects will occur within three miles of the perimeter of the airport within the first five and the first ten years after the date of expected completion.
- c. expected passenger loadings at the airport (time periods not specified).

(iii) Highway projects

Information that may be requested with an indirect source application for highway projects consists only of

- a. a description of the average and maximum traffic volumes for one, eight, and 24-hour time periods expected within 10 years of the date of expected completion.
- b. an estimate of vehicle speeds for average and maximum traffic volume conditions and the vehicle capacity of the highway project.
- c. a map showing the location of the highway projects, including the location of buildings along the right-of-way.
- d. a description of the general features of the highway and associated right-of-way, including the approximate height of buildings adjacent to the highway.
- e. any additional information or documentation that the Administrator deems necessary to determine the air quality impact of the indirect source, including the submission of measured air quality data at the proposed site prior to construction or modification.

Illinois

No separate information requirements for complex source permit applications for airports.

No separate information requirements for complex source applications for highway sections.

Federal

No Federal counterparts.

Illinois

- a) (8) for complex sources other than public roads or highways, required submissions with a permit application also include:
- .a list of governmental units having jurisdiction over siting of the complex source
 - .a list of the permits and approvals related to siting required by such governmental units
 - .a copy of all such siting-related permits and approvals obtained, or a statement that issuance is contingent solely on granting of complex source permits.
- (6) Informational and calculational bases used to comply with (a) (1) through (5).

No Illinois counterpart

- iv. For indirect sources other than airports and large volume highway projects (as specified in paragraph graph (6)), air quality monitoring required by the Administrator as additional information shall be limited to carbon monoxide and shall be conducted for a period of not more than 14 days.

- Procedures and criteria for making a tentative decision on a complex source application.

Federal

Separate paragraphs (b)(4), (5), and (6) contain the considerations to be made by the Administrator in arriving at tentative decisions regarding applications for sources other than highways or airports, for airports, and for highways, respectively. For sources other than airports, general reasons for disapproval are as follows: (4)(i)...., the Administrator shall not approve an application to construct or modify if he determines that the indirect source will:

- (a) Cause a violation of the control strategy of any applicable state implementation plan; or
- (b) Cause or exacerbate a violation of the national standards for carbon monoxide in any region or portion thereof.

Beyond the general reasons for disapproval of an application, specific examples of the kinds of analysis that will yield information to make the required determinations are detailed for each type of source, as follows:

(b)(4)(ii) Indirect sources other than highway projects and airports

Determination regarding an application shall be made by evaluating the anticipated concentration of carbon monoxide at reasonable receptor or exposure sites (defined in (b)(7) as locations where people might reasonably be exposed for time periods consistent with the national ambient air quality standards for the specified pollutant) which will be affected by the mobile source activity expected to be attracted by the indirect source.

(The time following source completion or modification over which this evaluation applies is not specifically stated.) Such determination may be made by using traffic flow-characteristic guidelines published by the Environmental Protection Agency.

Illinois

Rule 904 (b) A complex source permit shall be granted if and only if the Agency concludes that:

1) (B) for a complex source other than a public road or highway

Construction or modification of the complex source, other than a public road or highway, will not result in an increase in the ambient air quality levels of any specified air contaminant by more than 30% of the difference between ambient air quality standards and the existing ambient air quality levels of any specified air contaminant, and will not result in a violation of ambient air quality standards.

Federal

Protection Agency which relate traffic demand and capacity considerations to ambient carbon monoxide impact, by use of appropriate atmospheric diffusion models, and/or by any other reliable analytic method.

(b)(5) Airports

- (i) the Administrator shall base his decision on the approval or disapproval of an application on considerations to be published as an Appendix to this Part.
- (ii) Highway projects and parking facilities associated with the airport will be analyzed using the procedures appropriate to such kinds of indirect source.

(b)(6) Highway Projects

- (ii) Determination shall be made by evaluating the anticipated concentration of carbon monoxide at reasonable receptor or exposure sites which will be affected by the mobile source activity expected on the highway for the ten year period following the expected date of completion according to the procedures specified in paragraph (b)(4)(ii).

- (iii) For new highway projects subject to this paragraph with an anticipated average daily traffic volume of 50,000 or more vehicles within ten years of construction, or modification to highway projects subject to this paragraph which will increase average daily traffic volume by 25,000 or more vehicles within ten years after modification, the Administrator's decision on the approval or disapproval of an application shall be based on the considerations to be published as an Appendix to this Part in addition to requirements the same as (b)(4)(i).

Illinois1)(A) Public Roads and Highways

A complex source permit shall be granted if and only if the Agency concludes that construction or modification of a public road or highway will not result in an increase in the ambient air quality levels of any specified air contaminant by more than 80% of the difference between ambient air quality standards and the existing ambient air quality levels of any specified air contaminant, and will not result in a violation of ambient air quality standards.

Federal

No comparable Federal regulation

Illinois

Rule 904(d) To the extent that two or more proposed complex sources may jointly consume a portion of the difference between existing ambient air quality levels of any specified air contaminant and the ambient air quality standard at any particular point, the Agency shall consider such applications on a "first come, first served" basis, as identified by an Agency time and date stamp, in interpreting the provisions of Rule 904(b), provided that:

...an application shall not be deemed to be filed until the applicant has submitted all information forms required by Rule 903 and procedures adopted and effective pursuant thereto...

4. Time schedule of steps in the permit review process

Federal

paragraph (b)(8)

1. Determination of completeness of application; applicant advised of any deficiencies in application (within 20 days of receipt of the application or addition thereto).
2. Within 30 days of receipt of complete application materials, a preliminary decision (approval, conditional approval, or disapproval) regarding the application shall be made; availability for public inspection of application materials and of the preliminary decision shall be provided for; and request for written public comment shall be made by public notice..
3. Public comments received within 30 days of public notice shall be considered in reaching a final decision on the application. No later than 10 days after the close of the public comment period, the applicant may submit a written response (to be considered in reaching a final decision) to any comments submitted by the public.
4. Final action on the application shall be taken within 30 days of close of public comment period.
 - Normal maximum time between receipt of complete application materials and a final decision: 90 days
 - With Administrator's option to extend, the time from application to final decision could be as great as 180 days. With mutually agreed to extensions, the time to reach a decision could be indefinitely long.

Illinois

1. Rule 904 (d)(1). Determination of completeness of application; notification that the application is incomplete shall be considered a denial of the application. (Determination and notification are to be made within 30 days of the original filing of the application.)
2. Rule 909(a). Proposed approval or disapproval of the application; public notice of proposed decision and of the availability of relevant materials; request for public comment; notice of proposed decision sent to affected public agencies (within 40 days after an application is filed).
3. Receipt of public comments which will be considered in reaching a final decision (30 days after public notice of proposed decision).
4. Rule 909(b). Prior to issuing a complex source permit, a public hearing may be held. Time limits and rules pertaining to hearing procedures are unspecified. The time limit within which final determination by the Agency must be announced, with or without a public hearing, is 90 days from receipt of complete application materials. (Prior determination of hearing procedures, presumably including time limits, must be made by the Agency and filed with the Secretary of State. The complex source regulations themselves, however, provide no guidance for such procedures, time limit etc.)
 - Total time between filing of a complex source application and permit issuance is 90 days as per Section 39 of the Illinois Environmental Protection Act.

*maximum length of variable periods is indicated

+30 day extensions are possible by Administrator's decision

Schedules of Decision Steps in Complex Source Reviews

5. Regulations regarding conditional approval.

Federal

paragraph (b) (9)

- (i) If a proposed indirect source would fail to win approval by the tests given in paragraphs (b) (4)(i), (b)(5)(i), or (b)(6)(i), approval may be granted, provided that certain air quality aspects of the development are addressed, in such manner as:
- (a) binding commitments by governmental agencies to the applicant to provide highway improvements or mass transit facilities,
 - (b) binding commitments by the applicant to provide programs for mass transit incentives for employees and patrons, and
 - (c) with regard to the indirect source itself, binding commitments by the applicant, "to construct, modify, or operate the indirect source" to comply with traffic flow criteria used in determining initial disapproval.
- (ii) It may be specified that any items of information provided in an application for approval related to the operation of an indirect source which may affect the source's air quality impact shall be considered permit conditions.

paragraph (b) (10)

The Administrator may condition approval by reducing the extent to which the indirect source can be further modified without resubmission for approval.

Illinois

Rule 906

The Agency may issue a complex source permit on which is imposed conditions to accomplish the purposes of the Act. The form that conditions attached to permits might take is not made specific, but conditions might include air quality monitoring, traffic monitoring, or "further steps taken by the applicant to insure maintenance of ambient air quality standards."

6 Other provisions in the regulations

1. Delegation of authority to another agency

Federal

paragraph (b)(14)

Illinois

Rules 907, 908

2. Nullification of Permit

Federal

paragraph (b)(12)

Approval invalidated if facility is not commenced within 24 months after receipt of approval (unless an extension is considered justified).

Illinois

Rule 905

- a) A program of continuous construction must be commenced within 12 months of issuance of permit or within 12 months of permits relating to siting, whichever is issued latest.
- b) Construction must be completed within 3 years (unless the scope of the project warrants a longer construction period and a binding general construction contract exists.)

3. Responsibility to comply with all other applicable regulations

Federal

paragraph (b)(13)

Illinois

Rule 910

The Proposed Illinois Complex Source Regulation

PROPOSED PART IX: COMPLEX SOURCE REGULATIONS
(With Amendments as of 3/6/74)

UNLESS OTHERWISE DEFINED HEREIN, ALL TERMS DEFINED IN PART I OF THIS CHAPTER WHICH APPEAR IN PART IX OF THIS CHAPTER HAVE THE DEFINITIONS SPECIFIED BY RULE 101 OF PART I OF THIS CHAPTER.

Rule 901: DEFINITIONS

Average Daily Traffic(ADT): The average daily vehicle traffic volume (vehicles per day) on a segment of highway as determined by the Illinois Department of Transportation, or as estimated by a method approved by the Illinois Department of Transportation.

Busiest Public Road or Highway: That segment of any public road or highway located within one mile from any point on the property line of the complex source having the highest ADT.

Busiest Roadway: That segment of any road or highway located within one mile from any point on the property line of the complex source having the highest ADT.

Complex Source: Any building, facility, plant, auditorium or other structure or combination thereof, or any road or highway which causes or contributes to air pollution through the attraction of mobile air pollution emission sources.

Construction: On-site fabrication, erection or installation of a complex source.

Existing Ambient Air Quality Levels: The measured, and/or estimated levels of any specified air contaminant in the ambient air during the year preceding the filing of an application for a complex source permit under this Part IX, and including the impact of emissions of that contaminant expected from complex sources for which permits have been granted by the Agency or for which applications are considered on file in accord with Rule 904(d).

Regional Planning Body: Any planning body which has been recognized as a substate-clearinghouse for the purposes of conducting project review under the United States Office of Management and Budget Circular Number A-95.

Modification: Any physical change in or change in the method of operation of a complex source which tends to attract mobile emission sources in addition to those attracted during the normal operating modes of the complex source.

Public Road or Highway: Any road or highway or section thereof the construction of which is financed with monies obtained through taxes, referenda, general assessments, and/or bond issues authorized by a governmental unit.

Highway Section: A highway development of substantial length between logical termini (major crossroads, population centers, major traffic generators, or similar major highway control elements) as normally included in a single location study or multiyear highway improvement program.

Regional Plan: A plan for the future growth and development of any area within the State of Illinois.

Rule 902: PROHIBITION

No person shall cause or allow the construction or modification of any complex source without first obtaining a complex source permit from the Agency, except as provided in Rule 912 of this Part IX.

Rule 903: APPLICATION FOR COMPLEX SOURCE PERMIT

(a) Subject to the waiver provision of Rule 903(c), an application for complex source permit shall contain, as a minimum, the following data and information:

- (1) a site plan showing details of the location, including height and location of buildings, vehicle access and egress points, parking area design, internal traffic circulation patterns and volumes and traffic control devices utilized at the complex source;
- (2) expected vehicular traffic to be attracted by the complex source, specifying numbers and types of vehicles for the busiest one-hour period and the busiest eight-hour period occurring during each year of the ten-year period immediately following the construction or modification of the complex source;
- (3) specific times of occurrence (example: hour, day, month, year) of each one-hour and each eight-hour peak traffic volume identified in paragraph (2) above. Expected opening and closing times, and shift-change times, of the complex source during the days associated with each one-hour and each eight-hour peak traffic volume identified in paragraph (2) above; and
- (4) numbers of employees and/or patrons expected at the complex source during the days associated with each one-hour and each eight-hour peak traffic volume identified in paragraph (2) above; and
- (5) one or more diagrams or maps covering an area extending one mile from any point on the property line of the complex source and depicting the following:
 - (A) surrounding public roads or highways functionally classified as interstate, freeway, arterial, or collector facilities; and
 - (B) surrounding public roads or highways functionally classified as local streets or serving as access roads if such road or highway provides direct access to the complex source; and

(C) surrounding land uses (including, but not limited to, industrial, commercial, residential, recreational, educational, and undeveloped); and

(D) existing traffic conditions specifying average daily traffic and maximum daily traffic; estimates of vehicle speeds for average and maximum traffic volumes; roadway capacity; lane, median and shoulder width; and traffic control devices for the public roads and highways identified pursuant to Rule 903(a)(5)(A) and (B); and

(E) anticipated impact of the attracted traffic of the complex source on the existing one-hour and eight-hour peak volumes and on the existing average vehicle speeds during the one-hour and eight-hour peak volume conditions for the public roads and highways identified pursuant to Rule 903(a)(5)(A) and (B); and

(F) existing public transportation systems operating in the vicinity of the complex source, specifying current capacity, present utilization, and schedules relevant to the days of operation of the complex source; and

(G) topography of the area;

(6) description of the informational and calculational bases used to comply with paragraphs (1) through (5) above.

(7) a copy of any Environmental Impact Statement, or published draft Environmental Impact Statement, prepared pursuant to the National Environmental Policy Act.

(8) for complex sources other than public roads or highways, a list of the governmental units which have jurisdiction over the siting of the complex source; and

(A) a list of the permits and approvals related to siting required by such governmental units. Such list should consider permits and approvals including, but not limited to, zoning, special use, and planned unit development. Such list need not consider sewage permits, building permits, elevator permits, and other permits not specifically related to land siting; and

(B) a copy of all such siting related permits and approvals obtained, or a statement from the governmental unit that the requirements for such permits or approvals have been met and that final issuance is contingent solely on the issuance of the complex source permit required by these regulations.

(b) In addition to the application requirements in paragraph (a) above, if the complex source is located in an area covered by a regional plan approved by the Agency pursuant to Rule 908 of this Part IX the applicant must provide one of the following:

(1) recommendation by a regional planning body approved by the Agency pursuant to Rule 907 of this Part IX that the complex source is in conformity with a regional plan approved by the Agency pursuant to Rule 908 of this Part IX; or

(2) proof that construction or modification of the complex source in addition to the development envisioned by a regional plan approved by the Agency pursuant to Rule 908 of this Part IX will not result in a violation of ambient air quality standards.

(c) The Agency may waive the submission by the applicant of such portions of the above data and information as it shall deem inappropriate or unnecessary to the complex source permit application, provided that any such waiver by the Agency shall be given in writing to the applicant.

(d) The Agency may adopt procedures which require data and information in addition to and in amplification of the matters specified in this Rule, which are reasonably designed to determine compliance with the Act, ambient air quality standards, and the requirements of this Part IX, and which set forth the format by which all data and information shall be submitted. Such procedures, formats and revisions thereto shall not become effective until filed with the Index Division of the Office of the Secretary of State as required by "An Act concerning administrative rules", approved June 14, 1951, as amended.

(e) All applications and supplements thereto shall be signed by the owner or operator of the complex source or his authorized agent.

Rule 904: STANDARDS FOR ISSUANCE

(a) Regardless of any other provision of this Part IX, the failure of an applicant to submit information sufficient for an adequate air quality evaluation of the proposed complex source, as determined by the Agency, shall be cause for denial of the complex source permit.

(b) A Complex Source permit shall be granted if and only if the Agency concludes that:

1) Public Roads and Highways

(A) Construction or modification of a public road or highway will not result in an increase in the ambient air quality levels of any specified air contaminant by more than 80% of the difference between ambient air quality standards and the existing ambient air quality levels of any specified air contaminant, and will not result in a violation of ambient air quality standards;

Complex Source Other Than a Public Road or Highway

(B) Construction or modification of the complex source, other than a public road or highway, will not result in an increase in the ambient air quality levels of any specified air contaminant by more than 30% of the difference between ambient air quality standards and the existing ambient air quality levels of any specified air contaminant, and will not result in a violation of ambient air quality standards;

or

2) Any Complex Source

The complex source has been recommended for permit by a regional planning body approved by the Agency pursuant to Rule 907 of this Part IX as being in conformity with a regional plan approved by the Agency pursuant to Rule 908 of this Part IX, unless such recommendation is without proper foundation. The procedure provided for in this Rule 904(b)(2) shall be immediately available upon the effective date of the above-referenced approvals.

(c) No complex source permit shall be granted unless the applicant submits:

- 1) proof to the Agency that the complex source has obtained all permits and approvals related to siting required by governmental unit(s) having jurisdiction; or
- 2) a statement from the governmental unit(s) that the applicant has met all the requirements for such governmental unit's purposes other than the complex source permit required by this Part IX.

(d) To the extent that two or more proposed complex sources may jointly consume a portion of the difference between existing ambient air quality levels of any specified air contaminant and the ambient air quality standard at any particular point, the Agency shall consider such applications on a "first come, first served" basis, as identified by an Agency time and date stamp, in interpreting the provisions of Rule 904(b) of this Part IX, provided that:

- 1) an application shall not be deemed to be filed until the applicant has submitted all information and completed all application forms required by Rule 903 and procedures adopted and effective pursuant thereto. Provided, however, that if the Agency fails to notify the applicant within 30 days after the filing of a purported application that the application is incomplete and of the reasons the Agency deems it incomplete, the application shall be deemed to have been filed as of the date of such purported filing. The applicant may treat the Agency's notification that an application is incomplete as a denial of the application for purposes of review.
- 2) unless a notice of appeal is filed with the Pollution Control Board within 30 days of the denial by the Agency of a complex source permit application, an application denied by the Agency shall not be considered as received for the purpose of this paragraph (d).

Rule 905: NULLIFICATION OF PERMIT

(a) A complex source permit granted pursuant to Part IX shall be null and void 12 months after the date of issuance of that permit or 12 months after the date of issuance of all siting permits and approvals covered by statement(s) pursuant to Rule 904(c)(2), whichever is issued latest, if the recipient fails to begin a program of continuous construction during the applicable 12-month period.

(b) All construction or modification described in a permit application must be completed within three years from the date of issuance of the complex source permit. After said three years, the permit is null and void except for construction already completed; provided however, that if the scope and complexity of the project so warrant and a binding general construction contract exists, the Agency may by special condition allow a longer term.

(c) Application for renewal can be made if the complex source permit lapses in accordance with Rule 905(a) and (b). Such application must be on a form provided by the Agency setting forth the request for renewal and all circumstances which have changed since the issuance of the original complex source permit. Priority of such renewal application will be determined as of the date the renewal application is deemed to be filed under Rule 904(d)(1).

