II-96-01
II-A-460
#6

ARGONNE NATIONAL LABORATORY

ANL

EES

ENERGY AND ENVIRONMENTAL SYSTEMS DIVISION

#6 DRAFT

Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

# THE BALANCE SHEET TECHNIQUE:

## Volume II: Preconstruction Review of Airports: Review of State Regulations, Projects Affected and Resource Requirements

by

Sarah J. LaBelle, Dorathea A. Seymour,
Albert E. Smith and Michael Harbour

February 1977

U.S. EPA Project Officer: Jane Mitchell
Office of Transportation and Land Use Policy

Draft Report

DRAFT

Vol. II Preconstruction Review of Airports: Review of State Regulations, Projects Affected and Resource Requirements

DRAFT

LIST OF TABLES

DRAFT

LIST OF TABLES (Cont'd)

DRAFT

# 1. INTRODUCTION

## 1.1 PURPOSE OF REVIEWS

This volume of the report contains the results of several surveys and analyses to ascertain the effect of airport indirect source review (ISR) requirements. This material is all dated, in the sense that the survey of state activities and the forecast of proposed construction are accurate as of the date the survey was completed. The material does shed light on the magnitude of the problems posed by indirect source review of airports. In conjunction with the test case results presented in Volume I of this report, a fairly clear picture of the effect of such regulation emerges. The regulation would in fact cause review of 30-50 major airport projects that may not be reviewed under any other program. The airports are significant regional sources of hydrocarbon emissions, and become more so over the ten year planning horizon.

## 1.2 DESCRIPTION OF REPORT

The next section presents a review of the states' experiences with their own indirect source review regulations. Summary tables indicate the extent of the regulations and the projects included; Appendix A includes all of the detailed data used for the summary tables. The third section presents the results of a survey of airports regarding construction plans for 1977-87. The FAA's Terminal Area Forecast was used as the source of traffic forecasts for air carrier airports. Thirty-one projects were identified with fifteen more potential projects. The detailed data corresponding to the tables in Section 3 is found in Appendix B.

The fourth section provides estimates of the cost of this type of review to the state agencies that would be responsible for airport ISR regulations. Estimates are based on cost data from surveys of state air pollution control agencies. The last section contains a summary of the issues we have discerned as significant with respect to indirect source review.

## 2. REVIEW OF STATE INDIRECT SOURCE REGULATIONS

This section presents information on the present status of State Indirect Source Review (ISR) Regulations. Sixteen states, two territories, and two local areas have enacted indirect source regulations and 10 states and one local area are currently implementing their regulations. One of the local areas has simply incorporated the state law into the county code, leaving enforcement to the state. These regulations are reviewed and summarized and a discussion of the experience of those states that have implemented their regulations is presented. The information presented is based on a survey of the regulations of 17 of the states and local areas with such laws. Copies of the regulations in the two territories were unavailable. In states with active implementation programs, the administering agencies were contacted for further data.

In general, the state regulations are very similar to the Federal Indirect Source Regulation,[1] which is not being implementated at this time. The regulations define the minimum size a facility must exceed to be reviewed under the regulation, state the information required from the applicant, list air quality standards that must be met and discuss policies followed by the administering agency in approving or rejecting a construction permit application. The regulations are often quite general, with further specifications left to the administering agency.

### Size Criteria

The state indirect source regulations set forth guidelines as to the type and size of facilities that must apply for construction permits. These guidelines are in the form of size or activity-related criteria for airports, highways and parking facilities. These criteria are summarized in Tables 2.1-2.3.

For airports, three states have significantly stricter regulations than the Federal Regulation. The passengers per year criterion has been shown to be the dominant criterion in the Federal Regulation and in these three cases, the states have significantly lowered this criteria. Six states have regulations for which review criteria are significantly different from and not directly comparable with the Federal Regulation.

Table 2.1. Airport Size Criteria

| Criteria | Number of States |
|---|---|
| 50,000 operations and/or 1.6 million passengers per year | 8[a] |
| 50,000 operations and/or 1 million passengers per year | 3 |
| Parking criteria[b] | 2 |
| Other[c] | 4 |
| Total | 17 |

[a]Includes Federal Regulation

[b]No specific airport criteria. Any indirect source with parking area greater than specified size must be reviewed.

[c]All new airports, emission criteria (causes increase in amount of emissions above specific level), greater than 100,000 operations and total airport capacity.

Table 2.2. Highway Size Criteria

| Criteria | Location | Number of States |
|---|---|---|
| New roadway with AADT[a] of 20,000 vehicles and modified facility with AADT of 10,000 vehicles | SMSA[b] | 4[c] |
| | All areas | 5 |
| Total Capacity Criteria[d] | SMSA | 2 |
| | All areas | 3 |
| Other[e] | | 3 |
| Total | | 17 |

[a]Average Annual Daily Traffic

[b]Standard Metropolitan Statistical Area

[c]Includes Federal Regulation (for CO analysis)

[d]Modification increases capacity above minimum size criteria

[e]Criteria based on emissions resulting from completed roadway and other size criteria (new roadway with AADT of 10,000; any roadway with four or more lanes).

Table 2.3. Parking Facility Size Criteria

| Criteria | Number of States |
|---|---|
| Minimum ranging from 50 to 2000 spaces for new facility and from 50 to 1000 spaces for modified facility | 9[a] |
| Total capacity criteria[b] | 5 |
| Traffic inducement criteria[c] | 2 |
| Emission criteria[d] | 1 |
| Total | 17 |

[a]Includes Federal regulation.

[b]Modification increases capacity above the minimum size criteria.

[c]Facility generates greater than a specific amount of traffic in a given time period.

[d]Facility causes increase in amount of emission above a specified level.

For highways, eight states have criteria similar to the Federal Regulation. Five states use similar size criteria but for modified highways, total capacity and not additional capacity is considered. Three states have significantly different review criteria. The Federal Regulation specifies different criteria for review for impact on oxidant levels, unlike any of the states. For new roads of 50,000 AADT, or modified roadways expecting an increase of 25,000 AADT, review of the project for its impact on oxidant levels is required.