Rule 906: CONDITIONS

The Agency may impose such conditions in a complex source permit as may be necessary to accomplish the purposes of the Act, and as are not inconsistent with the regulations promulgated by the Board thereunder. Nothing in this Part IX shall be deemed to limit the power of the Agency in this regard. Such conditions may include conditions requiring air quality monitoring, traffic monitoring and further steps to be taken by the applicant to insure maintenance of ambient air quality standards. Failure to comply with any conditions imposed shall constitute a violation of the rules and regulations of this Part IX and shall be cause for revocation of the complex source permit by the Board.

Rule 907: APPROVAL OF REGIONAL PLANNING BODY

(a) The Agency may give approval to an eligible regional planning body pursuant to this Part IX if the applicant submits proof to the Agency that:

- 1) it has authority in preparing regional plans to consider the effect future growth and development will have on ambient air quality;
- 2) the regional planning body or its consultant(s) is competent to assess the effects of growth and development on ambient air quality;
- 3) it has authority to make recommendations for complex source permits pursuant to Rules 903(b) and 904 of this Part IX; and
- 4) it has authority in making its recommendation under subsection (4) above to receive and consider public comment as required by Rule 909(a) of this Part IX and procedures adopted thereunder.

5) it has adopted procedures which will enable the regional planning body to process a complex source application, including the Public Participation requirement of Rule 909 of this Part IX, within 65 to 70 days from the date such application is filed with the regional planning body. For the purposes of this subsection (5), all procedural rules of this Part IX shall be applicable to any approved regional planning body. In addition to all other procedural rules of this Part IX a complex source application shall not be deemed to be filed with a regional planning body until the applicant has notified the Agency, by registered letter, of such filing.

(b) The Agency shall not approve a regional planning body until the Agency has held a public hearing and until a 30-day public comment period has been completed. The Agency shall consider only those matters relevant to the requirements of paragraph (a) above.

(c) The Agency may adopt procedures which require data and information necessary to reach a determination under this Rule and which set forth the format by which all data and information shall be submitted. Such procedures and formats and revisions thereto, shall not become effective until filed with the Index Division of the Office of the Secretary of State as required by "An Act concerning administrative rules", approved June 14, 1951, as amended.

(d) Failure to continue to meet the requirements of Rule 907 shall be grounds for revocation of approval of the planning body. Revocation shall be by notice to the planning body.

(e) Failure of the Agency to receive a recommendation and supporting documents from an approved regional planning body, pursuant to Rule 904(b)(2) of this Part IX, within 75 days from the date the applicable complex source application was filed with such regional planning body shall be grounds for the Agency's denial of the requested complex source permit.

Rule 908: APPROVAL OF REGIONAL PLAN

(a) The Agency may give approval to a regional plan pursuant to this Part IX if the regional planning body submits proof to the Agency that:

- 1) the applicant is an eligible regional planning body approved pursuant to Rule 907 of this Part IX; and
- 2) the regional plan provides for the attainment and maintenance of ambient air quality standards.

(b) The Agency shall not approve a regional plan until it has held a public hearing and until a 30-day public comment period has been completed. The Agency shall consider only those matters relevant to the requirements of Rule 908(a)(2) above.

(c) The Agency may adopt procedures which require data and information necessary to reach a determination under this paragraph and which set forth the format by which all data and information shall be submitted. Such provisions and formats and revisions thereto, shall not become effective until filed with the Index Division of the Office of the Secretary of State as required by "An Act concerning administrative rules", approved June 14, 1951, as amended.

(d) Failure to continue to meet the requirements of Rule 908 shall be grounds for revocation of approval of the regional plan. Revocation shall be by notice to the planning body.

Rule 909: PUBLIC PARTICIPATION

(a) Within 40 days after an application has been filed, the Agency or approved regional planning body having jurisdiction will notify the public, by prominent advertisement in the region affected, of the opportunity for public comment on the information submitted by the owner or operator.

1) such information, as well as the analysis of the effect of the complex source on air quality and the Agency's or approved regional planning body's proposed approval or disapproval, shall be available in at least one location in the region affected;

2) a copy of the notice required pursuant to this paragraph (a) shall be sent to all registered local air pollution control agencies in the county where the complex source will be located, to all registered local pollution control agencies located in counties adjacent to the county where the complex source will be located, and to any other agency in the region having responsibility for implementing the procedures required under this paragraph (a). A registered local pollution control agency is any local pollution control agency which, by registered letter to the Agency, has requested notification of complex source projects subject to this paragraph (a).

3) public comments submitted within 30 days of the date such information is made available shall be considered by the Agency or approved regional planning body in making a final decision on the application.

(b) Prior to issuing a complex source permit pursuant to this Part IX, the Agency may conduct public hearings with regard to any or all of the following items: the information submitted in the permit application, the Agency's evaluation of the effect of the proposed construction or modification on ambient air quality, the Agency's proposed action on the permit application, and the adequacy of the information submitted by the applicant to prove compliance with the requirements of this Part IX. The Agency shall adopt procedures for the conduct of a hearing under this paragraph (b). Such procedures, and revisions thereto, shall not become effective until filed with the Index Division of the Office of the Secretary of State as required by "An Act concerning administrative rules", approved June 14, 1951, as amended.

RULE 910: EXISTENCE OF COMPLEX SOURCE PERMIT NO DEFENSE

The existence of a complex source permit under this Part shall not constitute a defense to a violation of the Act or any rule or regulation of this Chapter except for failure to obtain a complex source permit.

Rule 911: CIRCUMVENTION

(a) Notwithstanding the exemptions contained in Rule 912, below, no person or persons shall circumvent the requirements of this Part IX by:

- 1) causing or allowing a pattern of ownership or development over a geographic area of a complex source, which, except for the pattern of ownership or development, would otherwise require a complex source permit; or
- 2) entering into a contract for construction of a complex source with the intent of circumventing the requirements of this Part IX.

Rule 912: EXEMPTIONS

(a) A complex source permit shall not be required:

- 1) if the commencement of the proposed construction or modification of a complex source is begun prior to the effective date of this Part IX commencement shall be the Act of entering into a binding general construction contract which obligates one party to such contract to perform the physical work involved in construction or modification provided such work begins no later than 12 months after the date of the contract.
- 2) for complex sources the construction of which will attract fewer than 480 vehicles over the one-hour period during which the maximum number of vehicles over any one-hour period is expected and fewer than 1,000 vehicles during the continuous eight-hour period during which the maximum number of vehicles over any eight hour period is expected.
- 3) for complex sources the modification of which will attract fewer than 240 additional vehicles over the one-hour period during which the maximum number of vehicles over any one-hour period is expected and fewer than 500 additional vehicles during the continuous eight-hour period during which the maximum number of vehicles over any eight-hour period is expected.
- 4) for purposes of projecting the attracted vehicles under Rule 912(a)(2) and (3) the applicant shall use the highest estimated one-hour and continuous eight-hour vehicular activity to be attracted at any time during the ten year period following construction or modification.

(b) For all complex sources other than those described in Rule 912(a) above, the necessity of a complex source permit shall be determined according to procedures contained in Appendix A attached hereto and made a part hereof.

Rule 913: EFFECTIVE DATE

The regulations in this part shall become effective sixty (60) days after promulgation by the Board.

Rule 914: SEVERABILITY

If any provision of these rules or regulations is adjudged invalid, or if the application thereof to any person or in any circumstance is adjudged invalid, such invalidity shall not affect the validity of this Chapter as a whole or of any part, sub-part, sentence or clause thereof not adjudged invalid.

APPENDIX A

Begin with Step 1 and follow the instructions at the end of each step.

STEPS 1 AND 2: COMPARISON OF EXISTING AIR QUALITY TO THE NATIONAL AMBIENT AIR QUALITY STANDARDS

Information Required to Complete Steps 1 and 2:

- (1) The highest Average Daily Traffic count (hereinafter referred to as "ADT") on any segment of any public road or highway located within one mile from any point on the property line of the complex source. This public road or highway is the busiest roadway to be affected by the modification or construction and is hereinafter referred to as the "busiest roadway".
- (2) The existing average vehicle speed (y), in miles per hour, over the eight-hour period with maximum traffic on the busiest roadway; and the existing average vehicle speed (v), in miles per hour, over the one-hour period with maximum traffic on the busiest roadway. If this information is not available from the Illinois Department of Transportation or the Illinois Environmental Protection Agency, let y = 75 percent of the speed limit on the busiest roadway; and let v = 25 percent of the speed limit on the busiest roadway.

STEP 1: COMPARISON OF EXISTING AIR QUALITY TO THE EIGHT-HOUR STANDARD

x = the existing average hourly vehicle count (vehicles per hour) for the eight-hour period with maximum traffic on the busiest roadway

$$x = 12 \text{ percent of the ADT} = (0.12)(\text{ADT})$$

Using Graph 1, enter the existing average vehicle speed (y) and obtain the corresponding maximum allowable average hourly vehicle count (s) for the eight-hour period with maximum traffic.

s = the number of vehicles per hour at average speed (y) for eight hours equivalent to the national eight-hour ambient carbon monoxide (CO) air quality standard of nine parts per million (ppm)

If the value of x is greater than or equal to the maximum allowable average hourly vehicle count (s), a permit application is required and completion of the remaining Steps is not required; if it is less, go to Step 2.

STEP 2: COMPARISON OF EXISTING AIR QUALITY TO THE ONE-HOUR STANDARD

w = the existing maximum one-hour vehicle count (vehicles per hour) on the busiest roadway

$$w = 20 \text{ percent of the ADT} = (0.20)(\text{ADT})$$

Using Graph 2, enter the existing average vehicle speed (v) and obtain the corresponding maximum allowable one-hour vehicle count (m).

m = the number of vehicles at average speed (v) for one hour equivalent to the national one-hour ambient CO air quality standard of 35 ppm

If the existing maximum one-hour vehicle count (w) is greater than or equal to the maximum allowable one-hour vehicle count (m), a permit application is required and completion of the remaining Steps is not required; if it is less, go to Step 3.

STEPS 3 AND 4: EXAMINATION OF AIR QUALITY WITHIN THE COMPLEX SOURCE

Information Required to Complete Steps 3 and 4:

- (1) The projected average hourly number of vehicles (p) attracted by the proposed complex source construction or modification for the eight-hour period of maximum traffic at the complex source occurring at any time during the ten-year period immediately following the construction or modification.
- (2) The projected one-hour maximum number of vehicles (z) attracted by the proposed complex source construction or modification occurring at any time during the ten-year period immediately following the construction or modification.
- (3) The following information from Steps 1 and 2:

(x), (y), (s), (w), (v), and (m).

STEP 3: COMPARISON OF AIR QUALITY WITHIN THE COMPLEX SOURCE TO THE EIGHT-HOUR STANDARD

a = the difference between existing air quality (x) and the eight-hour standard (s), expressed in terms of vehicles per hour at average speed (y)

$$a = s - x$$

For all complex sources other than a public road or highway, determine from Graph 3 the speed correction factor (b) corresponding to the average speed (y) (this factor will be used to adjust (a) to an average speed of 5 mph).

If the projected average hourly number of vehicles (p) for the eight-hour period of maximum traffic exceeds:

- (1) for a public road or highway, the product of (.3)(a); or
- (2) for all complex sources other than a public road or highway, the product of (.3)(a)(b),

then a permit application is required. If it is less than or equal to the product, go to Step 4.

STEP 4: COMPARISON OF AIR QUALITY WITHIN THE COMPLEX SOURCE TO THE ONE-HOUR STANDARD

c = the difference between existing air quality (w) and the one-hour standard (m), expressed in terms of vehicles per hour at average speed (v)

$$c = m - w$$

For all complex sources other than a public road or highway, determine from Graph 3 the speed correction factor (d) corresponding to the average speed for the peak hour (v) (this factor will be used to adjust (c) to an average speed of 5 mph).

If the projected maximum one-hour number of vehicles (z) exceeds:

- (1) for a public road or highway, the product of $(.3)(c)$; or
- (2) for all complex sources other than a public road or highway, the product of $(.3)(c)(d)$,

then a permit application is required. If it is less than or equal to the product then no permit application is required.

GRAPH 1 - EIGHT-HOUR VEHICLE ACTIVITY EQUIVALENT TO EIGHT-HOUR
NATIONAL AMBIENT AIR QUALITY STANDARD (9 ppm)

10/24/73

GRAPH 2 - ONE-HOUR VEHICLE ACTIVITY EQUIVALENT TO ONE-HOUR
NATIONAL AMBIENT AIR QUALITY STANDARD (35 ppm)

GRAPH 2 (Cont'd)- ONE-HOUR VEHICLE ACTIVITY EQUIVALENT TO ONE-HOUR
NATIONAL AMBIENT AIR QUALITY STANDARD (35 ppm)

10/24/73

GRAPH 3 - SPEED CORRECTION

The Federal Indirect Source Regulation

Federal Register, Vol. 39, No. 132-Tuesday, July 9, 1974

No. 132-Pt. II-1, pp 25292-25298

No. 132-Pt. II-2, pp 25299-25301

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PART II

ENVIRONMENTAL PROTECTION AGENCY

■

AIR PROGRAMS; APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

Review of Indirect Sources

RULES AND REGULATIONS

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL
PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 52—APPROVAL AND PROMULGA-
TION OF IMPLEMENTATION PLANS

Review of Indirect Sources

On February 25, 1974 (39 FR 7270), the Administrator of the Environmental Protection Agency (EPA) promulgated an indirect source review regulation (40 CFR 52.22(b)) to be incorporated into the Clean Air Act implementation plans for 52 states and territories. As a follow-up to that regulation, the Administrator is today taking the following actions:

(1) In the preamble to the February 25 promulgation, the Administrator noted that additional written comments would be accepted until April 1, 1974, and that where appropriate, revisions may be made to the regulation (39 FR 7276). Many interested persons submitted written comments. The Administrator has considered the comments and has determined that several amendments of a clarifying, procedural nature are warranted. These amendments are being published today.

(2) The Administrator will respond in this preamble to significant new general comments which were not dealt with in the February 25 preamble.

(3) The Administrator has noted that some confusion exists as to the intended scope and application of the regulation and as to other matters relating to interpretation of the regulation. An explanation responding to frequently-raised questions of interpretation is provided in this preamble and in a new Appendix A to Part 52.

(4) Further information is provided regarding procedures to be followed in conducting review under the regulation and regarding delegation of review responsibilities to state and/or local agencies.

NEW GENERAL COMMENTS

Because many general comments directed to the wisdom of the basic scheme of the regulation have already been addressed in the February 25 preamble, the Administrator does not feel it is necessary or helpful to respond to them again. Nevertheless, there are three points the Administrator would like to make in response to the new comments.

1. *The need for the regulation.* One major retailer submitted lengthy comments challenging the entire concept of indirect source review for shopping centers because the Administrator allegedly has not adequately established that such a regulatory scheme is necessary to assure maintenance of the ambient standards for carbon monoxide. In an attempt to show that such a regulation is not necessary with regard to shopping centers, the retailer submitted two studies.

One was an empirical study showing that after several days of monitoring at one shopping center, no violation of an ambient carbon monoxide standard could be found. This study involved

"grab bag" sampling at various locations over the entire shopping center parking lot, and emphasized averaging the sample values over all locations for each hour and over all hours for each location. Such an averaging procedure is inconsistent with the method in which the air quality standards are prescribed. Air quality values should be averaged for discrete one and eight hour periods at each location, not over all locations. Although the study includes some continuous monitoring, carbon monoxide concentrations were not monitored in close proximity to the most frequently used exit/entrance, the site where the highest concentration would be likely to occur. Moreover, the study confined itself to analysis of air quality on the site of the shopping center, whereas more significant impacts can be created at nearby intersections.

While it is true that a shopping center may be constructed such that there would be no reasonable receptor sites in the close proximity to the areas where the highest concentrations would be likely to occur, it is not appropriate to generalize that a source category does not have a significant impact on air quality without studying its impact at the points of highest concentration, including nearby intersections, and under the worst conditions.

The other study dealt largely with the impact of various types of shopping center developments on area-wide emission rates. Such analysis is irrelevant to the question of whether localized carbon monoxide problems can be caused by vehicles attracted to a shopping center. This study also indicates, through the use of predictive models, that by 1980 various types of shopping center developments would not cause carbon monoxide violations due to the effects of the Federal Motor Vehicle Control Program. A prediction of the impact of an indirect source on ambient air in 1980 is unresponsive to the problem at hand since ambient carbon monoxide standards are to be met under the Clean Air Act as expeditiously as practicable but not later than the statutory attainment date, which is in most cases 1975 and in no event later than 1977.

The Administrator has conducted a number of studies to determine the impact of various types of indirect sources on ambient air quality, including shopping centers^{1,2} and sports stadia.³ Even

though the studies were conducted over a limited time period, the facilities were found to have a definite adverse impact on ambient carbon monoxide levels, and even to cause violations of the national standards. These results substantiate the need for procedures to review such sources prior to construction in order to protect the public health.

The Administrator has never contended that every indirect source subject to review will necessarily cause air quality violations. If such were the case, then the proper course of action would be to promulgate an absolute ban on further construction of such sources. Rather, the Administrator has determined that in certain circumstances indirect sources can create ambient violations or exacerbate existing violations. Even in circumstances where the construction of one source in an area might not create violations, the subsequent construction of one or more additional sources in the near vicinity could do so.

Since implementation plans under the Clean Air Act must contain measures to "insure" that the ambient standards will be attained and maintained, and since the Administrator has determined that indirect sources, singly or in combination, can cause violations of the standards, it is necessary for implementation plans to contain procedures for preconstruction review of such sources. The Administrator has confidence that the Federal Motor Vehicle Control Program being implemented pursuant to Title II of the Clean Air Act will continue to diminish the levels of ambient carbon monoxide. However, such reductions will not in the Administrator's judgment suffice to prevent ambient violations in the vicinity of indirect sources subject to the regulation for at least the next few years.

Some have questioned whether it is proper to promulgate this review regulation even in areas which now have no carbon monoxide problem. The relative cleanliness of a particular area's air is irrelevant to the question of whether indirect source review is necessary for that area, since a new indirect source (or several new sources) could easily convert almost pure air into air violating the public health standards. The primary purpose of the regulation is to assure maintenance of the ambient standards—to assure that no violations will occur where none now exist.

2. *Approval based solely on air quality factors.* A widespread misunderstanding of the purpose and effect of indirect source review is reflected in the following comment made by a national association:

According to the indirect source regulations, design characteristics, location and timing of future development is being based solely on air quality factors. We feel that no single factor should be the sole determinant of land use planning decisions.

The indirect source regulation does not make air quality the "sole determinant" of land use planning decisions except in an area which is now totally free

¹ GCA Corporation, "Validation Study of an Approach for Evaluating the Impact of a Shopping Center on Ambient Carbon Monoxide Concentrations", Contract No. 68-02-1376, Task Order No. 2 for EPA (March 1974).

² Quality Assurance and Environmental Monitoring Laboratory, Field Monitoring and Instrument Branch, "Carbon Monoxide Measurements in Vicinity of Shopping Centers," RTI Report, Contract No. 68-02-0294, Task Order No. 3 for EPA, (April 1973).

³ Bach, W. D., Crissman, B. W., Decker, C. E., Minear, J. W., Raspberry, P. P., and Tommerdahl, J. B.: "Carbon Monoxide Measurements in the Vicinity of Sports Stadiums," RTI Report, Prepared for EPA Under Contract 68-02-1096, Task No. 1 (July 1973).

of any zoning or other land-use regulations. As the Administrator explained in the February 25 preamble:

It should be emphasized . . . that the determination made pursuant to these regulations is only one necessary step among many other land-use measures already generally established (i.e., zoning approval, site plan approval, demolition and building permit approval, sewer tap-in approval, etc.) in order to assure that a specific facility will be designed and located in a manner not inconsistent with the public health, safety, and welfare. It is hoped that indirect source review will eventually be incorporated into comprehensive State and local land use planning processes so that social, economic, and air quality factors can be considered in an integrated manner. 39 FR 7274 (February 25, 1974).

The fact that one of many permits and approvals a facility must obtain before construction relates solely to air quality certainly does not make air quality "the sole determinant" of land use planning.

3. *Analysis Beyond One-Fourth Mile.* Additional comments indicated that the air quality impact of an indirect source should be examined at distances further than one-fourth mile from the source. It should be noted that the tests specified in subparagraphs (4) and (6) in no way restrict the Administrator as to the location of the air quality impact analysis. However, it is the Administrator's judgment that the major impact of most facilities with respect to carbon monoxide will be within one-fourth mile of the facility; accordingly, the detailed traffic data that must be submitted as part of each application is limited to the immediate vicinity of the indirect source. It is the Administrator's intent to request more comprehensive data pursuant to subparagraph (3)(i)(i) on a case-by-case basis, and to analyze the air quality impact at distances beyond one-fourth mile in cases where the facility might pose a threat to the air quality standards at such locations.

Explanation of Frequently-Raised Questions of Basic Interpretation. The purpose of the following discussion is to set forth certain basic interpretations of the regulation in order to clarify confusion reflected in public comments and questions. In addition, a new Appendix A to Part 52 is being published simultaneously with this rulemaking setting forth the substance of the following discussion in interpretative ruling form. As is true with any statute or regulation, it is impossible to answer definitively every conceivable question of interpretation or application which might arise in implementing the regulation. Just as courts frequently decline to decide certain issues until an actual situation presents a specific case or controversy before them, the Administrator believes that it would be unwise to answer every hypothetical question of interpretation or application raised in the comments because of the precedent that could be set based upon inadequate factual information. There are some questions of interpretation which will have to be resolved on a case-by-case basis in the process of implementing the regulation.

The explanation offered below relates to points so basic that if they were not clearly understood by the public and agencies implementing the regulation, serious mistakes in implementation might occur. One caveat should precede the discussion: The following is the Administrator's interpretation of his own regulation, 40 CFR 52.22(b). States which develop their own regulations which may be approved under 40 CFR 51.18 are not bound to interpret their regulations in the same manner, so long as their regulations operate to insure that ambient air quality standards will not be violated as a result of the construction of a new indirect source.

Most questions relate to the basic scope of the regulation, the type of indirect source which is subject to review, and the nature of the "associated parking area" concept. Since almost no comments or questions of interpretation were received regarding highways and airports, the following discussion, unless otherwise noted, deals with all other types of indirect sources.

The basic focus of the regulation is to review a new facility which will have an associated parking area of the requisite number of parking spaces. The list contained in 40 CFR 52.22(b)(1)(i) is merely a set of examples and should not be over-emphasized. The key to determining which facilities must be reviewed is in paragraph (b)(2), which requires review of "a new parking facility, or other new indirect source with an associated parking area" of the requisite size. Thus in every case, the most important factor will be to determine whether an "associated parking area" of the requisite size is to be "owned and/or operated in conjunction with" a facility.

An "associated parking area" is defined in paragraph (b)(1)(iii) as a "parking facility or facilities owned and/or operated in conjunction with an indirect source." To be an "associated parking area" within the intent of the regulation, the area must be a separate and discrete localized facility associated with a particular indirect source. Thus, to clear up much confusion reflected in the written comments, an urban renewal area is not itself an indirect source subject to review under the regulation merely because within the entire area there may be more than 1,000 parking spaces. Rather, it is necessary to look at discrete parking facilities within the urban renewal area to determine what, if any, construction within the area will be subject to review under the regulation.

For example, assume that twelve blocks of a city are being reconstructed pursuant to a redevelopment plan. Within the twelve blocks, there is to be a municipal auditorium with 1,500 parking spaces underneath it, an apartment building with 300 parking spaces adjacent to it to serve the residents, a 1,200-space municipal parking garage, many townhouses with single or double private garages for the use of their owners, and 500 spaces for curb-side on-street parking.

If such twelve blocks were within an SMSA, the municipal auditorium and the

municipal parking garage will each be subject to the regulation as a separate indirect source since each will have a separate and discrete associated parking area of 1,000 spaces or more. The redevelopment project itself is not an "indirect source" subject to review under the regulation, however, merely because it includes in the aggregate more than 1,000 spaces.

Thus, to answer another point which has caused confusion, the construction, 5 years later, of a new apartment building with an associated parking area of 600 cars within the urban renewal area will not by itself trigger review under the regulation. First, this is not a "modification" within the contemplation of paragraph (b)(2)(i)(b) since it is not a modification of an associated parking area but rather a new separate and discrete parking area. Second, this is not an increment under paragraph (b)(2)(iv) since it is not an increment to an existing "indirect source" within the contemplation of the regulation.

If 500 spaces are later added to the apartment's parking facility, then this is a modification to a particular facility which triggers review. Similarly, additional spaces added to such facility from time to time will be considered as increments to that facility within the contemplation of paragraph (b)(2)(iv).

The foregoing also applies to other large-scale developments such as industrial parks, new towns, and large subdivision developments. These types of developments are not in and of themselves indirect sources subject to review under the regulation, although in each case they may contain many indirect sources subject to review.

An understanding of this concept helps answer other questions raised in public comments. For instance, a question frequently posed is whether commencing construction of one facility within an urban renewal area before 1975 will exempt all future construction in the area from review. The answer is "no". The urban renewal area is not itself an indirect source; facilities within the area which have associated parking areas of the requisite size are. Thus construction of a second facility within the area after December 31, 1974, which is otherwise subject to review under the regulation will not be exempt merely because other facilities commenced pursuant to a common plan were exempt.

The reason the phrase "or facilities" is included in paragraph (b)(1)(iii) is to assure that mere physical barriers between parking areas serving a single indirect source will not operate to exclude from review what is in essence a discrete associated parking area for a single source. For instance, a shopping mall which is to be constructed with 500 parking spaces on the north side of the mall and 500 spaces on the south, even though the two parking "facilities" are physically separate and do not have connecting roads between them, will be considered to have an "associated parking area" of 1,000 spaces.

Several questions have been raised regarding the phrase "owned and/or oper-

RULES AND REGULATIONS

ated in conjunction with an indirect source" contained in paragraph (b) (1) (iii). The use of the word "owned" does not mean, as some who commented apparently feared, that a parking lot a particular developer owns in Tallahassee will be counted in determining the size of an associated parking area in Peoria. The key phrase is "in conjunction with," which is intended to convey an operational test looking to whether a particular parking area serves a particular facility under a common scheme of ownership and/or operation.

Parking facilities which are fortuitously constructed near an indirect source but over which the owner or operator of the source has no control, and which are not constructed pursuant to an understanding by which the facility will serve the indirect source, will not be considered an "associated parking area" of the source. For instance, if a developer constructs a shopping center with 600 parking spaces and a municipality erects a 500-space parking garage adjacent to the center completely independent of the shopping center development, there is not a single, 1100-space associated parking area within the contemplation of the regulation. However, if such parking garage were constructed pursuant to an explicit or even implied agreement with the shopping center developer to serve the shopping center, it would be considered part of the center's "associated parking area."

It is not necessary for an "associated parking area" to be directly contiguous to an indirect source to cause that source to be subject to review. For instance, a developer could not avoid review by constructing a large retail facility on one side of the street with forty parking spaces immediately adjacent to it, and constructing a 960-space parking facility across the street. All 1,000 spaces will be treated as an "associated parking area" within the contemplation of paragraph (b) (1) (iii) since they are owned and/or operated in conjunction with a particular indirect source. On the other hand, parking facilities located across the street from each other within an industrial park which serve two separate indirect sources will not constitute a single "associated parking area."

Many questions have arisen concerning "phased" development. As noted above, a major area-wide development such as an urban renewal project, an industrial park, or a "new town" will not be an indirect source itself but may instead contain several indirect sources separately reviewable under the regulation. In response to many comments, two points about phased development should be made clear at this time:

(1) Applicants will be able, and in fact are encouraged, to apply for approval of all indirect sources within their phased developments at the same time, so long as all the information required for the reviewing agency to perform an air quality impact analysis for each source can be provided. This will allow developers to proceed with major developments with a greater degree of certainty.

(2) Since a major area development is not in itself a discrete indirect source subject to review under the regulation, commencement of one phase of such development prior to 1975 will not operate to exempt subsequent indirect sources within such overall development plan which commence construction after December 31, 1974, from indirect source review.

One tangential issue which has been raised frequently relates to phased construction within a single indirect source subject to review under the regulation. For example, assume that a shopping center with a 3,000-space parking area is to have four major "anchor" department stores in addition to dozens of smaller retail and service establishments. The plan is to build the bulk of the shopping center initially, including all of the parking area, but for business reasons to withhold construction of two of the "anchor" stores for two or three years after the center first opens. The two questions which arise are: (1) If construction commences on the initial part of the center prior to 1975 will the subsequent construction of the two anchors trigger review for such two new stores? (2) Alternatively, will such subsequent construction mean that construction of the entire center is covered under the regulation under the theory that the construction which was commenced prior to 1975 was not "continuous"?

(1) The mere fact that two new stores are being added to the shopping center will not trigger indirect source review. The new construction is a modification to an existing indirect source (the shopping center with two "anchors" and 3,000 parking spaces), but modifications are not reviewed unless parking capacity is increased by 500 cars or more (1,000 cars or more in non-SMSA's). (2) The fact that the shopping center is not modified for two or three years after initial opening for business does not make the construction which commenced prior to 1975 non-"continuous" and therefore subject the entire project to indirect source review, because in essence a single indirect source (the shopping center with 3,000 parking spaces minus two anchors) was constructed in a continuous process which commenced prior to 1975.

Several persons questioned whether demolition is to be considered as "site clearance" as that term is used in the definitions of the phrases "to commence construction" and "to commence modification" in paragraph (b) (1) (v) and (vi). The Administrator considers demolition to be a form of site clearance. It is important to note, however, that the term "continuous" is crucial in the definition of these phrases. Demolition prior to 1975 will serve to exempt a project only where it is part of a continuous program of construction specifically designed for a particular indirect source. For example, where a developer demolished a structure on a particular site in 1973, then does no further physical site work until 1975, a source constructed on that site will not be exempt from review merely

because the site clearance began in 1973.

Two points should be made regarding the "force majeure" (acts of God, strikes, etc.) language in paragraph (b) (1) (v). (1) The fact that construction failed to commence at all prior to 1975 because of "force majeure" reasons is irrelevant. Actual physical site work must commence in a continuous course before 1975 for the exemption to be valid. (2) Only breaks in construction attributable solely to the enumerated "force majeure" reasons will be considered in determining whether a project is exempt. For instance, if a site were demolished in 1973, then for business or other reasons, actual physical construction ceased, and a developer planned to commence continuous construction on the site in mid-1974 but was prevented from doing so until 1975 because of litigation, the source would not be exempted from review since factors other than the "force majeure" reasons played a role in rendering the construction noncontinuous.

Some comments urged that the basic coverage requirement set forth in paragraphs (b) (2) (i) and (ii) be amended to require that only those indirect sources for which a new associated parking area is constructed be subject to review. As the regulation is now written, an indirect source constructed on a presently existing associated parking area is subject to review as well.

Such an amendment would create unwarranted exemptions. One case would be that of a developer who has operated a large surface parking lot for several years, and then decides to construct an office building on part of the lot while retaining the remainder to serve as the parking lot for the building. Although the associated parking area would not be new, the office building should clearly be required to undergo pre-construction review as a new indirect source. Another example is the demolition of a large shopping center structure followed by the construction of a new shopping center on the same parcel of land using the same parking lot. In each case, it is reasonable to expect the developer to take air quality considerations into account in planning his basic design, and the construction will not be exempt from indirect source review.

A closely related matter which has drawn several questions is the status under the regulation of accidental destruction of an indirect source followed by new construction on the same parcel. Consistent with the foregoing line of reasoning, such construction would not be exempt from review. Again, the developer can fairly be expected to consider air quality in designing and planning for his new construction. New construction following destruction on a parcel would certainly be subject to more rigid building code requirements or zoning ordinances which had been enacted since the construction of the original improvements, and there is no reason to depart from this principle where a public health regulation is concerned.

Some have questioned whether a reviewing agency could use paragraph (b)

(10) to specify that an approved indirect source may be further modified without review by adding more parking spaces than the number which triggers review under paragraphs (b) (2) (i) (b) and (b) (2) (ii) (b). As discussed on February 25 (39 FR 7276), the intent of this provision is to allow a reviewing agency to reduce the number of new parking spaces that would trigger review for a particular indirect source if it is determined that such a minor modification could cause a violation of the national standards. Since it is difficult to accurately predict the extent which the area surrounding a proposed facility will grow between the approval of its initial application and any possible modification, the Administrator does not consider it appropriate to allow paragraph (b) (10) to be used to liberalize the requirements of paragraphs (b) (2) (i) (b) and (b) (2) (ii) (b). Paragraph (b) (10) has been modified to clarify this point.

Several persons have questioned whether an indirect source approval is transferable. The Administrator considers such approvals to be fully transferable between successive owners of the property for which an approval is granted so long as the indirect source is constructed and/or modified fully in accordance with the approved application and all conditions thereto.

As alluded to before, it is not possible to issue an interpretative ruling which will answer precisely every question that will arise in administering this regulation. Many questions concerning whether or not a facility is subject to review under the regulation will necessarily have to be answered on a case-by-case basis, with those administering the regulation using their sound discretion. In general, developers should assume that devices used in an attempt to evade review will be scrutinized carefully to determine whether a source actually subject to the regulation is commencing construction without the required approval. Those conducting review under the regulation should resolve doubts and close cases in favor of coverage since the purpose of the regulation is to review all new and modified indirect sources except those clearly and specifically exempted. This approach best serves the dictates of the Clean Air Act, which requires measures to "insure" the attainment and maintenance of the ambient standards.

The Administrator does not expect many evasion problems to arise in view of the significant risks developers and lenders would be taking. In commencing construction of a facility subject to the regulation without securing the necessary approval, the developer would be subject to the heavy criminal penalties of section 113 of the Clean Air Act. Moreover, further construction of the facility could be enjoined and a facility for which construction had been completed could be shut down. Thus it is doubtful whether prudent lenders will fund projects unless they are sure that a facility has either received indirect source approval or that none is needed.

In this regard, developers who plan to construct projects which they feel are exempt but which may be arguably subject to the regulation may apply for a determination of applicability ruling from EPA to achieve a greater degree of certainty in proceeding with their projects.

Such rulings should be requested in writing from the appropriate regional offices. Requests should fully recite the facts upon which the developer believes an exemption is based. In appropriate cases a ruling will be issued which will be carefully and strictly limited to the facts as understood by the agency. If construction commences in circumstances under which any material fact is at variance with those represented in the ruling request, or if a material fact were omitted from the request, then the ruling would be rendered inoperative. Applicants should be aware of section 113(c) (2) of the Clean Air Act, which provides that any person who knowingly falsifies information in any application required pursuant to the Act is subject to fine and/or imprisonment.

SPECIFIC CHANGES TO THE REGULATION

The following changes have been made as a result of public comment on the February 25, 1974, regulations.

1. *Phased development.* Paragraph (b) (2) (iv), which is intended to prevent circumvention of the regulation through numerous minor modifications, is amended below to allow each phase of a project to be constructed without the issuance of a separate permit as long as the entire project had received approval at the outset. In addition, the information to be submitted in support of an application [Paragraph (b) (3)] has been clarified with respect to phased development projects. The traffic conditions at the time each phase becomes operational must be submitted so that the Administrator can determine the project's air quality impact at any time during the development process. This determination is necessary since a facility might be acceptable upon completion at some extended future date (due to the effects of the Federal Motor Vehicle Control Program), yet could cause a violation of air quality standards at some intermediate stage of development.

2. *Basis for disapproval for violations of the carbon monoxide standard.* The Federal indirect source regulation has been promulgated to conform to the requirements of 40 CFR 51.18, which requires all state implementation plans to have indirect source review procedures to prevent construction which "will interfere with attainment or maintenance" of ambient standards. The Federal regulations proposed on October 30, 1973, provided that construction must be prevented where the indirect source would "prevent or interfere with the attainment or maintenance" of ambient standards. (Proposed 40 CFR 52.22(b) (4) (i) (b), 38 FR 29896.) Because some comments in response to the October 30 proposal reflected concern as to the precise meaning of the quoted phrase, the

Administrator endeavored to state the test with more specificity in the final regulation (40 CFR 52.22(b) (4) (i) (b) - (c), 39 FR 7277).

Upon further analysis and consideration of comments, the Administrator has determined that the test for carbon monoxide violations can be stated more simply than in the February regulation, and more in conformity with the requirements of the Clean Air Act and 40 CFR 51.18. Moreover, the new statement of the test more closely follows the intent of the October 30 proposal.

The new statement of the test requires disapproval of a facility which would either cause a new violation or exacerbate any existing violation of a carbon monoxide standard, in any portion of any air quality control region. The test as stated in the February regulation could have permitted temporary new violations of the carbon monoxide standard to be created until the specified attainment date. This would be inconsistent with the requirements of the Clean Air Act, which requires attainment of primary ambient standards "as expeditiously as practicable," not merely by the statutory deadline. To allow violations to be created or exacerbated by the construction of a new source is consistent neither with this mandate nor with 40 CFR 51.18, since to allow a new source to create new violations would "interfere" with the attainment of the standards as expeditiously as practicable.

3. *Basis for decisions involving photochemical oxidant and nitrogen dioxide.* On several previous occasions (38 FR 29893 at 29894 and 39 FR 7270 at 7272), the Administrator has expressed reservations concerning the adequacy of available analytical techniques to accurately analyze the impact of a specific indirect source on ambient air quality concentrations of photochemical oxidant and nitrogen dioxide. The application of the proportional modeling technique specified in the February 25 regulations becomes quite subjective when applied to the incremental air quality impact of a single facility or project. Since the proportional model assumes that air quality is proportional to emissions, the key to analyzing the air quality impact of a highway or airport focuses on the definition of baseline emissions. If the baseline emissions are those presently emitted on the proposed site, the predicted air quality increase would be extremely large. If the baseline emissions are those of the entire region, the predicted air quality increase would in most cases, be quite small. As a result of these problems, the Administrator has chosen to eliminate the exclusive use of the proportional model, and to base decisions involving oxidant and nitrogen dioxide on considerations to be published shortly as a new Appendix to Part 52. While the Administrator does not desire to base photochemical oxidant and nitrogen dioxide decisions exclusively on the proportional model on a national scale, states are not precluded from using such a model where they feel it is appropriate for their local needs and conditions.