For parking facilities, most regulations are similar to the Federal regulation though there exists a wide range as to the specific minimum size that warrants review. Five states use size criteria based on total capacity and not additional capacity and three states have criteria significantly different from the Federal regulation.

Permit Applications

All states with Indirect Source Review Regulations require that sources that exceed any of the above size criteria apply for construction permits and undergo preconstruction review. Each state requires that the applicant supply the data necessary to assess the air quality impacts of the new construction. Specific data requirements are sometimes specified in the

regulations but most often only general information is required with more specific information requested on application forms supplied by the administering agency. The following information is generally requested by the administering agency:

For all indirect sources other than highway

- Map and description of site.
- Location of parking areas.
- Identification of principle roads and intersections used by motor vehicles moving to and from the indirect source and estimates of traffic volumes and capacities of roads and intersections within one quarter mile of the source.
- Availability of mass transit.
- Any information the administering agency deems necessary to determine the air quality impact of the indirect source.

For airports

- All above information.
- Present and expected average and maximum number of operations per day by type of aircraft.
- Description of expected development near the airport, generally within three miles of the site boundary.
- Expected passenger loadings at the airport.

For highway projects

- Present and expected average and maximum traffic volumes for 1, 8, and 24 hour time periods.
- Present and expected speeds on the facility.
- Capacity of roadway.
- Description of right-of-way.
- Effect of construction on other travel modes.
- Present and expected emissions.
- Any information seen necessary by the administering agency to assess the air quality impact of the roadway.

The Federal and state regulations are very similar in terms of the type of information requested with the major difference being the specific form the information must take.

Standards for Approval of Indirect Source Construction

The state indirect source regulations set forth standards that the proposed new source or modification must meet before approval to construct can be

granted. These requirements are generally stated in one of the following three ways:

- Applicable Ambient Standards - construction or modification of a source must not "interfere with the attainment or maintenance of any ambient air quality standard."[2] Alternatively, the specific pollutants are stated. In most cases this will be a CO standard; only one state specifies a $NO_x$ and oxidant standard.
- Air Quality Degradation - "Sources . . . will not cause a significant deterioration in existing air quality in areas . . . in which existing air quality is better than air quality standards . . ."[3]
- Other Applicable Regulation - Sources must not cause violations of any other local, state, or federal air quality regulations.

The scope of the state regulations is summarized in Table 2.4.

Table 2.4. Standards for Approval of Indirect Source Construction

| Type of Standard | Number of States |
|---|---|
| Applicable Ambient Standards | 11 |
| CO Ambient Standards[a] | 5 |
| CO, Ox, $NO_2$ Ambient Standards | 1 |
| Air Quality Degradation | 3 |
| Other Applicable Regulations[a] | 11 |
| Total[b] | 17 |

[a] Includes Federal Regulation.

[b] Several States have more than one of the provisions in their regulations.

Implementation of Indirect Source Regulation

At the present time 10 states and the Puget Sound region are implementing indirect source review regulations. The level of implementation, the number of projects affected, and the person-power requirements vary greatly and are summarized in Tables 2.5 and 2.6 The types of projects reviewed include highways, parking facilities, shopping centers, resort hotels, race tracks, and other facilities that exceed a specific parking space or activity-related criterion. No airports have been reviewed to date but review of proposed expansion at two airports (Gen. Mitchell Field in Milwaukee and King County

Airport in Puget Sound) will begin soon. Of the projects reviewed by the states, 99.6% were approved as planned or approved subject to certain conditions. These conditions are typically changes in the pattern of entrances and exits to the facility to smooth traffic flow and lessen delay. Only one state - Connecticut - has completely rejected projects on the basis of air quality (a shopping mall and a horse racing track).

Table 2.5. State Activity in Implementing Indirect Source Regulations

| Number of Projects Reviewed[a] | Number of States |
|---|---|
| 0 - 10 | 1 |
| 11 - 20 | 5 |
| 21 - 50 | 3 |
| 51 - 100 | 1 |
| > 100 | 1 |
| Total | 11[b] |

[a]Since adoption of regulation

[b]Includes Puget Sound

Table 2.6. Person Power Requirements for State Indirect Source Reviews

| Person-Years Required for ISR Review[a] | Number of States |
|---|---|
| Less than 1 | 4 |
| 1 - 2 | 5 |
| 3 - 5 | 1 |
| > 5 | 1 |
| Total | 11[b] |

[a]Person-years/year.

[b]Includes Puget Sound.

Survey data were not adequate to determine an average amount of time required for a review under the ISR regulations; therefore, only annual person-power figures are supplied. It is impossible to state, based on

presently available data, the approximate time requirements per review because of the nature of and variation in the information collected.

Review of this data might indicate that the state ISR programs are not an effective air quality management tool because of the low failure rate of reviewed projects and the relatively small amount of person-power devoted to review. However, the information obtained in discussion with state personnel was inadequate to support this conclusion. An alternative hypothesis to explain the low failure rate is that the objectionable aspects of most of the projects were eliminated by agreement between project sponsor and the agency prior to formal review. This concept cannot be fully supported on the basis of the assembled information.

One explanation for this low failure rate, based on our discussions with state personnel, is the reluctance of the state agencies to completely reject a project. Instead the procedure has been to approve a project subject to conditions (improved traffic flow, smaller size, improved public transportation) which will minimize the air quality impact of the project. Several states expressed concern that the projections and analyses used in the review might not withstand legal scrutiny and were reluctant to make major objections to a project on the basis of the air quality analysis alone. Several states felt that its personnel were not sufficiently trained in traffic planning to resolve many of the problems posed by the facilities under review.

The present uncertainty surrounding the Federal regulation has apparently had a significant influence on the states. The legal authority for review is clearly stated in all the state regulations for indirect source review; the basis for rejection is not so explicit, however. The indirect source review regulations have not been fully integrated with other air pollution regulations, leaving the states uncertain as to which standards and guidelines for review might prove effective in accomplishing the goal of improved air quality. One state, in reviewing parking facilities, preferred to rely on the legal authority of its traffic bureau to evaluate proposals rather than use the ISR regulation. The states, on several occasions, indicated that the lack of a federal ISR program has hampered implementation of the state program.