RULES AND REGULATIONS

25296

4. *Use of traffic flow characteristics for highway decisions.* As promulgated on February 25, the regulations specified the use of a diffusion model for analyzing the impact of highways on carbon monoxide air quality. In developing the traffic flow characteristics discussed below, it became apparent that such criteria would be equally applicable for analyzing localized carbon monoxide concentrations in the vicinity of roads and highway. Thus, the regulations are modified below to permit the use of such characteristics, with the option of using a diffusion model if either the applicant or the Administrator deems appropriate.

5. *Applicant's opportunity to respond to public comment.* The regulations are amended to permit the applicant to respond in writing, within 10 days after the close of the public comment period, on the comments submitted by the public. The Administrator is required to consider such response in making his final decision.

6. *Permit conditions and penalties.* One comment indicated that the requirement to "operate in accordance with the application" in paragraph (b)(11) was unreasonable, since it could be construed to require the applicant to obtain permission before changing store hours or other minor operating practices which may have been indicated in the application. It was not the Administrator's intent to provide that any minor operational factor which could have no reasonable impact upon air quality be an enforceable permit condition. Accordingly, the above-quoted phrase has been omitted from paragraph (b)(11). On the other hand, in most cases there will be certain operational factors which will be crucial to the air quality impact of an indirect source. Accordingly, paragraph (b)(9) is amended to permit the reviewing agency to specify that such operating provisions will be enforceable permit conditions.

It is crucial to the effective operation of the indirect source program that the reviewing agency utilize the provisions of paragraph (b)(9) to specify any such operating factor which could affect air quality as a permit condition. Conditions which must be considered on a routine basis will be:

a. A requirement that the facility, or any incremental development phase, not be opened for business prior to the date specified by the reviewing agency. Because of the continuing emission reduction effected by the Federal Motor Vehicle Control Program, the vehicle mix on the date of expected opening (and resulting average vehicle emission rate) could be an important factor in determining whether air quality standards would be violated.

b. Specification of the type and degree of modification to the approved facility that must be subject to review. Since the regulation only requires review of modifications that result in addition of a specified number of parking spaces, the reviewing agency may also specify that certain structural or use changes which would adversely impact air quality shall also be subject to review.

7. *Invalidation of approval.* Numerous comments were received indicating that in many cases, on-site construction would not commence within 18 months after receipt of approval as required under subparagraph (12). Accordingly, this period has been extended from 18 to 24 months. Subparagraph (12) still contains a provision allowing the Administrator to extend this time period upon a satisfactory showing that an extension is justified. Since the regulation has been modified to permit the applicant to request an extension at the time of initial application, this subparagraph should not introduce uncertainty for developers acting in good faith.

8. *Data to be submitted by the applicant.* Paragraph (b)(3) is amended to eliminate the requirement that an applicant submit the intermediate information, such as trip inducement and existing volumes, that are used to estimate future traffic volumes. As amended, paragraph (b)(10) requires submission of only that data needed to determine the traffic flow characteristics on which the Administrator will base his decision with respect to localized carbon monoxide concentrations. An additional parameter, vehicle capacity of major roads and intersection in the vicinity of the indirect source, is included since it is needed for determinations based upon traffic flow characteristic guidelines. Pursuant to paragraph (b)(3)(i)(4), the Administrator may request any additional information needed to check the accuracy of the estimates submitted by the applicant.

9. *Examples of traffic flow characteristics.* As indicated below, the Administrator is issuing guidelines setting forth traffic flow characteristics which may be used in determining localized carbon monoxide concentration. Consequently, the examples of traffic flow characteristics previously listed in paragraph (b)(4)(ii) are no longer necessary and have been deleted.

10. *Necessity for "on-site construction".* In order to clear up confusion, the phrase "on-site" has been added to the definitions of "to commence construction" and "to commence modification." This is entirely consistent with the Administrator's intent as reflected in the February 25 preamble at 39 FR 7273.

11. *Sources Subject to "Management of Parking Supply" Regulations.* "Management of parking supply" regulations have been promulgated by EPA as part of the transportation control plans in 19 regions. In order to eliminate confusion as to whether the indirect source regulation is applicable to a particular facility in areas where both regulations appear to be in effect, the indirect source regulation has been amended to state that in such areas, sources which would otherwise be required to undergo review under both regulations will be subject to review only under the management of parking supply regulation. Thus, applicants will not be required to apply for permits from EPA through two separate procedures. The parking management regulations will require facilities of the size subject to indirect source

review to undergo carbon monoxide impact analysis similar to that required by the indirect source regulation in addition to other parking management review requirements.

It should be noted, however, that the parking management regulations will not exempt from review sources of the size covered by the indirect source regulation merely because a general construction contract had been executed for such a source. Such sources shall be exempt only if they have commenced on-site construction or modification on or before January 1, 1975. The management of parking supply regulations will soon be refined by EPA in the respects noted above.

12. *Basis for Decisions on Carbon Monoxide Impact.* Paragraph (b)(4)(ii) has been clarified to emphasize that there are a number of analytical techniques which may be acceptable for evaluating the concentration of carbon monoxide in the vicinity of indirect sources. As discussed below, the Administrator has developed and published traffic flow characteristic guidelines which will be one method which may be used. The use of such guidelines, however, is not a requirement of the regulation.

As explained in the preamble to the February promulgation at 39 FR 7275, these guidelines will have the beneficial effect of allowing developers to plan their facilities so as to maximize their chances for approval. Such guidelines will frequently be used by EPA in conducting review since they provide a rather simple and expeditious method in analyzing carbon monoxide impact. Nevertheless, it is expected that in many cases other methods, such as diffusion modeling, will have to be relied on in making the determination. For instance, where basic technical assumptions used in developing the guidelines are not appropriate in a certain area, the guidelines would not be used as the basis for deciding whether a permit may be granted. Instead, a diffusion model or other technique which more accurately takes account of the actual conditions at a particular site would have to be used.

13. *Minor clarification changes.* There have been several other minor drafting changes made for clarification purposes which do not change the scope or intent of the regulation.

ANALYTICAL TECHNIQUES FOR DETERMINING CARBON MONOXIDE CONCENTRATIONS

In the preamble to the February 25 promulgation, the Administrator indicated that he would publish guidelines setting forth traffic flow characteristics which may be used in analyzing the carbon monoxide impact of indirect sources. Accordingly, the Agency is publishing Guidelines for the Review of the Impact of Indirect Sources on Ambient Air Quality which specify the analytical techniques the Agency will frequently use in determining the air quality impact of an indirect source on localized carbon monoxide concentrations. (See discussion under #12 above.)

These guidelines will be available for inspection and distribution at each Re-

RULES AND REGULATIONS

25297

gional Office as well as the EPA Freedom of Information Center, 401 M Street, S.W., Washington, D.C. 20460. As is true of any guidelines setting forth the Agency's procedures or practices, EPA welcomes any relevant written comments relating to these guidelines at any time. Interested persons may submit written comments to the Monitoring and Data Analysis Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711.

The main body of the Guidelines contains a simplified methodology which relates certain key traffic flow characteristics to local carbon monoxide concentrations. Nine appendices are also included for conducting a more complete analysis, if necessary, of the impact of an indirect source on ambient air quality. Seven of the appendices discuss methods for estimating emissions from the different types of indirect sources, the eighth discusses the use of dispersion models which may be used in such an analysis as well as methods for estimating background concentrations, and the ninth appendix provides a compilation of indirect source monitoring studies. The Guidelines also include a discussion of several considerations for improving traffic flow characteristics, thus minimizing a facility's potential to contribute to a violation of the national standards for carbon monoxide.

ADMINISTRATIVE PROCEDURES AND DELEGATION

Where the Administrator has not delegated the responsibility for implementing § 52.22(b) for indirect source review to a State or local agency, the implementation of the regulation will be the responsibility of the appropriate EPA Regional Administrator. A list of the States covered by each Regional Office and the Regional Office addresses are set forth in § 52.16 of Part 52. Questions concerning the applicability of the regulation and any other inquiries should be directed to the appropriate Regional Office. Application forms should be requested from the Regional Office and returned there for review. Since forms will not be available immediately, early applicants should contact the appropriate Regional Office for interim advice concerning the format for application. Those applicants wishing to submit the results of diffusion modeling or other analytical technique in support of their application are urged to contact the Regional Office first to discuss the appropriate input parameters and receptor sites which are of critical interest.

With respect to highways and airports, it is expected that all necessary technical data will be available in an Environmental Impact Statement (EIS) prepared pursuant to the National Environmental Policy Act (42 U.S.C. 4321). In such cases, all that is necessary to make application is a letter to the appropriate Regional Administrator from the initiating agency, accompanied by the EIS if not previously submitted, requesting permission to construct. If additional data are required, the Regional Office will

notify the applicant within 20 days after receipt of the request.

Normally, the draft EIS for highway projects is prepared after the general corridor has been defined but before a specific location has been selected. A draft EIS is circulated on the various location alternatives and a public hearing is held on the EIS. Depending on the comments received, the State highway agency may decide to abandon the project due to its adverse environmental consequences, re-draft the EIS to contain additional alternatives, or issue the final EIS on the alternatives considered in the draft. Following the issuance of the final EIS, the State highway agency generally proceeds with the following steps leading to the eventual construction of the highway: selects preferred alternative; performs detailed highway design and development of specifications; holds design hearing; obtains approval and funding commitment from the Federal Highway Administration; acquires right-of-way land and appropriate easements; advertises for and analyzes bids; and awards construction contracts.

The application for approval under the indirect source regulations would normally be made as early in the above process as the necessary data are available, which would not be earlier than the location study phase. The highway agency may, of course, make application at any later phase prior to actual commencement of construction. Although the Administrator would prefer to consider only the selected alternative based on the final EIS, he will provide the highway agency with a decision on each of the alternatives specifically analyzed in the draft EIS. In addition, review based on the draft EIS coincides with EPA's present procedures for review and rating of EIS's. Although not required, the Administrator urges States or local agencies accepting delegation of these regulations to utilize administrative procedures similar to those outlined above.

The Administrator reiterates his desire to delegate the indirect source review procedures to States and/or local governments. States will soon be receiving communications from EPA's regional offices containing more details regarding delegation.

If a State agency has not officially requested delegation, the Administrator will entertain requests from local agencies. Local agencies may inquire about delegation procedures at the appropriate EPA Regional Offices. However, no delegation will be made directly to a local agency if a State agency has already received delegation. In addition to the guidance provided on February 25, 1974, as to what type of agency should receive delegation, the Administrator feels there are certain agencies which should not be delegated review responsibility where a conflict of interest could be created. For example, the Administrator will not delegate the indirect source review to agencies, such as State highway agencies, which are substantially responsible for

originating projects subject to review under these regulations.

Since the amendments being published today are in response to public comments based upon the regulation published in February and review is to begin under the regulation immediately, the Administrator finds good cause not to subject the amendments to further public comment before finalization as such procedure would be unnecessary and impracticable. Appendix A is being promulgated in final form because interpretative rulings are exempt from the notice and public comment requirements of the Administrative Procedure Act. For the convenience of applicants, reviewing officials, and all other interested persons, the regulation is being reprinted in its entirety in its amended form. (Sections 110(a)(2)(B), 110(c), and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857c-5(a)(2)(B), 1857c-5(c), and 1857g(a)).)

Dated: June 28, 1974.

JOHN QUARLES,
Acting Administrator.

Part 52 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 52.22, paragraph (b) is revised to read as follows:

§ 52.22 Maintenance of standards.

(b) *Regulation for review of new or modified indirect sources.*

(1) All terms used in this paragraph but not specifically defined below shall have the meaning given them in § 52.01 of this chapter.

(i) The term "indirect source" means a facility, building, structure, or installation which attracts or may attract mobile source activity that results in emissions of a pollutant for which there is a national standard. Such indirect sources include, but are not limited to:

- (a) Highways and roads.
- (b) Parking facilities.
- (c) Retail, commercial and industrial facilities.
- (d) Recreation, amusement, sports and entertainment facilities.
- (e) Airports.
- (f) Office and Government buildings.
- (g) Apartment and condominium buildings.

(h) Education facilities.

(ii) The term "Administrator" means the Administrator of the Environmental Protection Agency or his designated agent.

(iii) The term "associated parking area" means a parking facility or facilities owned and/or operated in conjunction with an indirect source.

(iv) The term "aircraft operation" means an aircraft take-off or landing.

(v) The phrase "to commence construction" means to engage in a continuous program of on-site construction including site clearance, grading, dredging, or land filling specifically designed for an indirect source in preparation for the fabrication, erection, or installation

RULES AND REGULATIONS

of the building components of the indirect source. For the purpose of this paragraph, interruptions resulting from acts of God, strikes, litigation, or other matters beyond the control of the owner shall be disregarded in determining whether a construction or modification program is continuous.

(vi) The phrase "to commence modification" means to engage in a continuous program of on-site modification, including site clearance, grading, dredging, or land filling in preparation for a specific modification of the indirect source.

(vii) The term "highway section" means the development proposal of a highway of substantial length between logical termini (major crossroads, population centers, major traffic generators, or similar major highway control elements) as normally included in a single location study or multi-year highway improvement program as set forth in 23 CFR 770.201 (38 FR 31677).

(viii) The term "highway project" means all or a portion of a highway section which would result in a specific construction contract.

(ix) The term "Standard Metropolitan Statistical Area (SMSA)" means such areas as designated by the U.S. Bureau of the Budget in the following publication: "Standard Metropolitan Statistical Area," Issued in 1967, with subsequent amendments.

(2) The requirements of this paragraph are applicable to the following:

(i) In an SMSA:

(a) Any new parking facility, or other new indirect source with an associated parking area, which has a new parking capacity of 1,000 cars or more; or

(b) Any modified parking facility, or any modification of an associated parking area, which increases parking capacity by 500 cars or more; or

(c) Any new highway project with an anticipated average annual daily traffic volume of 20,000 or more vehicles per day within ten years of construction; or

(d) Any modified highway project which will increase average annual daily traffic volume by 10,000 or more vehicles per day within ten years after modification.

(ii) Outside an SMSA:

(a) Any new parking facility, or other new indirect source with an associated parking area, which has a parking capacity of 2,000 cars or more; or

(b) Any modified parking facility, or any modification of an associated parking area, which increases parking capacity by 1,000 cars or more.

(iii) Any airport, the construction or general modification program of which is expected to result in the following activity within ten years of construction or modification:

(a) New airport: 50,000 or more operations per year by regularly scheduled air carriers, or use by 1,600,000 or more passengers per year.

(b) Modified airport: Increase of 50,000 or more operations per year by regularly scheduled air carriers over the existing volume of operations; or increase

of 1,600,000 or more passengers per year.

(iv) Where an indirect source is constructed or modified in increments which individually are not subject to review under this paragraph, and which are not part of a program of construction or modification, in planned incremental phases approved by the Administrator, all such increments commenced after December 31, 1974, or after the latest approval hereunder, whichever date is most recent, shall be added together for determining the applicability of this paragraph.

(3) No owner or operator of an indirect source subject to this paragraph shall commence construction or modification of such source after December 31, 1974, without first obtaining approval from the Administrator. Application for approval to construct or modify shall be by means prescribed by the Administrator, and shall include a copy of any draft or final environmental impact statement which has been prepared pursuant to the National Environmental Policy Act (42 U.S.C. 4321). If not included in such environmental impact statement, the Administrator may request the following information:

(i) For all indirect sources subject to this paragraph, other than highway projects:

(a) The name and address of the applicant.

(b) A map showing the location of the site of indirect source and the topography of the area.

(c) A description of the proposed use of the site, including the normal hours of operation of the facility, and the general types of activities to be operated therein.

(d) A site plan showing the location of associated parking areas, points of motor vehicle ingress and egress to and from the site and its associated parking areas, and the location and height of buildings on the site.

(e) An identification of the principal roads, highways, and intersections that will be used by motor vehicles moving to or from the indirect source.

(f) An estimate, as of the first year after the date the indirect source will be substantially complete and operational, of the average daily traffic volumes, maximum traffic volumes for one-hour and eight-hour periods, and vehicle capacities of the principal roads, highways, and intersections identified pursuant to subdivision (i) (e) of this subparagraph, located within one-fourth mile of all boundaries of the site:

(g) Availability of existing and projected mass transit to service the site.

(h) Where approval is sought for indirect sources to be constructed in incremental phases, the information required by this subparagraph (3) shall be submitted for each phase of the construction project.

(i) Any additional information or documentation that the Administrator deems necessary to determine the air quality impact of the indirect source, including the submission of measured air

quality data at the proposed site prior to construction or modification.

(ii) For airports:

(a) An estimate of the average number and maximum number of aircraft operations per day by type of aircraft during the first, fifth and tenth years after the date of expected completion.

(b) A description of the commercial, industrial, residential and other development that the applicant expects will occur within three miles of the perimeter of the airport within the first five and the first ten years after the date of expected completion.

(c) Expected passenger loadings at the airport.

(d) The information required under subdivisions (i) (a) through (i) of this subparagraph.

(iii) For highway projects:

(a) A description of the average and maximum traffic volumes for one, eight, and 24-hour time period expected within 10 years of date of expected completion.

(b) An estimate of vehicle needs for average and maximum traffic volume conditions and the vehicle capacity of the highway project.

(c) A map showing the location of the highway project, including the location of buildings along the right-of-way.

(d) A description of the general features of the highway project and associated right-of-way, including the approximate height of buildings adjacent to the highway.

(e) Any additional information or documentation that the Administrator deems necessary to determine the air quality impact of the indirect source, including the submission of measured air quality data at the proposed site prior to construction or modification.

(iv) For indirect sources other than airports and those highway projects subject to the provisions of paragraph (b) (6) (iii) of this section, the air quality monitoring requirements of paragraph (b) (3) (i) (i) of this section shall be limited to carbon monoxide, and shall be conducted for a period of not more than 14 days.

(4) (i) For indirect sources other than highway projects and airports, the Administrator shall not approve an application to construct or modify if he determines that the indirect source will:

(a) Cause a violation of the control strategy of any applicable state implementation plan; or

(b) Cause or exacerbate a violation of the national standards for carbon monoxide in any region or portion thereof.

(ii) The Administrator shall make the determination pursuant to paragraph (b) (4) (i) (b) of this section by evaluating the anticipated concentration of carbon monoxide at reasonable receptor or exposure sites which will be affected by the mobile source activity expected to be attracted by the indirect source. Such determination may be made by using traffic flow characteristic guidelines published by the Environmental Protection Agency which relate traffic demand and capacity considerations to ambient car-

RULES AND REGULATIONS

25299

on monoxide impact, by use of appropriate atmospheric diffusion models (examples of which are referenced in Appendix 0 to Part 51 of this chapter), and/or by any other reliable analytic method. The applicant may (but need not) submit with his application, the results of an appropriate diffusion model and/or any other reliable analytic method, along with the technical data and information supporting such results. Any such results and supporting data submitted by the applicant shall be considered by the Administrator in making his determination pursuant to paragraph (b) (4) (i) (b) of this section.

(5) (i) For airports subject to this paragraph, the Administrator shall base his decision on the approval or disapproval of an application on the considerations to be published as an Appendix to this Part.

(ii) For highway projects and parking facilities specified under paragraph (b) (2) of this section which are associated with airports, the requirements and procedures specified in paragraphs (b) (4) and (6) (i) and (ii) of this section shall be met.

(6) (i) For all highway projects subject to this paragraph, the Administrator shall not approve an application to construct or modify if he determines that the indirect source will:

(a) Cause a violation of the control strategy of any applicable state implementation plan; or

(b) Cause or exacerbate a violation of the national standards for carbon monoxide in any region or portion thereof.