It must be concluded, therefore, that the state indirect source review program is not having a clearcut impact on air quality management.

The small number of states having regulations, the even smaller number implementing their regulations and the low failure rate of the reviewed projects imply that this mechanism is having only limited success in controlling indirect sources of air pollution. It was not possible to determine the extent of control that could be achieved with an active state and federal indirect source review program.

## 3. AIRPORT CONSTRUCTION PROJECTS, 1977-1987

This section presents information on airport construction and modifications over the ten-year period 1977-1987. The proposed projects were selected according to the amount of new air traffic, measured by passengers or operations, resulting from the construction project. It should be noted that the construction projects described here have not all gained final approval of all parties involved. They are either mentioned in the published airport master plan or have begun the federal review procedures for a construction project. Thus, this is not to be interpreted as a forecast or as firm commitments to construction, but rather as a likely set of projects over the next ten years.[4,5,6,7]

A summary of the projects within the designated ten year period, for which the increase is greater than 1.6 million annual air carrier passengers (800,000 enplaned), or 50,000 annual air carrier operations, is presented in Table 3.1. These criteria are the ones stated in the Federal Register (July 9, 1974, pp. 25292-25301), regarding the review of indirect sources of air pollution. Over the next ten years, relatively little airport construction is expected at air carrier airports. In part this is due to the lag in air traffic growth over the last two years. Nationally, only two new airports meeting the size criteria are proposed. Thirty-one airports propose modifications over this period. Most of the projects (58%) meet only the expected passenger growth criterion. Only 14 airports qualified on both the passenger and the operations criteria. Twenty-five of the airports are in oxidant problem areas; either in Air Quality Maintenance Areas (AQMA) designated for photochemical oxidant (Ox) or nitrogen dioxide ($NO_2$), or in an area designated for state implementation plan revisions for oxidants or both. Only six of those airports are in states with indirect source review regulations. Twenty-nine percent of all the airports proposing construction are in such states.

Table 3.2 presents information on airport growth that is expected to occur without any additional construction. In some cases this growth is quite substantial. In 10 instances, it occurs in AQMAs designated for Ox or $NO_2$. There are a total of 14 airports whose growth meets the stated criteria, but can accommodate this growth without any physical expansion. A partial explanation for this is in the increased utilization of larger planes with higher passenger loads. Additionally, some airports now have some

Table 3.1. Summary of Proposed Air Carrier Airport Construction[a], 1977-1987

| Air Quality Region | Number of Airport Projects: New Runway | Extended Runway | Terminal Expansion | Parking Facility | Access Road | New Airport | Growth In Passenger Movements: Mean ($10^6$) | Ranges ($10^6$) | Projects In States With Review[b] | Total[c] |
|---|---|---|---|---|---|---|---|---|---|---|
| AQMA-Ox | 5 | 7 | 11 | 2 | - | 1 | 5.714 | 1.876-21.278 | 3 | 17 |
| SIP Revision Only[d] | 4 | 2 | 3 | 1 | 1 | 1 | 6.588 | 1.836-21.828 | 3 | 8 |
| Not in either | 3 | 1 | 3 | 2 | - | - | 4.223 | 2.464- 7.838 | 3 | 6 |
| TOTAL | | | | | | | 5.651 | 1.836-21.828 | 9 | 31 |

[a]Inducing air traffic growth of at least 1.6 million annual passengers or 50,000 annual operations.

[b]Preconstruction review procedure at the State level.

[c]Total number of airports; one airport may have two or more projects.

[d]The thirteen airports in both AQMA-Ox and SIP Revision areas are included in AQMA-Ox totals.

Table 3.2. Summary of Proposed Air Carrier Airport Growth in Place[a], 1977-1987

| Region | Projects In States With Preconstruction Review | Total | Growth In Passenger Movements | |
|---|---|---|---|---|
| | | | Mean ($10^6$) | Range ($10^6$) |
| AQMA-Ox | 4 | 10 | 10.234 | 2.080-30.066 |
| SIP Revision Only[b] | 1 | 1 | 2.432 | 2.432 |
| Not in either | 1 | 3 | 6.285 | 3.500-11.174 |
| TOTAL | 6 | 14 | 8.831 | 2.080-30.066 |

[a]At least 1.6 million annual passengers or 50,000 annual operations.

[b]The eight airports in both AQMA-Ox and SIP Revision areas are included in AQMA-Ox totals.

unused capacity, related to the lower traffic levels of the last few years. For all the airports included in Tables 3.1 and 3.2, the forecast traffic is at a larger average passenger load than the existing traffic.

Data on airports that are borderline cases, which would be included under modified size criteria, are presented in Tables 3.3 and 3.4. The airports are included either because they just missed the annual passenger criteria of 1.6 million, or the operations grew to over 50,000 annually as a result of the project (Table 3.3). Airports accommodating growth without construction, meeting the same criteria as Table 3.3, are noted in Table 3.4. If the operations criterion were changed to 'growing to a size of 50,000 annual operation , then four airport construction projects would be added, with two in oxidant problem areas. Another four would be added if the passenger criteria were lowered to 1.3 million annual passengers, all of which are in oxidant problem areas. Under the growth-in-place grouping (Table 3.4), nine more airports would be considered. Five are in oxidant problem areas; four meet both criteria, one falls under only the operations criterion, and four under only the passenger criterion. If the criteria for the change in operations is dropped by 20% to 40,000, no new airports are added to the list. Any airport expecting an increase of 40,000 or more operations is expecting a corresponding increase in passenger movements of at least 1.6 million. Also, no airport met the operations standard only; if the increment in operations exceeded 50,000 annually, then the passenger growth always exceeded 1.6 million.