(ii) The determination pursuant to paragraph (b) (6) (i) (b) of this section shall be made by evaluating the anticipated concentration of carbon monoxide at reasonable receptor or exposure sites which will be affected by the mobile source activity expected on the highway for the ten year period following the expected date of completion according to the procedures specified in paragraph (b) (4) (ii) of this section.

(iii) For new highway projects subject to this paragraph with an anticipated average daily traffic volume of 50,000 or more vehicles within ten years of construction, or modifications to highway projects subject to this paragraph which will increase average daily traffic volume by 25,000 or more vehicles within ten years after modification, the Administrator's decision on the approval or disapproval of an application shall be based on the considerations to be published as an Appendix to this Part in addition to the requirements of paragraph (b) (6) (i) of this section.

(7) The determination of the air quality impact of a proposed indirect source "at reasonable receptor or exposure sites" shall mean such locations where people might reasonably be exposed for time periods consistent with the national ambient air quality standards for the pollutants specified for analysis pursuant to this paragraph.

(8) (i) Within 20 days after receipt of an application or addition thereto, the

Administrator shall advise the owner or operator of any deficiency in the information submitted in support of the application. In the event of such a deficiency, the date of receipt of the application for the purpose of paragraph (b) (8) (ii) of this section shall be the date on which all required information is received by the Administrator.

(ii) Within 30 days after receipt of a complete application, the Administrator shall:

(a) Make a preliminary determination whether the indirect source should be approved, approved with conditions in accordance with paragraphs (b) (9) or (10) of this section, or disapproved.

(b) Make available in at least one location in each region in which the proposed indirect source would be constructed, a copy of all materials submitted by the owner or operator, a copy of the Administrator's preliminary determination, and a copy or summary of other materials, if any, considered by the Administrator in making his preliminary determination; and

(c) Notify the public, by prominent advertisement in a newspaper of general circulation in each region in which the proposed indirect source would be constructed, of the opportunity for written public comment on the information submitted by the owner or operator and the Administrator's preliminary determination on the approvability of the indirect source.

(iii) A copy of the notice required pursuant to this subparagraph shall be sent to the applicant and to officials and agencies having cognizance over the location where the indirect source will be situated, as follows: State and local air pollution control agencies, the chief executive of the city and county; any comprehensive regional land use planning agency; and for highways, any local board or committee charged with responsibility for activities in the conduct of the urban transportation planning process (3-C process) pursuant to 23 U.S.C. 134.

(iv) Public comments submitted in writing within 30 days after the date such information is made available shall be considered by the Administrator in making his final decision on the application. No later than 10 days after the close of the public comment period, the applicant may submit a written response to any comments submitted by the public. The Administrator shall consider the applicant's response in making his final decision. All comments shall be made available for public inspection in at least one location in the region in which the indirect source would be located.

(v) The Administrator shall take final action on an application within 30 days after the close of the public comment period. The Administrator shall notify the applicant in writing of his approval, conditional approval, or denial of the application, and shall set forth his reasons for conditional approval or denial. Such notification shall be made available for public inspection in at least one location in the region in which the indirect source would be located.

(vi) The Administrator may extend each of the time periods specified in paragraphs (b) (8) (ii), (iv), or (v) of this section by no more than 30 days, or such other period as agreed to by the applicant and the Administrator.

(9) (i) Whenever an indirect source as proposed by an owner or operator's application would not be permitted to be constructed for failure to meet the tests set forth pursuant to paragraphs (b) (4) (i), (b) (5) (i), or (b) (6) (i) and (iii) of this section, the Administrator may impose reasonable conditions on an approval related to the air quality aspects of the proposed indirect source so that such source, if constructed or modified in accordance with such conditions, could meet the tests set forth pursuant to paragraphs (b) (4) (i), (b) (5) (i), or (b) (6) (i) and (iii) of this section. Such conditions may include, but not be limited to:

(a) Binding commitments to roadway improvements or additional mass transit facilities to serve the indirect source secured by the owner or operator from governmental agencies having jurisdiction thereof;

(b) Binding commitments by the owner or operator to specific programs for mass transit incentives for the employees and patrons of the source; and

(c) Binding commitments by the owner or operator to construct, modify, or operate the indirect source in such a manner as may be necessary to achieve the traffic flow characteristics published by the Environmental Protection Agency pursuant to paragraph (b) (4) (ii) of this section.

(ii) The Administrator may specify that any items of information provided in an application for approval related to the operation of an indirect source which may affect the source's air quality impact shall be considered permit conditions.

(10) Notwithstanding the provisions relating to modified indirect sources contained in paragraph (b) (2) of this section, the Administrator may condition any approval by reducing the extent to which the indirect source may be further modified without resubmission for approval under this paragraph.

(11) Any owner or operator who fails to construct an indirect source in accordance with the application as approved by the Administrator; any owner or operator who fails to construct and operate an indirect source in accordance with conditions imposed by the Administrator under paragraph (b) (9); any owner or operator who modifies an indirect source in violation of conditions imposed by the Administrator under paragraph (b) (10); or any owner or operator of an indirect source subject to this paragraph who commences construction or modification thereof after December 31, 1974, without applying for and receiving approval hereunder, shall be subject to the penalties specified under section 113 of the Act and shall be considered in violation of an emission standard or limitation under section 304 of the Act. Subsequent modification to an approved indirect source may be made without applying for permission

RULES AND REGULATIONS

pursuant to this paragraph only where such modification would not violate any condition imposed pursuant to paragraphs (b) (9) and (10) of this section and would not be subject to the modification criteria set forth in paragraph (b) (2) of this section.

(12) Approval to construct or modify shall become invalid if construction or modification is not commenced within 24 months after receipt of such approval. The Administrator may extend such time period upon a satisfactory showing that an extension is justified. The applicant may apply for such an extension at the time of initial application or at any time thereafter.

(13) Approval to construct or modify shall not relieve any owner or operator of the responsibility to comply with the control strategy and all local, State and Federal regulations which are part of the applicable State implementation plan.

(14) Where the Administrator delegates the responsibility for implementing the procedures for conducting indirect source review pursuant to this paragraph to any agency, other than a regional office of the Environmental Protection Agency, the following provisions shall apply:

(i) Where the agency designated is not an air pollution control agency, such agency shall consult with the appropriate State or local air pollution control agency prior to making any determination required by paragraphs (b) (4), (5), or (6) of this section. Similarly, where the agency designated does not have continuing responsibilities for land use planning, such agency shall consult with the appropriate State or local land use and transportation planning agency prior to making any determination required by paragraph (b) (9) of this section.

(ii) The Administrator of the Environmental Protection Agency shall conduct the indirect source review pursuant to this paragraph for any indirect source owned or operated by the United States Government.

(iii) A copy of the notice required pursuant to paragraph (b) (8) (ii) (c) of this section shall be sent to the Administrator through the appropriate Regional Office.

(15) In any area in which a "management of parking supply" regulation which has been promulgated by the Administrator is in effect, indirect sources which are subject to review under the terms of such a regulation shall not be required to seek review under this paragraph but instead shall be required to seek review pursuant to such management of parking supply regulation. For purposes of this paragraph, a "management of parking supply" regulation shall be any regulation promulgated by the Administrator as part of a transportation control plan pursuant to the Clean Air Act which requires that any new or modified facility containing a given number of parking spaces shall receive a permit or other prior approval, issuance

of which is to be conditioned on air quality considerations.

[Note: Interpretative rulings regarding the above paragraph are published in Appendix A to this Part.]

APPENDIX A—INTERPRETATIVE RULINGS FOR § 52.22(b)—REGULATION FOR REVIEW OF NEW OR MODIFIED INDIRECT SOURCES

The purpose of this appendix is to set forth certain basic interpretations of the regulation for the review of new or modified indirect sources in § 52.22(b). It is not possible to issue an interpretative ruling which will answer precisely every question that will come up in the administration of that regulation. Many questions concerning whether a facility is subject to review must necessarily be answered on a case-by-case basis. Those administering the indirect source regulation should resolve doubts and close cases in favor of review since the regulation's intent is to review all indirect sources except those clearly and specifically exempted.

Since cases may arise in which developers plan to construct projects which they feel are exempt but which may be arguably subject to the regulation, developers may apply for a determination of applicability ruling from EPA to achieve a greater degree of certainty in proceeding with their projects. Such rulings should be requested in writing from the appropriate regional offices. Requests should fully recite the facts upon which the developer believes the exemption is based. In appropriate cases a ruling will be issued which will be strictly limited to the facts as understood by the Agency. If construction commences in circumstances under which any material fact is at variance with those represented in the ruling request or if a material fact were omitted from the request, then the ruling would be rendered inoperative.

One caveat should precede these interpretative rulings: the following is the Administrator's interpretation of his own regulation, 40 CFR 52.22(b). States which develop their own regulations which may be approved under 40 CFR 51.18 are not bound to interpret their regulations in the same manner, so long as their regulations operate to insure that the national standards will not be violated as a result of the construction of a new indirect source.

(1) The basic focus of the regulation is to review a new facility which will have an associated parking area of the requisite number of parking spaces. The list contained in 40 CFR 52.22(b) (1) (i) is merely a set of examples and should not be overemphasized. The key to determining which facilities must be reviewed is in paragraph (b) (2), which requires review of "a new parking facility, or other new indirect source with an associated parking area" of the requisite size. Thus, in every case, the most important factor will be to determine whether an "associated parking area" of the requisite size is to be "owned and/or operated in conjunction with" a facility. To be an "associated parking area" within the intent of

the regulation, the area must be a separate and discrete localized facility associated with a particular indirect source.

(2) A major area development, such as an urban renewal project, industrial park, new town, or large residential development, is not considered an indirect source itself. Rather, such a project may contain a number of indirect sources, some of which may require preconstruction review under the regulation. For example, assume that twelve blocks of a city within an SMSA are being reconstructed pursuant to a redevelopment plan and within the twelve blocks there is to be a municipal auditorium with 1,500 parking spaces underneath it, an apartment building with 300 parking spaces adjacent to it to serve its residents, a 1,200-space municipal parking garage, many townhouses with single or double private garages for the use of their owners, and 500 spaces for curb-side on-street parking. The municipal auditorium and the municipal garage will each be subject to the regulation as a separate indirect source since each will have a separate and discrete associated parking area of 1,000 spaces or more. The redevelopment project itself is not an "indirect source" subject to review under the regulation, however, merely because it includes in the aggregate more than 1,000 spaces. The construction, 5 years later, of a new apartment building with an associated parking area of 600 cars within the urban renewal area will not trigger review under the regulation. First, this is not a modification of an associated parking area but rather a new separate and discrete parking area. Second, this is not an increment under § 52.22(b) (2) (iv) since it is not an addition to an existing "indirect source" within the contemplation of the regulation. On the other hand, if 500 spaces are later added to the apartment building's parking facility, this is a modification to a particular facility which triggers review. Similarly, additional spaces added to such facility from time to time will be considered as increments to that facility within the contemplation of § 52.22(b) (2) (iv).

(3) The phrase "or facilities" is included in § 52.22(b) (1) (ii) to assure that mere physical barriers between parking areas serving a single indirect source will not operate to exclude from review what is in essence a discrete associated parking area for a single source. For example, a shopping mall which is to be constructed with 500 parking spaces on the north side of the mall and 500 spaces on the south, even though the two parking "facilities" are physically separate and do not have connecting roads between them, will be considered to have an "associated parking area" of 1,000 spaces.

(4) The term "owned and/or operated in conjunction with" which is used to define an associated parking area is intended to convey an operational test as to whether a particular parking area serves a particular facility under a common scheme ownership and/or operation. Thus,

RULES AND REGULATIONS

25301

(1) Two parking facilities owned by the same person which are located in different areas of a city will not be considered a single associated parking area.

(ii) Parking facilities which are fortuitously constructed near an indirect source but over which the owner or operator of the source has no control, and which are not constructed pursuant to an understanding by which the facility will serve the indirect source, will not be considered an "associated parking area" of the source. For example, if a developer constructs a shopping center with 600 parking spaces and a municipality erects a 500-space parking garage adjacent to the center completely independent of the shopping center development, there is not a single 1100-space associated parking area within the contemplation of the regulation. However, if such parking garage were constructed pursuant to an explicit or even implied agreement to serve the shopping center, it would be considered part of the center's "associated parking area."

(5) It is not necessary for an "associated parking area" to be directly contiguous to an indirect source to cause that source to be subject to review. For instance, a developer could not avoid review by constructing a large retail facility on one side of the street with 40 parking spaces immediately adjacent to it, and constructing a 960-space parking facility across the street. All 1,000 spaces would be treated as an "associated parking area" within the contemplation of § 52.22(b)(1)(iii) since they are owned and/or operated in conjunction with a particular indirect source. On the other hand, parking facilities located across the street from each other which serve two separate indirect sources would not constitute a single "associated parking area."

(6) The following is a clarification of a number of issues concerning the phased development of individual indirect sources and of major area developments, such as an urban renewal project.

(i) In all cases applicants are allowed, and in fact encouraged, to apply for approval of all phases of the project at the same time, so long as all the information required for the reviewing agency to perform an air quality impact analysis is provided.

(ii) Since a major area development is not in itself a discrete indirect source subject to review under the regulation, commencement of construction of one phase of such development or of a single facility within the development prior to 1975 will not operate to exempt subsequent indirect sources within such overall development plan which commence construction after 1974.

(iii) In the phased development of a single indirect source, if construction for the initial phase commences prior to

1975, additional phases would be considered modifications or increments and

would require review only by addition of the requisite number of parking spaces. For example, assume that a shopping center with a 3000-space parking area began construction prior to 1975 and was to have four major "anchor" department stores in addition to dozens of smaller retail and service establishments. The plan is to build the bulk of the shopping center in the first phase, including the entire parking area, and to build two of the "anchor" stores in the second phase some time after the center begins operation. Neither phase of construction of this shopping center would require indirect source review since the first phase of construction began prior to 1975, and the second phase did not provide for the addition of the requisite number of parking spaces.

(iv) Similarly, in the phased development of a single indirect source, a break in construction between phases would not make the construction which commenced prior to 1975 "noncontinuous" and therefore subject the entire project to indirect source review, because in essence a single source (the result of the first phase) was constructed in a continuous process which commenced prior to 1975. For example, neither phase of the shopping center discussed above would be subject to review simply because there was a break in construction between the distinct phases.

(v) In cases where applicants apply for approval of all phases of a project at the same time, the information required by § 52.22(b)(3) must be submitted for each phase of the development. It is necessary that the air quality analysis be performed for each phase as it opens and not merely for the last phase. For example, assume that analysis of a phased project indicated that operation of the facility following completion of the first phase would cause a violation of the national standards, but operation following completion of the following phases would not. Approval of the project would not be granted until essential design or operational changes were made to the first phase so that the national standards would not be violated.

(7) Demolition can be considered to be a form of "site clearance" as that term is used in the definitions of the phrases "to commence construction" and "to commence modification" in § 52.22(b)(1)(v) and (vi). It is important to note, however, that demolition prior to 1975 will serve to exempt a project only where it is part of a continuous program of construction specifically designed for a particular indirect source. Thus, where a developer demolishes a structure on a particular site in 1973, then does no further physical site work until 1975, a source constructed on that site will not be exempt from review merely because the site clearance began in 1973.

(8) The *force majeure* language in § 52.22(b)(1)(v) (acts of God, litigation, strikes, etc.) applies only in the deter-

mination of whether construction of an indirect source is "continuous." Thus,

(i) The fact that construction failed to commence at all prior to 1975 because of force majeure reasons is irrelevant. Actual physical site work must commence in a continuous course before 1975 for the exemption to be valid.

(ii) Only breaks in construction attributable solely to the enumerated force majeure reasons will be considered in determining whether a project is exempt. For example, assume a developer demolished a site in 1973 and for business or other reasons discontinued actual physical construction, then planned to commence continuous construction on the site in mid-1974 but was prevented from doing so until 1975 because of litigation. The source would not be exempted from review since factors other than the force majeure reasons played a role in rendering the construction non-continuous.

(9) Section 52.22(b)(2) requires review of "any new parking facility, or other new indirect source with an associated parking area." Thus, if either the parking facility or the indirect source with the associated parking area are new, an indirect source review would be necessary. For example, if a developer who has operated a large surface parking lot for several years decided to construct an office building on part of the lot while retaining the remainder to serve as the parking lot for the building, the project would be required to undergo preconstruction review as a new indirect source. Another example is the demolition or accidental destruction of an indirect source followed by the construction of similar facility on the same parcel of land using the same parking lot. Again this new indirect source would be required to undergo preconstruction review.

(10) Indirect source approvals are fully transferable between successive owners of the property for which an approval is granted so long as the indirect source is constructed and/or modified fully in accordance with the approved application and all conditions thereto.

(11) Section 52.22(b)(9) provides that the reviewing agency may specify any operating factor which could affect air quality as a condition to approval of the permit application. Conditions which must be considered when necessary to insure attainment and maintenance of the national standards are:

(i) A requirement that the facility, or any incremental development phase, not be opened for business prior to the date specified by the reviewing agency.

(ii) Specification of the type and degree of further modification that would be subject to another review. This may include specification of fewer parking spaces than required by § 52.22(b)(2) or specifying certain structural or use changes which may increase traffic associated with the indirect source.

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APPENDIX B
COST ESTIMATION PROCEDURES AND ASSUMPTIONS

APPENDIX B. Cost Estimation Procedures and Assumptions

Analysis Costs

To comply with the complex source regulations, a developer will have to make expenditures to file an application, reduce the risk of not having a permit granted, and respond to public comments. These expenditures will be referred to as data acquisition, traffic and air quality analyses, and public participation costs, respectively. The assumptions used to estimate these costs are listed below.*

1. Data Acquisition for Filing a Permit

- A. For federal permit 3 days required @ \$200/day
- B. For state permit 10 days required @ \$200/day

2. Traffic and Air Quality Analysis to Reduce Risk

- A. Two man-months are required to conduct analysis for developments, with construction and land costs totaling more than \$15 million
- B. One man-month is required to conduct analyses for developments, with construction and land costs totaling less than or equal to \$15 million
- C. There are 22 man-days of effort per man-month and the costs is \$250/day

Note: There is a difference between the costs for large and small developments because the risks are higher for the larger developer, i.e., more money is invested. Furthermore, larger developers are able, and would most likely be willing, to pay for these analyses.

- D. The analysis costs are assumed to be equal for both the state and federal regulations.

3. Public Participation Costs

- A. The probability of active public participation will be higher if the existing air quality about the proposed development is poor. This statement is based on the premise that in more heavily polluted areas there would be more people concerned about the violation of air pollution standards. Therefore, under the state regulation it is assumed that a public hearing will be held if the maximum 8-hr average concentration of CO, prior to the development, is greater than 6 ppm.

*These assumptions are based on discussions with developers, lawyers, technical analysts, etc. Meetings with these persons were held regularly throughout the project.

- B. It is assumed that public hearings average 7 days; 3 for the EPA, 1 for citizens, and 3 for the developer. This will require 6 days of legal preparation or a total of 13 (7+6) days of legal services @ \$500/day.
- C. Three expert witnesses will be needed, each requiring 2 days of preparation and 1 day of testimony or a total of 9 (3x3) days @ \$300/day.
- D. Because the federal regulation provides for written testimony only, the cost of these would be equal to the preparation time plus writing time, which is assumed to be 3 days for legal work and 1/2 day of each expert witness. Therefore, a total of 9 (3+6) days of legal services and 7.5 (6 + .5x3) days of expert services will be required.
- E. If a public hearing is not required, 2 days of legal services will still be needed to review any written citizen comments. These costs are the same for both the federal and state regulations.