The data on these four tables show that only a small portion of the airport construction projects meeting the federal growth criteria are planned for states with pre-construction review regulations. The majority of projects will not be evaluated at the state level through the preconstruction review mechanism. The majority of them are in oxidant-designated AQMAs and could conceivably be reviewed through the maintenance planning process. It is likely that many projects will use federal funds and thus be subject to the environmental impact statement review process. A significant amount of air traffic growth is scheduled for airports with no planned construction activity and hence would not be subject to either federal or state pre-construction review and possibly not to AQMA review. Changing either of the size criteria downward does not greatly increase the number of airport projects falling under the review guidelines.

Table 3.3. Proposed Air Carrier Airport Construction Projects Included Under Alternative Size Criteria[a]

| Air Quality Region | New or Extended Runway | Terminal Expansion | Parking Facility | Projects In States With Preconstruction Review | Total[b] |
|---|---|---|---|---|---|
| AQMA-Ox | 2 | - | 1 | 0 | 2 |
| SIP Revision Only[c] | 4 | 2 | - | 2 | 4 |
| Not in either | 1 | 1 | - | 1 | 2 |
| TOTAL | | | | 3 | 8 |

[a]Passenger growth criterion lowered to 1.3 million, or attainment of 50,000 annual operations by 1987.

[b]Total number of airports; one airport may have two or more projects.

[c]The two airports in both AQMA-Ox and SIP Revision areas are included in AQMA-Ox totals.

Table 3.4. Proposed Air Carrier Airport Growth in Place Included Under Alternative Size Criteria[a]

| Air Quality Region | Projects in States With Preconstruction Review | Total |
|---|---|---|
| AQMA-Ox | 0 | 4 |
| SIP Revision Only[b] | 1 | 1 |
| Not in either | 4 | 4 |
| TOTAL | 5 | 9 |

[a]Passenger growth criterion lowered to 1.3 million, or attainment of 50,000 annual operations by 1987.

[b]The three airports in both AQMA-Ox and SIP Revision areas are included in AQMA-Ox totals.

of regulation development for airport review is approximately 6 person months of professional effort. The person power allocation would be distributed approximately as follows: 10% director; 15% deputy director; and 25% legal specialist and technical assistants.

Updating Existing Emission Inventory

Most states are in the process of updating emission inventories. Airport ISR will rely heavily on good emissions data. In some cases data will have to be translated to a suitable format for the airport ISR. Currently most states spend from 2 to 4 person years annually, maintaining and updating emission inventories. Efforts attributable to ISR analysis would most likely be in the area of 3 person months initially and 1 person month annually. Work would be performed by Engineer I and Specialist I.

Updating Existing Air Quality Data

Air quality data in states having oxidant problems most likely will be adequate for ISR. Costs for updating air quality data will be borne mostly by states with airports in 'non-problem' areas for oxidants. States with insufficient or outdated air quality data will require at least 3 person months of monitoring data in the region under review. Agency monitoring activities place resource demands not only on personnel staffing but also on equipment for monitoring calibration and maintenance activities. Monitoring sites for photochemical oxidant stations using automated gas phase chemiluminescence instrumentation would require an initial capital expenditure of approximately $10,000 with 2 person months of Technician II time, and $800 annual operating costs (representing expenditures for calibration and maintenance). Field operations, calibration, and maintenance personnel for three monitoring stations would require approximately 4 person weeks of Technician II time per year. Another 2 person weeks per year of Specialist I time should be allocated to data analysis.

Coordination with Airport Operators and Local Air Pollution Control Agencies

Technical and legal coordination, both with airport staff and local and regional air pollution control staff will require approximately two person months

# 4. AIR POLLUTION CONTROL AGENCY RESOURCE REQUIREMENTS RELATED TO AIRPORT REVIEW

## 4.1 DEFINITION OF TASKS

As part of the assessment of the impact of an indirect source review regulation (ISR), an analysis of the costs to state reviewing agencies has been prepared. Generally, as in the case of new stationary sources, agency costs for airport review are principally related to analysis and processing of applications for permits to contruct and permits to operate, and to regional new source review for certain large sources. Since proposed airport projects are not likely to fall under existing permit systems, costs incurred by air pollution control agencies will be related to effort required to complete a set of activities that is slightly different from other new source reviews. Tasks to be performed for ISR include the following:

1) Regulation development establishing airport review procedures
2) Updating existing emission inventories
3) Updating existing air quality data
4) Coordination with airport operators and local air pollution control agencies
5) ISR analysis
6) Inspection and update

Airport ISR costs are assumed to be imposed only upon state air pollution control agencies. In the case of stationary sources, permit review, analysis and inspection is often duplicated by the local agency having jurisdiction over the source in question. Local agency participation in ISR of airports will most likely be in coordination with the state air pollution control agency, rather than duplicating the state's effort.

Regulation Development Establishing New Airport Review Procedures

Based upon interviews with state air pollution control agency personnel, agency resources required to establish new regulations vary considerably depending upon precedents that have been established governing regulation of the sources in question. In cases where similar regulations have been established and model regulations existed, agency involvement could be limited to 2 or 3 person weeks of effort. New hydrocarbon emission regulations, for example, have required as much as 2 person years of effort. A best estimate

of effort and another two person weeks per year. Initial coordination will most likely be at the Engineer II level with follow up undertaken by Engineer I personnel.

ISR Analysis (Balance Sheet Analysis)

ISR analysis has been mechanized to the point where minimal effort is required in regions not considered to be oxidant problem areas. When allowable emission are exceeded, however, the ISR can become extremely complex and time consuming. Regions not considered to be oxidant problem areas should require about 4 person weeks of Engineer II time for review and appropriate reporting of the results. In oxidant problem areas where airport emissions exceed or will exceed allowable regional emissions could require trade-off analysis and new regulation development (SIP revisions). In cases where new regulations must be developed to reduce emission levels, agency person power requirements could extend from 1 to 3 person years. An approximation of 1.5 person years of technical effort in oxidant problem areas is a reasonable estimate of the resource requirement.

Inspection and Update

Inspection and update tasks represent the annual operational effort required to insure emission levels are being maintained and the SIP is in conformance. Approximately two person months of Engineer I and Inspector III time is likely to be used in this effort.