Note: In summary the public hearing costs are:

	<u>State</u> (\$10 ³)	<u>Federal</u> (\$10 ³)
Active Public Participation	9.2	6.8
Little Public Participation	1.0	1.0

The difference between the state and federal regulations is that the state may hold hearings, while the federal regulation provides for written testimony only.

Delay Costs

When the construction of a development is delayed, the developer incurs extra costs because money is tied up for a longer period of time. These costs may be either additional interest charges on loans or revenues lost on alternative uses of the money (i.e., opportunity costs).

In order to estimate the delay costs caused by the complex source regulations, it was necessary to estimate first the length of the delay and to calculate the amount of money invested prior to this delay. If t is the delay time in days and I is the dollar investment prior to the delay, then the delay cost, C , would be:

$$C = I \cdot r \cdot t / 365.$$

The parameter " r " is a simple annual interest rate, which was assumed to be 20%.

This method of estimating delay costs assumes that the delay caused by the regulations cannot be made up, i.e., the completion of the project occurs t days later than it would have without the regulations. Additional assumptions were required to estimate t and I . These assumptions are discussed below where the method used to estimate these parameters is described.

Calculating Delay Times

To calculate delay times it was necessary to describe the preconstruction process in a simple fashion. We discovered that this process is highly variable. However, there are procedures that every developer follows to some extent. These are:

1. determining the type of development to be constructed,
2. assembling the land for the development,
3. planning the development,
4. obtaining tenants when appropriate,
5. developing the site plan,
6. obtaining loan commitments,
7. obtaining legislative approval (e.g., zoning),
8. developing construction drawings
9. closing loan contracts, and
10. buying land and commencing construction.

These procedures and some of their components have been formulated into the PERT chart* shown in Fig. B-1.

*We express our gratitude to Gerald Tucker of the International Council of Shopping Centers for his help in formulating this PERT chart.

Fig. B-1. The Preconstruction Development Process
Without A Complex Source Regulation

The preconstruction PERT chart was designed to be representative of a large number of development processes. However, the delay-time analysis is affected only by the small portion of the chart indicated by the large box in Fig. B-1. The importance of this portion of the PERT chart is based on the premises that preliminary environmental analyses conducted by the developer will not fall on the critical path, the federal permit cannot be filed until the site plan for the development is prepared, and the detailed construction drawings will not be started until legislative approval, EPA approval, and loan commitments are obtained.

Fig. B-1 is a representation of the preconstruction process prior to any complex source regulations. Figures B-2 and B-3 show the impacts of the federal and state regulations, respectively. The main difference between these two latter figures is that under the state regulation the permit application cannot be submitted until all site-related permits and approvals are obtained.

The critical path of each of these PERT charts was determined to estimate preconstruction times. The difference in the preconstruction time, with and without a complex source regulation, provided the delay time for that regulation. It was determined that these delay times were dependent on the time estimates made for five steps in the preconstruction development process. These are the times to develop site plans, to obtain loans, to obtain site (legislative) approval, to prepare a complex source permit application, and to review the complex source permit application. If the values of these five times are known, the delay times of each regulation and the marginal delay time (i.e., the difference between the delays caused by the state and federal regulations) can be calculated using the following equations:

Notation:*

$\Delta t \equiv$ delay time

$t_I \equiv$ delay time for Illinois regulation

$t_F \equiv$ delay time for Federal regulation

$t_S \equiv$ time required to prepare site plan

$t_a \equiv$ time required to obtain site approval (e.g., zoning)

*See Fig. B-3 for those time links on the preconstruction PERT chart. Note that it was assumed that the additional information required to obtain loan commitments can be obtained in a shorter time than a site plan can be developed.

Fig. B-2. The Preconstruction Development Process With The Federal Complex Source Regulation

$t_p \equiv$ time required to prepare EPA permit application

$t_\ell \equiv$ time required to obtain loan commitment

$t_r \equiv$ time required to have permit application reviewed by EPA

Delay Times of the Illinois Regulation

If $t_\ell - t_p - t_r \leq 0$ and $t_\ell \geq t_p$, then

$$t_I = \begin{cases} t_p + t_r - t_\ell, & t_a < t_s + t_p \\ t_a + t_r - t_\ell - t_s, & t_p + t_s \leq t_a \leq t_\ell + t_s \\ t_r, & t_a > t_\ell + t_s \end{cases}$$

If $t_\ell - t_p - t_r \leq 0$ and $t_p > t_\ell$, then

$$t_I = \begin{cases} t_p + t_r - t_\ell, & t_a < t_s + t_\ell \\ t_p + t_r + t_s - t_a, & t_s + t_\ell \leq t_a \leq t_s + t_p \\ t_r, & t_a > t_s + t_p \end{cases}$$

If $t_\ell - t_p - t_r > 0$, then

$$t_I = \begin{cases} 0, & t_a < t_s + t_\ell - t_r \\ t_a - (t_s + t_\ell - t_r), & t_s + t_\ell - t_r \leq t_a \leq t_s + t_\ell \\ t_r, & t_a > t_s + t_\ell \end{cases}$$

Delay Times of the Federal Regulation

If $t_\ell - t_p - t_r \leq 0$, then

$$t_F = \begin{cases} t_p + t_r - t_\ell, & t_a < t_s + t_\ell \\ -t_a + t_p + t_r + t_s, & t_s + t_\ell \leq t_a \leq t_p + t_s + t_r \\ 0, & t_a > t_p + t_s + t_r \end{cases}$$

If $t_\ell - t_p - t_r > 0$, then

$$t_F = 0$$

Marginal Delay Times

If $t_\ell - t_p - t_r \leq 0$, then

$$\Delta t = t_I - t_F = \begin{cases} 0, & t_a < t_s + t_p \\ t_a - t_s - t_p, & t_p + t_s \leq t_a \leq t_p + t_s + t_r \\ t_r, & t_a > t_p + t_s + t_r \end{cases}$$

If $t_\ell - t_p - t_r > 0$, then

$$\Delta t = t_I - t_F = \begin{cases} 0, & t_a < t_s + t_\ell - t_r \\ t_a - [t_s + t_\ell - t_r], & t_s + t_\ell - t_r \leq t_a \leq t_s + t_\ell \\ t_r, & t_a > t_s + t_\ell \end{cases}$$

If the times to develop a site plan and to obtain loan commitments are assumed to be 60 days each and it takes 30 days to prepare a permit application, then delay times can be determined using the graphs provided in Figs. B-4 through B-6.

A great deal of effort was made to obtain the actual times for t_s , t_ℓ , and t_a for each case study. Unfortunately, these data were not available to us. Therefore, the following assumptions were made:

1. the value of t_s was set equal to 60 days for all the case studies,
2. the value of t_ℓ was set equal to 60 days for all the case studies,
3. the value of t_a was set equal to 150 days for the regional shopping centers and 90 days or less for the other case studies.

Both regulations provide for a normal review period of no longer than 90 days. Certainly, all permit applications will not take this long to process. However, each regulation has a provision to extend, if necessary, the amount of time needed to review an application. Therefore, it was assumed that on the average the review time would be 90 days under each regulation.* It was also assumed that the permit preparation time would be 30 days for all the case studies. These two assumptions imply that t_p is 30 days and t_r is 90 days for all the case studies.

Based on these assumptions t_F is equal to 30 days and t_I is equal to 90 days for the regional shopping centers. For all the other case studies t_F and t_I are both equal to 60 days. Therefore, when both regulations require a permit for a regional shopping center development, the marginal delay time would be 60 days. If a permit is required under both regulations for any other type of development, there would be no marginal delay time.

Note that the delay time can never be greater than $t_p + t_r$ or 120 days when only the state regulation requires a permit. Furthermore, when both regulations require a permit the maximum marginal delay time is t_r or 90 days. Therefore, an estimate of the maximum delay costs can be made assuming marginal delay times of 120 and 90 days for case studies requiring a state permits only and those requiring both permits, respectively.

*Actually the average review time under the federal regulation might be longer than it would be under the state regulation. The reason for this time difference is that the federal regulation does not provide for mutual consent when the review period is extended. In addition, the length of the extension period may be greater under the federal regulation.

Fig. B-4. Delay Times of the Federal Regulations

Fig. B-5. Delay Times of the Illinois Regulation

Fig. B-6. Marginal Delay Times

Calculating the Preconstruction Investment

The parameter needed for calculating delay costs is the investment made during the preconstruction period prior to the delay (i.e., the parameter I). This is the cost of all the preconstruction activities prior to developing the detailed construction drawings. Since actual costs were not available, it was assumed that "I" was equal to 1% of the total cost of the development. Table B-1 summarizes the calculations made to obtain the estimates of I. It was assumed that construction costs are \$35 per sq ft for enclosed buildings, and \$20 per sq ft for opened structures (e.g., a raceway). Land costs were assumed to be $1.0 \times \$10^5/\text{acre}$ for an improved area and $.25 \times \$10^5/\text{acre}$ for an unimproved area.

TABLE B-1. Data Used To Estimate PreConstruction Costs

<u>Case Study</u>	<u>Sq. Ft.</u>	<u>Acres</u>	<u>\$/Sq.Ft.</u>	<u>\$/Acre</u>	<u>Construction Costs</u>	<u>Land Cost</u>	<u>Total</u>	<u>"I"</u>
				$\$10^6$	$\$10^5$	$\$10^6$	$\$10^6$	$\$10^3$
Hillside	471,000	53	35	.1	16.5	5.3	21.8	218
Northwoods	790,000	52	35	.1	27.7	5.2	32.9	329
Town & Country	458,000	32	35	.1	16.2	3.2	19.2	192
Oak Brook	1,250,000	125	35	.1	43.3	12.5	56.3	563
Ford City	1,300,000	100	35	.1	45.5	10.0	55.5	555
River Oaks	1,250,000	100	35	.1	43.3	10.0	53.8	538
Howard & Western	92,300	6	35	.1	3.2	.6	3.8	38
Chrysler Plant	2,207,560	124		.1				
		125	35	.025	77.3	15.5	92.8	928
State National Bank	325,000	1	35	.1	11.4	.1	11.5	115
Parking Garage	236,000	1	20	.1	4.7	.1	4.8 ^a	48
Arlington Park	780,300	460	20	.025	15.6	11.5	27.1	271
Skating Rink	40,960	5		.1				
		11	35	.025	1.4	.8	2.2 ^b	22
DuPage County	305,000	10		.1				
		50	35	.025	10.7	2.3	13.0 ^c	130
Sandburg Village	1,800,000	17	35	.1	63.0	1.7	64.7	647
Four Lakes Village	855,000	12		.1				
		150	35	.025	30.0	5.0	35.0	350
Allstate Office	722,000	10		.1				
		70	35	.025	25.5	2.8	28.1	281
Oak Lawn H.S.	455,000	6		.1				
		20	35	.025	15.9	1.1	17.0	170

Actual value was 3.5, b. Actual value was 1.7, c. Actual value was 13.5.

Modification Costs

When a violation is identified, a modification of the roadway network, the development site plan, or the operation of the development will be required before a permit will be granted. These modifications result in air quality improvement by speeding up the flow of traffic, reducing traffic volumes, and/or altering the spatial relationship between the development and a critical receptor. Table B-2 is a partial list of the control options available to a developer. The minimum cost control option that would allow the permit to be granted would be the modification cost associated with the regulations.

TABLE B-2. Alternative Control Options

Additional entrances and exits
Additional or upgraded intersection signalization
Change design of complex source
Change hours of operation or shifts
Change size of complex source
Change the location of entrances and exits
Construction of additional thorough lanes
Construction of new roadway
Construction of partial or complete interchange
Continuous movement entrances and exits
Coordination of intersection signalization
Encourage car pools
Implementation of parking restrictions or traffic control regulations
Increase easement between "receptors" and roadways
Intersection approach widening or channelization
Manual direction of traffic
Mass-transit (buses)
Widen entrances and exits

Time did not permit us to search for the minimum modification cost solution in the case study analyses. Instead, a limited number of control options were analyzed. These are presented in Table B-3. The first two

options are designed to increase the speed of traffic entering or leaving the development. The second two options will improve the flow of traffic on the roadways about the development. A design change is considered if a critical location is found within the complex source (e.g., an open sales area). Additional entrances and exits are used to reduce traffic volumes in critical areas. Finally, the size of the complex source is changed to reduce traffic volumes. In the extreme, the size can be reduced to zero; i.e., the source will not be constructed.

TABLE B-3. Control Options Used In the Analyses

Control Options

Widening of entrances and exits
 Signalization of entrance and exits
 Intersection approach widening or channelization
 Additional or upgraded intersection signalization
 Changes in the design of the complex source
 Additional entrances and exits
 Change the sizes of the complex source

The costs of roadway modifications were calculated by Westenhoff and Novick, Inc., using the cost coefficients provided in Tables B-4 through B-5d. Tables B-5a through 5d were obtained from the U.S. Department of transportation document "Characteristics of Transportation Systems."

TABLE B-4. Road Modification Cost Coefficients

Signal Coordination:
 Trench, cable, & conduit = \$6.25/lin. ft.
 + \$2000/signal controller

Building Demolition:
 \$0.15/cu. ft. + 0.20/sq. ft.
 demolition + backfill

Major Structures (viaduct, bridges):
 \$45 sq. ft.

Traffic Signal Installation:
 Major = \$50,000
 Minor = \$30,000

Table B-5a. Expressway and Freeway Land Costs
(Million \$ per lane mile)

<u>Facility Type</u>	<u>Location</u>	<u>POPULATION GROUPS (1000's)</u>					
		<u>0- 50</u>	<u>50- 100</u>	<u>100- 250</u>	<u>250- 500</u>	<u>500- 1000</u>	<u>Over 1000</u>
NEW ROADS ⁽¹⁾	CBD	0.36	0.36	0.43	0.54	0.72	1.11
	Fringe	0.36	0.36	0.39	0.43	0.54	0.72
	Residential	0.32	0.32	0.36	0.36	0.46	0.64
RECONSTRUCTION ⁽²⁾	CBD	0.36	0.36	0.43	0.51	0.69	1.04
	Fringe	0.19	0.19	0.21	0.23	0.28	0.36
	Residential	0.16	0.16	0.17	0.19	0.20	0.26
MAJOR WIDENING ⁽³⁾	CBD	0.28	0.28	0.30	0.34	0.39	0.51
	Fringe	0.14	0.14	0.17	0.20	0.24	0.34
	Residential	0.04	0.04	0.06	0.09	0.16	0.30

TABLE B-5a. (Contd.)

- (1) New roads refers to the cost of land needed to construct an entirely new roadway; it assumes no land has been purchased before-hand.
- (2) Reconstruction refers to that cost of land needed to construct a new roadway by partially using existing land and partially obtaining more in order to straighten highway curves, provide shoulders, etc.
- (3) Major widening refers to that cost of land needed to increase the surface area of an existing roadway.

Notes: Costs reflect 1973 price levels.

The above data reflect a per lane cost.

Sources: Bhatt, K., and Olson, M., Capacity and Cost Inputs for Community Aggregate Planning Model (CAPM) Working Paper 5002-3, The Urban Institute, Washington, D.C., December, 1973
Characteristics of Urban Transportation Systems, A Handbook for Transportation Planners, U.S. Department of Transportation, May 1974.

Table B-5b. Arterial Land Costs
(Million \$ per lane mile)

<u>Facility Type</u>	<u>Location</u>	<u>POPULATION GROUP (1000's)</u>					
		<u>0-50</u>	<u>50-100</u>	<u>100-250</u>	<u>250-500</u>	<u>500-1000</u>	<u>Over 1000</u>
NEW ROADS ⁽¹⁾	CBD	0.32	0.32	0.36	0.41	0.52	0.75
	Fringe	0.29	0.29	0.31	0.33	0.39	0.49
	Residential	0.17	0.17	0.18	0.19	0.21	0.27
RECONSTRUCTION ⁽²⁾	CBD	0.11	0.11	0.11	0.13	0.14	0.19
	Fringe	0.09	0.09	0.09	0.10	0.11	0.14
	Residential	0.17	0.07	0.07	0.09	0.10	0.11
MAJOR WIDENING ⁽³⁾	CBD	0.16	0.16	0.19	0.23	0.33	0.54
	Fringe	0.16	0.16	0.19	0.22	0.24	0.32
	Residential	0.09	0.09	0.10	0.11	0.16	0.26

Note: See footnotes and sources following Table B-5d.

Table B-5c. Expressway and Freeway Construction Costs
(Million \$ per lane mile)

<u>Facility Type</u>	<u>Location</u>	<u>POPULATION GROUP (1000's)</u>					
		<u>0-50</u>	<u>50-100</u>	<u>100-250</u>	<u>250-500</u>	<u>500-1000</u>	<u>Over 1000</u>
NEW ROAD ⁽¹⁾	CBD	1.04	1.04	1.07	1.10	1.14	1.24
	Fringe	0.71	0.71	0.75	0.81	0.94	1.20
	Residential	0.62	0.62	0.62	0.65	0.71	0.84
RECONSTRUCTION ⁽²⁾	CBD	1.12	1.12	1.13	1.14	1.18	1.26
	Fringe	0.62	0.62	0.64	0.65	0.68	0.71
	Residential	0.51	0.51	0.52	0.55	0.60	0.68
MAJOR WIDENING ⁽³⁾	CBD	1.08	1.08	1.10	1.20	1.27	1.48
	Fringe	0.78	0.78	0.81	0.88	1.04	1.33
	Residential	0.62	0.62	0.65	0.70	0.79	0.98

Note: See footnotes and sources following Table B-5d.

Table B-5d. Arterial Construction Costs
(Million \$ per lane mile)

<u>Facility Type</u>	<u>Location</u>	<u>POPULATION GROUPS (1000's)</u>					
		<u>0-50</u>	<u>50-100</u>	<u>100-250</u>	<u>250-500</u>	<u>500-1000</u>	<u>Over 1000</u>
NEW ROADS ⁽¹⁾	CBD	0.33	0.33	0.36	0.39	0.46	0.56
	Fringe	0.29	0.29	0.30	0.33	0.36	0.46
	Residential	0.26	0.26	0.27	0.29	0.33	0.38
RECONSTRUCTION ⁽²⁾	CBD	0.33	0.33	0.35	0.36	0.40	0.49
	Fringe	0.30	0.30	0.31	0.33	0.35	0.39
	Residential	0.28	0.28	0.29	0.29	0.31	0.33
MAJOR WIDENING ⁽³⁾	CBD	0.33	0.33	0.36	0.39	0.42	0.55
	Fringe	0.31	0.31	0.33	0.34	0.39	0.45
	Residential	0.31	0.31	0.33	0.34	0.39	0.45

Table B-5d. (Contd.)

Footnotes and sources for Tables B-5b,c, and d:

- (1) New roads refers to the cost of land needed to construct an entirely new roadway; it assumes no land has been purchased before-hand.
- (2) Reconstruction refers to that cost of land needed to construct a new roadway by partially using existing land and partially obtaining more in order to straighten highway curves, provide shoulders, etc.
- (3) Major widening refers to that cost of land needed to increase the surface area of an existing roadway constructed.

Notes: Costs reflect 1973 levels.

The above data reflect a per lane cost.

Source: Bhatt, K., and Olson, M., Capacity and Cost Inputs for Community Aggregate Planning Model (CAPM), Working Paper 5002-3, The Urban Institute, Washington, D.C., December, 1973
Characteristics of Urban Transportation Systems, A Handbook for Transportation Planners, U.S. Department of Transportation, May, 1974.

For the case studies, only one design change was required, the elimination of a gas station in the Hillside Shopping Center. The cost of this change was estimated to result in a loss of revenues of \$20,000 a year for two years or \$36,600, (i.e., $C = 20,000 + (1/1.20) 20,000$).* If the roadway and design changes were insufficient, so that the size of the development would have to be reduced to reduce the volume of traffic, it was assumed that the developer loses a return of 10% on the investment dollars not used in this development. It was further assumed that an alternative investment of this money is delayed for two years. Symbolically, the cost of reducing the size of the development can be expressed as:

$$180 \cdot I \cdot \Delta R ,$$

where I can be found in Table B-1 and ΔR is the percent reduction required. The constant 180 is equal to $\{1.0 + (1/1.20)\} 10^2$, i.e., the present value of \$100 revenue a year for two years.*

It is extremely important to keep in mind that the option to reduce the size of a development in this study was used as a surrogate for control options not considered in this study. A more detailed analysis of each case study would most likely result in modifications that would not require actual reductions in the size of the development. Therefore, it cannot be concluded from this study that any development would have to be reduced in size.

Finally, only the modifications required to meet the 8-hr standard were estimated for all the case studies except the Arlington Park Raceway. This time-saving approach is justified since the 8-hr standard is usually the most limiting. The percent improvements in the 8-hr average air quality levels at various receptors for different apportionment and vehicle mix assumptions are shown in Tables B-6 through B-9. The roadway and intersection modifications considered for each case study and their costs and effectiveness are provided in Table B-10.

*A cost of capital of 20% was assumed.

TABLE B-6. Air Quality Improvements Required at the First Receptor

	1975 Vehicle Mix								1978 Vehicle Mix							
	Eight-Hour Average								Eight-Hour Average							
	Percent Improvement Required								Percent Improvement Required							
	Existing Traffic Peaks				Induced Traffic Peaks				Existing Traffic Peaks				Induced Traffic Peaks			
	Receptor 1				Receptor 1				Receptor 1				Receptor 1			
	30	50	90	100	30	60	90	100	30	60	90	100	30	60	90	100
Hillside	-	-	-	-	0	0	0	0	-	-	-	-	0	0	0	0
Northwoods	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Town & Country	-	-	-	-	22	14	6	3	-	-	-	-	8	-	-	-
Oak Brook	39	11	0	0	78	67	56	52	15	0	0	0	69	49	29	22
Ford City	-	-	-	-	71	66	60	58	-	-	-	-	63	50	36	32
River Oaks	-	-	-	-	58	30	3	0	-	-	-	-	38	0	0	0
Howard & Western	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
7/11 Convenience	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
McDonalds	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Chrysler Plant	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Caterpillar Plant	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Evanston State Nat'l. Bank	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Evanston Parking Garage	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Arlington Raceway	22	0	0	0	67	45	30	16	0	0	0	0	54	18	0	0
Oakton Skating Rink	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
DuPage Cty Civ Ctr	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Sandburg Village	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Four Lakes Village	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Allstate Complex	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Oak Lawn High School	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CASE STUDIES

Table B-7. Air Quality Improvements Required at the Second Receptor

	1975 Vehicle Mix								1978 Vehicle Mix							
	Eight-Hour Average								Eight-Hour Average							
	Percent Improvement Required								Percent Improvement Required							
	Existing Traffic Peaks				Induced Traffic Peaks				Existing Traffic Peaks				Induced Traffic Peaks			
	Receptor 2				Receptor 2				Receptor 2				Receptor 2			
	30	60	90	100	30	60	90	100	30	60	90	100	30	60	90	100
Hillside	-	-	-	-	20	2	0	0	-	-	-	-	0	0	0	0
Northwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Town & Country	-	-	-	-	26	0	0	0	-	-	-	-	0	0	0	0
Oak Brook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ford City	-	-	-	-	62	45	27	22	-	-	-	-	47	26	0	0
River Oaks	-	-	-	-	63	42	20	13	-	-	-	-	47	9	0	0
Howard & Western	-	-	-	-	0	0	0	0	-	-	-	-	0	0	0	0
7/11 Convenience	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
McDonalds	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Chrysler Plant	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Caterpillar Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Evanston State Nat'l. Bank	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Evanston Parking Garage	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Arlington Raceway	13	0	0	0	65	38	11	2	0	0	0	0	50	7	0	0
Oakton Skating Rink	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
DuPage Cty Civ Ctr	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Sandburg Village	39	13	0	0	-	-	-	-	16	0	0	0	-	-	-	-
Four Lakes Village	11	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Allstate Complex	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Oak Lawn High School	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CASE STUDIES

Table B-8. Air Quality Improvements Required at the Third Receptor

	1975 Vehicle Mix								1978 Vehicle Mix							
	Eight-Hour Average								Eight-Hour Average							
	Percent Improvement Required								Percent Improvement Required							
	Existing Traffic Peaks				Induced Traffic Peaks				Existing Traffic Peaks				Induced Traffic Peaks			
	Receptor 3				Receptor 3				Receptor 3				Receptor 3			
	3D	6D	9D	10D	3D	6D	9D	10D	3D	6D	9D	10D	3D	6D	9D	10D
Hillside	-	-	-	-	18	0	0	0	-	-	-	-	0	0	0	0
Northwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Town & Country	-	-	-	-	43	40	38	37	-	-	-	-	31	17	2	0
Oak Brook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ford City	-	-	-	-	22	0	0	0	-	-	-	-	0	0	0	0
River Oaks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Howard & Western	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/11 Convenience	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
McDonalds	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Chrysler Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caterpillar Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Evanston State Nat'l. Bank	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Evanston Parking Garage	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Arlington Raceway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakton Skating Rink	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
DuPage Cty Civ Ctr	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Sandburg Village	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Four Lakes Village	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Allstate Complex	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Oak Lawn High School	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table B-9. Air Quality Improvements Required at the Fourth Receptor

	1975 Vehicle Mix								1978 Vehicle Mix							
	Eight-Hour Average								Eight-Hour Average							
	Percent Improvement Required								Percent Improvement Required							
	Existing Traffic Peaks				Induced Traffic Peaks				Existing Traffic Peaks				Induced Traffic Peaks			
	Receptor 4				Receptor 4				Receptor 4				Receptor 4			
	30	60	90	100	30	60	90	100	30	60	90	100	30	60	90	100
Hillside	-	-	-	-	0	0	0	0	-	-	-	-	0	0	0	0
Northwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Town & Country	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oak Brook	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ford City	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
River Oaks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Howard & Western	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/11 Convenience	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
McDonalds	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Chrysler Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caterpillar Plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Evanston State Nat'l Bank	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Evanston Parking Garage	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arlington Raceway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakton Skating Rink	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DuPage Cty Civ Ctr	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Sandburg Village	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Four Lakes Village	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allstate Complex	0	0	0	0	-	-	-	-	0	0	0	0	-	-	-	-
Oak Lawn High School	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CASE STUDIES

Table B-10. Roadway and Intersection Improvements For Each Case Study

Name	Modification	Cost	Percent	CO		Improvement ^a	
			R1	R2	R3	R4	R4
Ford City	1. Add one exit lane from main entrance at 75th (E-bound)--add through lane in each direction on Pulaski at 79th.	\$ 388,000	58	—	—	—	—
Hillside	1. Coordinate 3 signals on Wolf Rd.	15,500	—	5	29	—	—
	2. Widen Frontage Rd. to two lanes in each direction and put right turn lane--limit access from parking lot to Frontage to two points	485,000	—	3	—	—	—
	3. Combine 1 and 2	500,500	—	8	—	—	—
Town and Country	1. Add left turn lane at entrance and Isles Ave.	86,000	1	0	1	—	—
	2. Add left turn lane as above and coordinate signals--Grand to Isles	140,000	21	8	17	—	—
	3. Add through lanes in each direction from Grand to Isles and add left turn lane as before	1,420,000	27	11	22	—	—
	4. As 3, but also add through lanes on Grand, each direction	1,684,000	—	—	24	—	—
Oak Brook	1. Make 83 three lanes in each direction with left hand turning lanes	300,000	53	—	—	—	—
	2. Make 83 four lanes in each direction with left hand turning lanes	654,000	58	—	—	—	—
	3. Do 2 above and add two lanes to 22nd St.	860,000	59	—	—	—	—
	4. Build overpass on 83 over 22nd with ramps	1,462,000	73	—	—	—	—
River Oaks	1. Through lane each direction on 159th at Torrence Ave.	237,000	53	53	—	—	—
	2. Extend through lanes full length of shopping center and coordinate 4 signals	595,000	57	57	—	—	—
Sandburg Village	1. Left turn lanes at signalized lane at Division (within r.o.w.)	33,000	—	26	—	—	—
	2. Widen by 8' for 2nd through lane--removing parking from street (both sides), add center division, developer provide off-street parking	300,000	—	48	—	—	—
Arlington Park Raceway	1. Add lane each direction on Wilke and rt turn lanes at Euclid & N.W. Highway	873,000	38	44	—	—	—
	2. Add two lanes each direction on Wilke & rt turn lanes at Euclid & NW Highway	1,915,000	42	48	—	—	—
	3. Build overpass at Euclid & N.W. Highway in addition to 2 above	3,434,000	47	61	—	—	—
	4. Do 3 above and add through lanes each direction on Euclid for full length of park	4,744,000	—	65	—	—	—
	5. Do 3 above, add right turn lane westbound on N.W. Highway	4,826,000	71	—	—	—	—

^aA " — " implies calculation not needed.

Phasing Costs

During the course of this study, certain costs associated with the timing of developments in an area became apparent. These phasing costs occur because developers often compete for the same air space. Since the case study approach used in this analysis is concerned primarily with the costs to the first developer affected by the regulation, a detailed analysis of phasing costs was not possible. However, we were able to identify some of the issues involved and to determine the most likely effects of phasing on our cost estimates. There are two provisions in the Illinois regulation that make the phasing costs between it and the federal regulation differ. These are the apportionment aspect of the state regulation (i.e., only 30% of the available air space can be used by each development) and the continuous construction requirement. The implications of these differences are:

The marginal cost estimates of the apportionment scheme made in the case study analyses are overestimates because phasing was not considered.

The phasing costs associated with the continuous construction aspects of the state regulation tend to make them less expensive than those of the federal regulation. These savings are not included in the case study analyses.

The extent to which the marginal cost estimates would be reduced if phasing was considered depends on the rate of development in an area. The faster an area develops, the smaller the marginal costs of the state regulation become.

The justification for these conclusions are presented in the following two sections.

Costs Resulting from the Apportionment Aspect of the Illinois Regulation

Four Lakes Village, one of the case studies, will be used to illustrate the impacts of each regulation on two developments located next to each other. The second development is Benedale Greens, a residential development located opposite Four Lakes on Maple Avenue, (see Fig. 11). The air quality values used are provided in Table B-11.

Assume that the Illinois regulation is in effect; then the developer of Four Lakes would have to make a modification because its contribution to the air quality at receptor R3 is greater than 30% of the CO concentration and thus causing a violation (i.e., $(6.7 - 4.5) = 2.2 \text{ ppm} > .3 (9 - 4.5) = 1.35 \text{ ppm}$).

Traffic signals and turning lanes would provide the needed improvement.* With these road modifications, the impact of Benedale Greens is reduced to only 1 ppm, which is below the 30% cut-off point (i.e., $1 < .3 (9-5.5) = 1.05$). The total modification costs under the state regulation are borne by the developer of Four Lakes.

Now assume that the federal regulation is applicable. Then Four Lakes Village could have been built without any modifications because 6.7 ppm is below the 9 ppm standard. However, before Benedale Greens could be built, a modification would be required. Providing a traffic signal and turning lanes at the access point to Maple would reduce CO concentrations to 6.5 ppm, which satisfies the standard. The total cost of this modification would now be borne by the developer of Benedale Greens.

Table B-11. Maximum 8-hr Carbon Monoxide Concentrations at Receptor R3^a (ppm)

	Without Roadway Modification	With Roadway Modification
Without Four Lakes and Benedale Greens	4.5	—
With Four Lakes Only	6.7	5.5
With Both Developments	9.5	6.5

^aThe values are not estimates based on the actual development. They are assumed values for the discussion on phasing costs.

For the case study analysis, only Four Lakes Village was considered. If both Four Lakes and Benedale Greens were analyzed, then the marginal cost of the state regulation attributed to the apportionment scheme would be reduced, because the cost to the Benedale Green developer is greater with the federal regulation. Therefore, the marginal costs presented for the case studies are overestimates since phasing was considered.**

*For reasons other than the complex source regulations, two additional lanes were added to Maple and a stop light was placed at the access point of Four Lakes and Benedale Greens.

**When phasing is considered all cost estimates would have to be converted to a preset value.

Costs Resulting from the Continuous Constitution Provision

Now assume that Four Lakes Village was built in two phases and that prior to the development of the second phase Benedale Greens was constructed. Because the federal regulation allows a developer to submit a permit for a phased development and the state regulation requires continuous construction, the phasing costs in the above situation would be different.

Let Table B-12 represent the air quality impacts associated with each construction/regulation possibility, then the developer of Benedale Greens would have to pay for the modification under the federal regulation. Under this situation, the developer of Four Lakes Village would not have to pay for any modification because 6.7 ppm, the CO concentration with both phases constructed, is below the 9 ppm standard. However, under the Illinois regulation no modification will be required until the second phase of Four Lakes Village is constructed.* Although the modification is assumed to be the same, this time it is paid for by the developer of Four Lakes.

Table B-12. Maximum 8-hr Carbon Monoxide Concentrations at Receptor R3^a (ppm)

	Without Roadway Modification	With Roadway Modification
Without Four Lakes and Benedale Greens	4.5	—
With Four Lakes Phase 1	5.8	—
With Four Lakes Phase 1 & 2	6.7	5.5
With Four Lakes Phase 1 and Benedale Greens	6.7	5.5
With Four Lakes Phase 1 & 2 and Benedale Greens	9.5	6.5

^aThe values are not estimates based on the actual development. They are assumed values for the discussion on phasing costs.

*Four Lakes Village Phase 1 does not need a modification because
 $(5.8 - 4.5) = 1.3 \leq .3(9 - 4.5) = 1.35$.
 Benedale Greens does not need a modification because
 $(6.7 - 5.8) = .9 \leq .3(9 - 5.8) = .96$.

Again, the difference in the cost of the regulations depends on the timing of the development. In this example, the federal regulation is more expensive since the expenditure would occur earlier. Based on this example, it is reasonable to expect the federal regulation's provision for phased developments to be more expensive than the state regulation's continuous construction provision.

For both of the phasing issues discussed, the timing of the second development is crucial. The marginal costs of the state regulation will be minimized when the two developments are built simultaneously (the cost increases as the time between construction increases). This is true because expenditures made in the future must be discounted or reduced in value to equate them with present dollars.* The effect of the discounting procedure is to make the marginal costs of the state regulation the smallest in rapidly growing areas.

Calculating the Marginal Costs of the State Regulation

Case Study Cost Estimates

Using the procedures described in the preceding sections of this appendix, estimates of the analysis, delay, and modification costs were made. These estimates are summarized in Table B-13. This table provides all of the information needed to generate the cost results presented in the main text.

For example, the Hillside Shopping Center would require a permit if the Illinois regulation was in effect. The analysis costs would be $(2.0 + 11.0 + 1.0) \times 10^3 = \$14,000$, the delay cost \$10,800 (the cost of a 90 day delay) and the modification cost \$52,100 (the cost with a 30% allowance and a 1975 vehicle mix). The total cost of compliance would, therefore, be \$76,900. If the federal regulation did not require a permit, then this would be the marginal cost of the state regulation for Hillside. However, the federal regulation would require a permit. The analysis cost would be $(.6 + 11.0 + 1.0) = \$12,600$, the delay cost \$3,600 (the cost of a 30 day delay) and no modification would be required. The total cost with the federal regulation is \$19,800. Therefore, the marginal cost of the state regulation was estimated to be $\$76,900 - 16,200 = \$60,700$. This is the cost reported in Table 1.

*This is based on the time value of money theory and not inflation.

TABLE B-13. Absolute Cost Estimates

COST EVALUATION FORM (\$103)	ANALYSIS COSTS					DELAY COSTS				MODIFICATION COSTS 1975 VEHICLE MIX				MODIFICATION COSTS 1978 VEHICLE MIX			
	DATA ACQUISITION 1/4 MILE	DATA ACQUISITION 1 MILE	TRAFFIC AND AIR QUALITY	PUBLIC HEARING COSTS	PUBLIC PARTICIPATION NO HEARINGS	DELAY IN PERMIT REVIEW 30 DAYS	DELAY IN PERMIT REVIEW 50 DAYS	DELAY IN PERMIT REVIEW 90 DAYS	DELAY IN PERMIT REVIEW 120 DAYS	COSTS TO COMPLY WITH 30% ALLOWANCE	COSTS TO COMPLY WITH 60% ALLOWANCE	COSTS TO COMPLY WITH 90% ALLOWANCE	COSTS TO COMPLY WITH 100% ALLOWANCE	COSTS TO COMPLY WITH 30% ALLOWANCE	COSTS TO COMPLY WITH 60% ALLOWANCE	COSTS TO COMPLY WITH 90% ALLOWANCE	COSTS TO COMPLY WITH 100% ALLOWANCE
HILLSIDE SHOPPING CENTER HILLSIDE	.6	2.0	11.0	1.0	1.0	3.6	7.2	10.8	14.3	52.1	15.5	0.0	0.0	0.0	0.0	0.0	0.0
NORTHWOODS SHOPPING CENTER PEORIA *	.6	2.0	11.0	—	—	5.4	10.8	16.2	21.6	—	—	—	—	—	—	—	—
TOWN & COUNTRY SHOPPING CENTER SPRINGFIELD	.6	2.0	11.0	9.2	6.8	3.2	6.3	9.5	12.6	2340.	2238.	2168.	2133.	1926.	140.	140.	0.0
OAK BROOK SHOPPING CENTER OAK BROOK	.6	2.0	11.0	1.0	1.0	9.3	18.5	27.8	37.0	1969.	1462.	654.	300.	1462.	300.	300.	300.
FORD CITY SHOPPING CENTER CHICAGO	.6	2.0	11.0	1.0	1.0	9.1	18.2	27.4	36.5	2586.	1189.	590.	388.	893.	388.	388.	388.
RIVER OAKS SHOPPING CENTER CALUMET CITY	.6	2.0	11.0	1.0	1.0	8.8	17.7	26.5	35.4	1176.	237.	237.	237.	237.	237.	0.0	0.0
HOWARD & WESTERN CENTER CHICAGO	.6	2.0	5.5	1.0	1.0	.6	1.2	1.9	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7/11 CONVENIENCE CENTER CHICAGO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MCDONALD'S EVANSTON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CHRYSLER PLANT BELVIDERE	.6	2.0	11.0	1.0	1.0	15.3	30.5	45.8	61.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CATERPILLAR TRACTOR PLANT PEORIA	.6	2.0	11.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
STATE NATIONAL BANK EVANSTON	.6	2.0	5.5	9.2	6.8	1.9	3.8	5.7	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PARKING GARAGE EVANSTON	.6	2.0	5.5	9.2	6.8	.8	1.6	2.4	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARLINGTON PARK RACEWAY ARLINGTON HEIGHTS	.6	2.0	11.0	9.2	6.8	4.5	8.9	13.4	17.8	4826.	3434.	873.	873.	3516.	873.	0.0	0.0
SKATING RINK PARK RIDGE	.6	2.0	5.5	9.2	6.8	.4	.7	1.1	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DUPAGE CO. CIVIC CENTER WHEATON	.6	2.0	5.5	1.0	1.0	2.1	4.3	6.4	8.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SANDBURG VILLAGE CHICAGO	.6	2.0	11.0	9.2	6.8	10.6	21.3	31.9	42.5	300.	33.0	0.0	0.0	33.0	0.0	0.0	0.0
FOUR LAKES VILLAGE LISLE	.6	2.0	11.0	1.0	1.0	5.8	11.5	17.3	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ALL STATE OFFICE COMPLEX NORTHBROOK	.6	2.0	11.0	1.0	1.0	4.6	9.2	13.9	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OAK LAWN HIGH SCHOOL OAK LAWN	.6	2.0	11.0	—	—	2.8	5.6	8.4	11.2	—	—	—	—	—	—	—	—

*Data could not be obtained in time to complete the analysis.