## 4.2 DETERMINATION OF COSTS

Having defined the tasks required to implement airport ISR, agency resource estimates were completed for each defined task. These estimates are the result of discussions with state air pollution control personnel regarding other review and control programs that have tasks very similar to those required for indirect source review of airport projects.[8] A summary of the tasks and time/cost estimates for an airport review is presented in Table 4.1. The costs in general apply to all areas; costs accrued only in non-problem areas for oxidant are noted on the table.

DRAFT

Table 4.1. Summary of Estimated State Agency Resource Requirements for an Airport Indirect Source Review

| Task | First Year Staffing (person weeks) | Annual Staffing (person weeks) | First Year Capital Cost ($) | Annual Operational Cost ($) |
|---|---|---|---|---|
| Regulation Development | 2.4 Director<br>3.6 Deputy<br>6 Legal<br>6 Engr. II<br>6 Specialist II | | | |
| Updating Emission Inventory | 6 Engr. I<br>6 Specialist I | 2 Engr. I<br>2 Specialist I | | |
| Updating Air Quality Data[a] | 12 Technician II<br>2 Specialist I | 4 Technician II<br>2 Specialist I | $10,000 | $800 |
| Coordination Activities | 8 Engr. II | 2 Engr. I | | |
| ISR Analysis | 4[a]-150 Engr. II | | | |
| Inspection and Review | 4 Engr. I<br>4 Inspector III | 4 Engr. I<br>4 Inspector III | | |

[a]For projects in areas not considered to be oxidant problem areas.

Resource requirements summarized in Table 4.1 can be translated to dollar costs. A survey of salary levels at state and local air pollution control agencies has been made[8]; the results appear in Table 4.2. Table 4.3 gives a cost summary for a typical airport indirect source review. First year personnel costs will run approximately $23,000; $30,000 will be required for monitoring equipment. Operational costs for maintenance and servicing of the monitors will cost another $2,400. Thus, total first year costs per airport should be in the vicinity of $55,000, and $45,000 for each additional airport to be reviewed and monitored by the same agency. Annual expenditures for the program should run approximately $8,000 per year per airport. Those states with sufficient air quality data can reduce initial costs by almost $36,000 and annual costs by $4000. Those states where emissions will require trade-off regulations (SIP revisions) can expect costs to be increased by as much as $50,000. Given the proposed projects identified in Section 3 and Appendix B of this volume and summarized on Table 4.4, and making several assumptions the total national costs of airport indirect source review can be estimated. The assumptions include (1) that oxidant problem areas have sufficient monitoring data; and (2) that the average problem area will require 1.5 person years for alternative strategy analysis.

Based on the estimate for each airport review, knowing which projects are in oxidant problem areas, the total national costs expected to be incurred by state review agencies are $1.3 million for first year cost and $181,000 annual costs. This is a relatively low cost on a national scale for this program, with an average annual cost of about $6,000 for each airport reviewed and nearly $43,000 first year cost per airport. Of course, these estimates are subject to error on several counts. First, the estimate of proposed airport projects over the next ten years could be in error. If the other 15 airports listed in Appendix B carry out construction projects to help meet the forecast demand, then these figures could increase by 50%. There must also be some consideration for errors in the estimates of person-power per task, although such errors are not likely to change final cost results by much (less than an order of magnitude).

In summary, the preconstruction review of airports as indirect sources of air pollution is not expected to be a very great burden on the state reviewing agencies in general. With the exception of California, Florida and Texas, no

Table 4.2. Survey of Salary Levels at State and Local Air Pollution Control Agencies[a]
(Annual Salary, in Thousands of Dollars)

| Occupational Category | High | Low | Overall Sample Mean | Standard Deviation | Number in Sample |
|---|---|---|---|---|---|
| APC Director | 32.11 | 15.60 | 23.24 | 5.06 | 23 |
| APC Deputy Director | 27.09 | 15.05 | 22.68 | 3.35 | 25 |
| Legal Officer | 22.95 | 6.00 | 15.67 | 4.06 | 22 |
| APC Specialist II | 22.64 | 12.00 | 17.36 | 1.52 | 103 |
| APC Specialist I | 24.47 | 8.05 | 13.78 | 2.10 | 108 |
| Engineer II | 29.87 | 11.86 | 18.65 | 1.69 | 144 |
| Engineer I | 22.24 | 8.78 | 15.42 | 1.21 | 178 |
| Chemist II | 18.52 | 8.39 | 14.72 | 1.78 | 51 |
| Chemist I | 15.22 | 6.96 | 11.91 | 1.51 | 27 |
| Meteorologist II | 18.06 | 12.00 | 13.15 | 1.74 | 9 |
| Meteorologist I | 13.10 | 9.66 | 11.44 | 1.09 | 6 |
| Inspector III | 18.15 | 10.15 | 13.59 | 1.27 | 46 |
| Inspector II | 18.77 | 7.40 | 12.83 | 1.12 | 146 |
| Inspector I (Tr.) | 9.77 | 8.76 | 9.25 | 0.28 | 7 |
| Technician III | 20.22 | 8.78 | 12.87 | 2.60 | 47 |
| Technician II | 15.20 | 7.60 | 11.30 | 0.92 | 147 |
| Technician I (Tr.) | 13.80 | 7.33 | 9.61 | 1.00 | 50 |
| Aide II | 12.00 | 7.32 | 8.98 | 1.12 | 15 |
| Aide I | 8.57 | 2.87 | 6.65 | 1.63 | 9 |
| Clerical | 16.05 | 5.15 | 7.82 | 1.09 | 243 |

[a]Sample included all agencies in EPA Region V, Texas Air Control Board, and the San Diego Air Pollution Control District; Source: Reference 8.

Table 4.3. Dollar Costs Estimated for Airport Indirect Source Review

| Task | First Year Cost | | | Annual Cost | |
|---|---|---|---|---|---|
| | Personnel | Capital | Operational | Personnel | Operational |
| Regulation Development | 9,067 | | | | |
| Updating Emission Inventory | 3,696 | | | 1,232 | |
| Updating Air Quality Data | 3,328 | 30,000 | 2,400 | 1,520 | 2,400 |
| Coordinating Activities | 2,976 | | | 616 | |
| ISR Analysis | 1,488[a]-55,800[b] | | | | |
| Inspection and Review | 2,312 | | | 2,312 | |
| TOTAL | 22,867 | 30,000 | 2,400 | 5,680 | 2,400 |

[a]For airports in areas not considered to be oxidant problem areas.

[b]For airports in oxidant problem areas.

Table 4.4. Summary of Airport Projects and Costs by State

| State | Number Projects | Oxidant Problem Area | Estimated Cost ($000) | |
|---|---|---|---|---|
| | | | First Year | Annual |
| New York | 1 | yes | 46 | 5 |
| Pennsylvania | 2 | yes | 81 | 11 |
| District of Columbia | 1 | yes | 46 | 5 |
| Florida | 3 | 2-no<br>1-yes | 136 | 22 |
| Georgia | 1 | yes | 46 | 5 |
| Kentucky | 1 | yes | 46 | 5 |
| North Carolina | 1 | yes | 46 | 5 |
| Ohio | 2 | yes | 81 | 11 |
| Indiana | 1 | yes | 46 | 5 |
| Wisconsin | 1 | yes | 46 | 5 |
| Minnesota | 1 | yes | 46 | 5 |
| Michigan | 1 | yes | 46 | 5 |
| Louisiana | 1 | yes | 46 | 5 |
| Texas | 3 | yes | 116 | 17 |
| Missouri | 2 | 1-no<br>1-yes | 55 | 13 |
| Utah | 1 | no | 55 | 8 |
| California | 5 | yes | 186 | 28 |
| Arizona | 1 | yes | 46 | 5 |
| Hawaii | 1 | no | 55 | 8 |
| Washington | 1 | no | 55 | 8 |
| TOTAL | 31 | 6-no<br>25-yes | 1,326 | 181 |

state bears more than $100,000 in first year costs. Where several airports are likely to be reviewed it is unlikely that all will be reviewed in the same year. Regarding annual costs, the same three states plus Missouri are likely to bear expenses exceeding $12,000/year, the highest expected value being $18,000/year. This is about equivalent to the salary of one engineering staff salary for an agency.

## 5. SUMMARY OF ISSUES

Indirect source review is a sometimes controversial part of the set of tools for state implementation plans, formulated to guarantee attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). The balance sheet analysis technique described and tested in Volume I of this report is intended for use in conjunction with indirect source reviews of airport and highway projects. The reviews are preconstructuion reviews, the end result of which is a decision to grant or to deny a permit for construction. The purpose of indirect source review is to identify and review for their air quality impact projects, such as runway or highway pavement construction, that are not of themselves emitters of hydrocarbons but that attract significant volumes of automobile traffic, and that would not otherwise be reviewed for air quality impacts. These projects are major projects capable of causing significant changes in regional emissions in and of themselves.

Given this description of indirect source review, the issues we have uncovered in this regard by developing and testing the balance sheet analysis technique can be outlined as follows. The current method of forecasting air traffic levels is basically compatible with a balance sheet review. The principal problems arise from the fact that most airports were not thoroughly inventoried on emission sources during the preparation of existing air quality plans. This situation generates some extra calculations and data assembly at the time of a review, in the form of doing that detailed inventory so that the effects of the project can be determined. The current method of forecasting highway traffic is not compatible with the balance sheet review for several reasons. One is the inability of the methods to measure the effect of supply increases (new highways) on future traffic volumes and vehicle-miles travelled. In addition to overlooking these induced traffic emissions, the emissions from the new stationary sources that attract the vehicular traffic are also not included. Also, because the forecasting techniques for large urban areas are expensive to use, the changes that could be made in the existing pattern of modeling demand to meet this need of air quality impact analysis are not likely to be made (i.e., running all the transportation models for different land use forecasts). Another reason for the incompatibility is that the set of models attuned to the problems of determining the need for additional highway capacity is not cognizant of the path followed between

the base year and the design (future) year. Although the pattern of changes in traffic volumes is significant in an emission burden analysis, particularly if the compliance year for a non-attainment area precedes the highway system design year, only the design year situation is of relevance in an analysis of future construction needs. Following from the problems associated with the review of highway projects is the need to define policies regarding the fineness of the resolution to be used in a balance sheet review. As an accounting technique, it requires balancing if the excess in the predicted emissions level is greater than zero. However, in the light of the fact that regional emission inventories are sometimes rounded to $10^3$ tons, some consideration must be made for how large a difference is significant given the measurement tools available.

Another area of concern,not a part of the technique but related to it, is the method used to enforce the emission reduction strategies proposed as trade-offs. The route of SIP revisions seems to be the most likely, although it is a cumbersome process. If it is too cumbersome, agencies may avoid using it as a tool for every such review.

It should also be noted that the balance sheet depends heavily on a good emissions inventory for the entire region and for the proposed airport or highway project. It assumes that the desired regional emissions are known, which is dependent on the completion of AQMA and other areawide air quality plans. In areas not considered oxidant problem areas, this might prove to be a prohibitive requirement for overburdened staff.

In sum, the issues raised, beyond the basic issue of the value of indirect source reviews as an effective method for identifying significant pollution sources are:

1) Authority to implement trade-offs once identified;

2) Usefulness of the existing forecasting techniques for demand on highway systems, for purposes of impact analysis;

3) Timely availability of regional emission inventories in the context of a regional air quality plan;

4) Cost to areas not now experiencing oxidant problems for completing an adequate HC emission inventory and gathering oxidant air quality data that is current;

5) Reliance on proportional reduction models for the regional oxidant air quality analysis; and

6) Development of policies relating to numerical accuracy-that is, the degree of resolution of the size of the emissions increase that would indicate the need for an emission trade-off.