Statewide Cost Estimates

Statewide cost estimates were made using information from the following sources:

1. Directory of Shopping Centers in the United States and Canada, 14th Edition, Vol. XIV, The Natural Research Bureau, Incorporated;
2. Shopping Center Digest;
3. Illinois Manufacturers Directory, 1971 and 1967, Manufacturers' News, Inc;
4. Construction Reports, Residential Building Permits 1973, Table 4, Department of Commerce, U.S. Bureau of the Census;
5. 1972 housing inventory of Chicago, Peoples Gas, Light, and Coke Company;
6. County Business Patterns, 1971 and 1968, U.S. Department of Commerce;
7. International Association of Auditorium Managers;
8. Capital Development Board, State of Illinois; and
9. Conversations with developers.

Based on the data obtained from these sources, estimates of future developments in Illinois were generated. These are summarized in Table B-14

The cost coefficients in Table B-15 were generated on the assumption that the case study cost estimates are expected values for developments throughout the state. For example, consider retail/commercial strip developments. The Howard and Western Strip Center has a gross floor area of 92,300 sq ft and the total marginal costs of the state regulation for this source are \$8,500. Therefore, the marginal cost coefficient would be $\$8,500/92,300 = \$.0921/\text{sq ft}$.

Using the information provided in Tables B-14 and B-15, statewide cost estimates can be generated. These are summarized in Table B-16.

TABLE B-14. Estimated Number of Developments Requiring Complex Source Permits per Year

Type of Development	Number Built Annually		Special Characteristic
	Permits Required		
	Ill. Only	Both	
<u>Regional Shopping Centers</u>			
Requiring Illinois Permit Only*	3		Average size of 114,000 sq ft
Requiring Both Permits		4	Average size of 578,000 sq ft
<u>Retail/Commercial Strip</u>			
Requiring Illinois Permit Only	30		Average size of 102,000 sq ft
<u>Office, Government, and Misc.</u>			
Requiring Illinois Permit Only	24		Sources with more than 499 employees but less than 1000
Transportation	0		
Wholesale Trade	0		
Finances	4		
Service	1		
Schools	<u>19</u>		
Requiring Both Permits		14	Sources with more than 999 employees
Transportation	3		
Wholesale Trade	1		
Finance	0		
Service	10		
Schools	<u>0</u>		
<u>Industrial</u>			
Requiring Illinois Permit Only	11		Plants with more than 499 but less than 1000 employees. Average 750
Requiring Both Permits		4	Plants with more than 1000 employees. Average 2500
<u>Residential</u>			
Requiring Illinois Permit Only	20		Based on the no. of buildings constructed with more than 60 dwelling units.
Requiring Both Permits		80	
<u>Recreation, Amusement, Etc.</u>			
Requiring Illinois Permit Only	3		
Major Complexes	0		
Others	<u>3</u>		
Requiring Both Permits		1	
Major Complexes	1		
Others	<u>0</u>		
Totals	<u>91</u>	<u>103</u>	= 194 Combined

*These estimated are based on a 30%-apportionment scheme.

Table B-15. Marginal Cost Coefficients

Type of Development	Units	Analysis	Costs		Total
			Delay	Modification	
Regional Shopping Center	\$/sq ft				
State Permit Only		0.09	0.02	0.00	0.11
Both Permits		0.002	.009	0.91	.921
Retail/Commercial Strip	\$/sq ft				
State Permit Only		0.09	0.00	0.00	0.09
Office, Government, and Miscellaneous	\$/development				
State Permit Only		14,000	4,730	0	18,730
Both Permits		1,400	0	0	1,400
Industrial	\$/employee				
State Permit Only		2.80	6.10	0	8.90
Both Permits		.28	0	0	.28
Residential	\$/development				
State Permit Only		18,100	16,400	0	34,500
Both Permits		2,600	0	150,000	152,600
Recreational, Amusement, Etc.	\$/development				
State Permit Only		16,700	700	0	17,400
Both Permits		3,800	0	3,950,000	3,953,800

Table B-16. Statewide Marginal Cost Estimates
(\$10³)

Type of Development	Costs			Total
	Analysis	Delay	Modification	
Regional Shopping Centers	35.4	27.6	2,100.0	2,170.0
Retail/Commercial Strip	275.0	0.0	0.0	275.0
Office, Government, & Misc.	356.0	114.0	0.0	470.0
Industrial	25.9	50.3	0.0	76.2
Residential	713.0	328.0	12,000.0	13,000.0
Recreation, Amusement, Etc.	53.9	2.1	3,950.0	4,000.0
Totals	1,460.0	522.0	18,100.0	20,000.0

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Appendix C
Traffic Analysis
Procedures and Assumptions

by

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Westenhoff and Novick, Inc.

APPENDIX C. Procedures and Assumptions

The following is a discussion of general assumptions and analysis methodology used by Westenhoff and Novick in performing the traffic analyses.

Traffic Generation

- a) Shopping Centers: Average daily trip generation was estimated using rates specified in a report by the Institute of Traffic Engineers (ITE), Committee 5N-S and published in the February, 1973 issue of Traffic Engineering magazine. These rates were adjusted where field data was available. Daily and seasonal variations in trips were estimated based on national distributions reported in "Vehicle Behavior In and Around Complex Sources and Related Complex Source Characteristics, Volume I - Shopping Centers", August 1973, by the USEPA. Assumed hourly distributions of entering and existing traffic were based on data provided by the Chicago Area Transportation Study (CATS) from a 1966 survey of Chicago area shopping centers.
- b) Residential Generators: Daily and peak hour trip generation was estimated based on the above referenced ITE report. These estimates were adjusted to reflect the current modal choice of residents, as reported in 1970 census tract data.
- c) Employment Centers: Traffic generation estimates were based on employment, car-pooling, and modal choice data obtained directly from the case study complex sources, when available. In other cases, generalized trip generation rates reported in "Urban Travel Patterns for Hospitals, Universities, Office Buildings, and Capitals," Report 62 of the National Cooperative Highway Research Program (NCHRP) were used. The hourly distribution of arrivals and departures was also estimated based on the findings of NCHRP Report 62.
- d) Special Generators: Trip generation for recreational complex sources was based on reported historical attendance records and assumed mode choice and car occupancy rates. Hourly variations of arrivals and departures were based on judgmental assumptions for each case. Trip generation for the parking garage case was based on reported historical usage.

Trip Assignment

Generated trips were distributed to the street system based on a judgmental evaluation of surrounding land use activity. Individual driveway volumes were assigned with the aid of reported IEPA, CATS, and City of Chicago traffic count data, where available.

Traffic Volumes

Based on reported historical average daily traffic volume data from the State of Illinois, City of Chicago, and other municipalities, trend line projections were used to estimate 1974 traffic volumes. Traffic conditions for the hypothetical condition of the case study complex source not yet existing were approximated by subtracting the trips generated by the source from the 1974 traffic volumes. Seasonal, daily, and hourly variations in traffic volumes were estimated based on detailed traffic count information when available, or on the generalized relations reported in "Traffic Volume Factors for Preferential Street System of Chicago", Chicago Bureau of Street Traffic and in "Traffic Characteristics on Illinois Highways/1972," Illinois Department of Transportation.

Average Speeds

Street and intersection capacities were calculated based on the methods of "Special Report 87, Highway Capacity Manual, Highway Research Board. Based on the ratio of volume to capacity and posted speed limits, the average speeds for highway sections were computed. These were adjusted to account for delays experienced at signalized intersections using the assumptions and computational techniques of "Procedures for Estimating Highway User Costs, Air Pollution, and Noise Effects," Report 133 of the NCHRP. These techniques are sensitive to alternative improvements in intersection or highway capacity and were used to evaluate alternative control options, when required.

Control Option Cost Estimate

General cost estimates of alternative control options for improving traffic flow were based on the data reported in "Characteristics of Urban Transportation Systems," which have been reproduced in Appendix B. The 1973 costs reported in this manual were updated to 1974 levels based on an assumed 10% increase in construction costs. Where applicable, detailed cost estimates of specialized improvements were prepared based on unit prices in recent highway improvement contract awards (see Table B-4).

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Appendix D.

Air Quality Analyses, Procedures and Assumptions

APPENDIX D. Air Quality Analyses, Procedures and Assumptions

A detailed air quality analysis was carried out for each case study that required a permit review. To the extent possible (within the time constraints of this project) suggestions contained in the Interim Guidelines* published by the USEPA were followed in these analyses.

Geometry of Critical Receptor Sites

Information needed to begin an analysis included the traffic information resulting from the analyses described in Appendix C, a street map of the complex source vicinity on which was noted principal land uses near the affected roadways, and whenever possible, a site plan of the complex source itself. Sites for critical receptors were identified on the street map in the following manner. Attention focused on areas near roadways expected to undergo the most adverse impact from the induced traffic. Critical receptor sites were then chosen on the basis of actual land use. We chose receptors only within residential, recreational, vacant, or outdoor work areas, because only in these areas did it seem likely that a person might remain for eight hours. Most of the receptor sites used are outside the property boundaries of the complex source, but for one of the case studies several receptors within the complex source were chosen. Two to four receptor sites should provide adequate representation of the impact of a source on ambient air quality. Some of these receptor locations are outside the quarter-mile reporting area required by the federal regulation. These are identified in Table D-1

Having defined the critical receptor sites, we then proceeded to set up a simplified description of the geometrical relationship between each receptor site and the roadways with primary influence on the air quality at the site. Typically, only the one or two roadways near the receptor that are most heavily traveled by existing and/or induced traffic were modeled. Two lane roadways were modeled as a single line, and wide, multilane and divided lane roadways close to the receptor were usually modeled with a separate line for each traffic direction.

* Interim Guidelines for the Review of the Impact of Indirect Sources on Ambient Air Quality," U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, July 1974.

TABLE D-1. Receptor Locations Beyond a Quarter Mile
Radius of a Complex Source

Case Study	Receptors
Ford City	R1, R2
Hillside	None
Oak Brook	R2
River Oaks	None
Town and Country	R3
Howard and Western	R3
Allstate	R2, R3, R4
DuPage County	R1
Evanston Garage	None
State National Bank	R2
Chrysler	R1, R2
Four Lakes	None
Sandburg Village	None
Arlington Park	R3
Oakton Skating Ring	None

Roadway Line Emission Factors

Emissions on the roadway segments were based on the 1974 national average vehicle mix, and the emission rate per vehicle that was used is shown as a function of vehicle speed by the solid curve in Fig. D-1. An emission rate of 52.5 gm/veh mi at 20 mph was chosen to match the value derived from Table 2 of the USEPA Interim Guidelines.* Emission rates at all other speeds then have a magnitude relative to 52.5 as determined from the speed correction factor curve (Graph 3) of the Illinois (proposed) Complex Source Regulations. Use of Fig. D-1 in conjunction with traffic information in the form of actual vehicle volumes (as contrasted to demand volumes) and speeds resulted in emission rates in units of gm/m sec which were used in subsequent dispersion model calculations.

Comparison with the emission rates at various speeds inferred from the Interim Guidelines is also presented in Fig. D-1. Basic traffic information for using the Guidelines consists of designation of roadway type (e.g., urban arterial), roadway traffic capacity, and roadway demand volume. Different values of the ratio of volume demand to capacity result in the vehicle speeds shown by the scale at the bottom of Fig. D-1, and for these conditions the corresponding CO emission factors in units of gm/min veh contained in Tables 2 and 3 of the Interim Guidelines are shown as isolated points at the top of Fig. D-1. The point on solid curve at 20 mph was chosen to be equal to the emission factor in the Guidelines (converted to units of gm/veh mi) for this speed. To demonstrate that the emission factors at other speeds compare closely with the values used in our analyses, the locations of the points at other speeds along the solid curve are shown.

The development of Graphs 1 and 2 of Appendix A of the proposed Illinois regulations followed a somewhat different assumption for vehicle emission rate.** An emission factor at five miles per hour of 123 grams of carbon monoxide per vehicle mile, based on a 1975 Cook County vehicle age

* Ibid., p. 61.

** Information on Proposed "Complex Sources" Regulation, Environmental Protection Agency. Division of Air Pollution Control, Springfield, Illinois, August 24, 1973. p. 35.

Fig. D-1. CO Emission Factor as a Function of Vehicle Speed Based on 1974 National Average Vehicle Mix (Solid Curve). Points are Comparative Values from USEPA Interim Guidelines.

distribution, was used. At five miles per hour, the curve in Fig. D-1 is at 158 grams per vehicle mile. An adjustment factor of 0.9, obtained from Table 1 of the Interim Guidelines, reflects the application of national CO emission control programs in going from the 1974 national average vehicle mix to the one in 1975. For 1975, therefore, the emission factor at five miles per hour used in this study is 142 grams per vehicle mile. Air quality levels were calculated with the 1974 national vehicle mix. These levels were then adjusted to reflect the 1975 vehicle mix, and additionally, the 1978 vehicle mix (adjustment factor = 0.6) for analysis of possible degrees of modification necessary to assure compliance of each case study with the regulations.

CO Concentration Calculations

Calculations of the concentration of CO due to each roadway line at the critical receptor site was carried out with the HIWAY line source model. A mathematical modeling approach, rather than a graphical one based on curves such as those in the Interim Guidelines, was chosen for the flexibility in geometries and meteorological conditions it permitted. An example of the results of application of the HIWAY model is shown on Fig. D-2. In Fig. D-2 the CO concentrations in ppm calculated receptors located various distances from a 4000 ft long roadway line are drawn as a function of angle between the wind direction and the roadway line. The receptor is 6 ft above ground level and the roadway line is centered 5 ft above ground level. The roadway line is assumed to be 24 ft wide. For these curves, the emission rate on the roadway is 0.01 grams per meter second. Stability class D, a mixing depth of 2000 feet, and a wind speed of 2.2 miles per hour (1 meter per second) constitute the assumed meteorological conditions.

Comparisons of the calculations with the curves in the USEPA Interim Guidelines is given in Fig. D-3. The solid curves of Fig. D-3 are CO concentrations as a function of roadway to receptor spacing for two fixed wind angles relative to the roadway. The roadway emission factor for these curves, which are derived from the curves of Fig. D-2, is 0.00803 gm/m sec for 1600 vehicles per hour traveling at 40 mph. In the Interim Guidelines a 40 mph vehicle speed corresponds to an urban expressway with a v/c ratio of 0.8. The curves for 2000-vehicle capacity urban expressways at various roadway to

Fig. D-2. Calculated CO Concentrations as a Function of Wind Angle for Various Roadway-to-receptor Spacings. Roadway length = 4000 ft. Emission Rate is 0.01 gm/m sec. Receptor is Opposite the Midpoint of the Roadway. (See text for details of the calculation.)

Fig. D-3. Comparison Between HIWAY Model Calculations Used in this Report (Solid Curves) and Corresponding Points on Curves Contained in Federal EPA Guidelines. (See text.)

receptor spacings give the concentrations at $v/c = 0.8$ shown by the points in Fig. D-3. Most of the difference between the curve and the points at 10° is accounted for by the fact that the roadway length for the curve is 4000 ft, while the points are based on an infinite length roadway. For relatively close receptor sites, the sensitivity to roadway length decreases as the angle between the wind direction and the roadway increases, which is reflected in the closer correspondence between the curve and the points at 20° .

A few tests were performed to determine sensitivity of the calculations to assumed values for the mixing depth. It was found that within the range used in the calculations for the case studies (1500-2500 ft), there was no change with mixing depth.

General Assumptions for Total CO Concentrations

For each critical receptor site, the wind direction picked for calculating the total CO concentration was the one expected to demonstrate the most adverse impact of the induced traffic. The curves in Fig. D-2 show a strong peaking of calculated concentrations at receptors between 50 ft and 200 ft from a roadway line when the wind angle with respect to the line is about 10° . This angle was chosen for the wind direction relative to the modeled roadway line with the greatest probable impact, and the wind direction for other roadways was then fixed by their orientation relative to the first. In those cases where the choice was doubtful, the results for several wind angles were calculated, and the largest total impact was used for analyses of compliance with the regulations.

Due to time constraints of the study, analysis was limited primarily to compliance with the regulations regarding the 8-hr ambient air quality standard, which was deemed to be generally more restrictive than the 1-hr standard. Questions of persistence of assumed meteorological conditions over an 8-hr period were not addressed in any detail. Suggestions in the Interim Guidelines are that when it is infeasible to derive a persistence factor specific to a particular site, a value of 0.6 be used. All of the concentrations calculated from roadway lines were adjusted by this factor before comparison with the 8-hr standards. Because the concentrations are so strongly peaked about the 10° wind angle assumed for the most critical

roadway, the actual variation in wind angles over 8 hours is likely to be crucial in determining the persistence factor that ought to be used. We did not, however, carry through an analysis of wind direction variations to determine whether some value other than 0.6 would be more representative in the Chicago area (where most of the case studies are located).

Persistence of wind speed also has an effect on concentrations, with concentration inversely proportional to wind speed. Calculations of CO concentration assumed a wind speed of 2.2 miles per hour (1 meter per second) in every case. Extended periods of low wind speed are often accompanied by large variation in wind angles. Effects of both wind speed and wind angle variations were assumed to be contained within the 0.6 persistence factor.

Another factor in determining total CO concentration that could not be examined in detail was the background concentration at each receptor site. The case studies are largely in metropolitan areas, but range from near midtown to suburban Chicago and include sites in smaller cities in the state. Background for the purposes of this discussion is the pollutant level due to all sources other than the modeled roadways, and would likely be larger for midtown Chicago than for suburban Belvidere. The actual differences among the various sites were unknown. Without firm justification for using specific background concentrations for the various case studies, we have used a value of 2.0 ppm suggested in the Interim Guidelines.

The CO background concentration has been assumed to be attributable to motor vehicle operation. When the calculated concentrations are adjusted to reflect the changing vehicle mix in 1975 and 1978, the background is, therefore, adjusted by the same factor.