DRAFT

# APPENDIX A

## Review of State Indirect Source Review Regulations

DRAFT

The following tables present the detailed results of a review of state indirect source review (ISR) regulations performed as part of a contract with the U.S. EPA regarding pre-construction review of airport projects. The first three tables describe the various criteria used by the states and local areas to determine which projects are subject to review under the regulation. The data are given for each state and local area, organized by U.S. EPA region number. The Federal regulation, which is not now being implemented, is included for comparison in all the tables. The next two tables (A.4 and A.5) present a tabulation of the data required of an applicant, as described in the state regulation, in applying for a permit for airport or highway projects. Additional information is often required on the application forms supplied by the administering agency; the data from these forms are not included in the two tables.

Table A.6 lists the conditions specified in the state regulations that require disapproval of a permit. That is, if the conditions listed in the table are met, the permit cannot be approved by the administering agency. The seventh table concerns the states that are actively implementing their ISR regulation. Data regarding the number and type of projects reviewed, as well as the personpower required to accomplish the reviews, are presented. Not all the states having regulation are actively implementing them, so Table A.7 covers only 10 states and one local area. The information was gathered by telephone and letter survey of the administering agency in each of the states with an active implementation process. The last table provides, for each state, the name and address of the agency designated in the state regulation to administer the regulation. Except for Table A.7, all data are based on the latest version of each state's regulation.

Table A.1. Indirect Source Review Regulations in the U.S. - Airport Criteria

| Jurisdiction | Operations/yr | | Passengers/yr | | Other Criteria |
|---|---|---|---|---|---|
| | New | Modified | New | Modified | |
| Federal | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| Region I [a] | | | | | |
| Connecticut | | | | | Emissions |
| New Hampshire | | | | | Parking space |
| Maine | | | | | Land area developed |
| Region II | | | | | |
| New York | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| Region III | | | | | |
| Virginia | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| West Virginia | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| Region IV | | | | | |
| Alabama | 50,000 | 50,000 | | | |
| Florida | All | 10% increase | All | 10% increase | |
| Kentucky | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| North Carolina | 100,000 | 100,000 | | | 45 peak hour operations |
| Region V | | | | | |
| Minnesota | | | 1,000,000 | 1,000,000 | |
| Wisconsin | 50,000 | 50,000 | 1,000,000 | 1,000,000 | |
| Region VII | | | | | |
| Nebraska | | | | | Parking space |
| Region IX | | | | | |
| Nevada | 50,000 | 50,000 | 1,000,000 | 1,000,000 | |
| Region X | | | | | |
| Idaho | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |
| Oregon | 50,000 | 25,000 | | | |
| Puget Sound | 50,000 | 50,000 | 1,600,000 | 1,600,000 | |

[a] Vermont's regulation is excluded since it is not part of the State Implementation Plan.

Table A.2. Indirect Source Review Regulations in the U.S. - Highway Criteria

| Jurisdiction | New | Modified | | Other Criteria |
|---|---|---|---|---|
| | Total Capacity[a] (AADT)[b] | Total Capacity (AADT) | Additional Capacity (AADT) | |
| Federal | | | | |
| SMSA | 20,000[c] | | 10,000[c] | |
| Region I | | | | |
| Connecticut | | | | Emissions |
| New Hampshire | 20,000 | | 10,000 | |
| Maine | | | | Four or more lanes |
| Region II | | | | |
| New York | | | | |
| Urban area | 20,000 | | 10,000 | |
| Region III | | | | |
| Virginia | | | | |
| SMSA | 20,000 | | 10,000 | |
| non-SMSA | All | | All | |
| West Virginia | 20,000 | | 10,000 | |
| Region IV | | | | |
| Alabama | 10,000 | | 10,000 | |
| Florida | | | | |
| Selected Counties | 7,500 | 7,500 | 7,500 | |
| Other | 10,000 | 10,000 | 10,000 | |
| Kentucky | | | | |
| SMSA | 10,000 | 10,000 | 10,000 | If AADT presently > 20,000 then 25% capacity increase |
| North Carolina | 10,000 | 10,000 | 10,000 | |
| Region V | | | | |
| Minnesota | | | | |
| SMSA | 20,000 | 20,000 | 10,000 | |
| Wisconsin | | | | |
| SMSA | 8,000 | | 8,000 | |
| non-SMSA | 9,000 | | 9,000 | |
| Region VII | | | | |
| Nebraska | 20,000 | | 10,000 | |

Table A.2. Indirect Source Review Regulations in the U.S. - Highway Criteria (Cont)

| Jurisdiction | New | Modified | | Other Criteria |
|---|---|---|---|---|
| | Total Capacity[a] (AADT)[b] | Total Capacity (AADT) | Additional Capacity (AADT) | |
| Region IX | | | | |
| Nevada | 20,000 | | 10,000 | |
| Region X | | | | |
| Idaho | 20,000 | | 10,000 | |
| Oregon | | | | |
| Municipal counties | 20,000 | 20,000 | 10,000 | |
| Other areas | 50,000 | 50,000 | 25,000 | |
| Puget Sound | 20,000 | | 10,000 | |

[a]Peak hour volume corrected to 24 hour volume using Highway Capacity Manual.

[b]Average Annual Daily Traffic

[c]For CO analysis; New - Total Capacity 50,000; Modified - Additional Capacity 25,000 are applicable for oxidant impact analysis.

Table A.3. Indirect Source Review Regulations in the U.S. - Parking Facility Criteria

| Jurisdiction | New | | | Modified | | | | Other Criteria |
|---|---|---|---|---|---|---|---|---|
| | Total Capacity (parking space) | Traffic Induced | | Total Capacity | Added Capacity | Traffic Induced | | |
| | | 1-hr max. | 8-hr max. | | | 1-hr max. | 8-hr max. | |
| **Federal** | | | | | | | | |
| SMSA | 1000 | | | | 500 | | | |
| non-SMSA | 2000 | | | | 1000 | | | |
| **Region I** | | | | | | | | |
| Connecticut | | | | | | | | Emissions |
| New Hampshire | 750 | | | | 500 | | | |
| Maine | | | | | | | | Land area developed |
| **Region II** | | | | | | | | |
| New York | | | | | | | | |
| Urban Area | 1000 | | | 500 | 500 | | | |
| Outside Urban Area | 2000 | | | 1000 | 1000 | | | |
| New York County | All | | | All | All | | | |
| **Region III** | | | | | | | | |
| Virginia | | | | | | | | |
| SMSA | | 700 | 1750 | | | 700 | 1750 | |
| non-SMSA | | 1400 | 3500 | | | 1400 | 3500 | |
| West Virginia | | | | | | | | |
| SMSA | 1000 | | | | 500 | | | |
| non-SMSA | 2000 | | | | 1000 | | | |
| **Region IV** | | | | | | | | |
| Alabama | | | | | | | | |
| SMSA | 1000 | | | | 500 | | | |
| non-SMSA | 2000 | | | | 1000 | | | |
| Florida | | | | | | | | |
| single-level | 1500 | | | 1500 | 1500 | | | |
| multi-level | 750 | | | 750 | 750 | | | |
| Kentucky | | | | | | | | |
| single-level | 1500 | | | 1500 | 1500 | | | If size > minimum specified, then any increase of 25%. |
| multi-level | 750 | | | 750 | 750 | | | |

Table A.3. Indirect Source Review Regulations in the U.S. - Parking Facility Criteria (Cont)

| Jurisdiction | New | | | Modified | | | | Other Criteria |
|---|---|---|---|---|---|---|---|---|
| | Total Capacity (parking space) | Traffic Induced | | Total Capacity | Added Capacity | Traffic Induced | | |
| | | 1-hr max. | 8-hr max. | | | 1-hr max. | 8-hr max. | |
| North Carolina | | | | | | | | |
| single-level | 1500 | | | 1500 | 1500 | | | |
| multi-level | 750 | | | 750 | 750 | | | |
| Region V | | | | | | | | |
| Minnesota | 2000 | | | 2000 | 1000 | | | |
| Wisconsin | | | | | | | | |
| SMSA | 1000 | | | | 500 | | | |
| non-SMSA | 1500 | | | | 750 | | | |
| Region VII | | | | | | | | |
| Nebraska | | | | | | | | |
| SMSA | 1000 | 1000 | 5000 | | 500 | 1000 | 5000 | |
| non-SMSA | 2000 | 2000 | 10000 | | 1000 | 2000 | 10000 | |
| Region IX | | | | | | | | |
| Nevada | 1000 | | | | 500 | | | |
| Region X | | | | | | | | |
| Idaho | | | | | | | | |
| SMSA | 1000 | | | | 500 | | | |
| non-SMSA | 2000 | | | | 1000 | | | |
| Oregon | | | | | | | | |
| Municipal | 50 | | | | 50 | | | |
| Large counties | 500 | | | | 500 | | | |
| Other | 1000 | | | | 1000 | | | |
| Puget Sound (King, Pierce, and Snobish Co.) | 250 | | | | 250 | | | |
| Kitsap Co. | 1000 | | | | 1000 | | | |

Table A.4. Airport Data Required by State Indirect Source Review Regulations

| Jurisdiction | Operations per day | | Expected Development | | Traffic Volume | | | | Mass Transit | Passenger Loadings | General Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avg | Max | Description | Dist. (mi) | ADT[a] 1,8 hr | Max 1,8 hr | Dist. (mi) | Capacity | | | |
| Federal | X[b] | X | X | 3 | X | X | .25 | X | X | X | X |
| Region I | | | | | | | | | | | |
| Connecticut | | | | | | | | | | | X |
| New Hampshire | | | X | | | | | | | | X |
| Maine | | | | | | | | | | | X |
| Region II | | | | | | | | | | | |
| New York | | | | | | | | | | | X |
| Region III | | | | | | | | | | | |
| Virginia | | | | | | | | | | | c |
| West Virginia | | X | | | | | | | | X | X |
| Region IV | | | | | | | | | | | |
| Alabama | | | | | | | | | | | X |
| Florida | | | | | | | | | | | X |
| Kentucky | | | X | | X | X | | | | | X |
| North Carolina | | | | | | | | | | | c |
| Region V | | | | | | | | | | | |
| Minnesota | X | X | X | 3 | X | X | .25 | X | X | X | X |
| Wisconsin | | X | | | | | | | | X | X |

Table A.4. Airport Data Required by State Indirect Source Review Regulations (Cont)

| Jurisdiction | Operations per day | | Expected Development | | Traffic Volume | | | | Mass Transit | Passenger Loadings | General Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avg | Max | Description | Dist (mi) | ADT[a] 1,8 hr | Max 1,8 hr | Dist (mi) | Capacity | | | |
| Region VII | | | | | | | | | | | |
| Nebraska | | | | | | | | | | | X |
| Region IX | | | | | | | | | | | |
| Nevada | X | X | X | 3 | X | X | .25 | X | X | X | X |
| Region X | | | | | | | | | | | |
| Idaho | | | | | | | | | | | c |
| Oregon | X | X | X | 3 | d | d | .25 | d | X | X | X |
| Puget Sound | | | | | | | | | | | c |

[a]Average Daily Traffic

[b]An 'X' indicates that data or description is required.

[c]Application form supplied by administering agency.

[d]General description of the change in traffic patterns.

Table A.5. Highway Data Required by State Indirect Source Review Regulations

| Jurisdiction | Volume: Average 1,8,24 hr. | Volume: Maximum 1,8,24 hr. | Speeds miles/hr. | Capacity vehicles/day | Right-of-way description | Other |
|---|---|---|---|---|---|---|
| | vehicles/time period | vehicles/time period | | | | |
| Federal | X | X | X | X | | |
| Region I | | | | | | |
| Connecticut | | | | | | General info. |
| New Hampshire | X | X | X | | | |
| Maine | | | | | | |
| Region II | | | | | | |
| New York | | | | | | General info. |
| Region III | | | | | | |
| Virginia | | | | | | General info. |
| West Virginia | | | | | | General info. |
| Region IV | | | | | | |
| Alabama | | | | | | General info. |
| Florida | | | | | | General info. |
| Kentucky | | | | | | General info. |
| North Carolina | | | | | | General info. |
| Region V | | | | | | |
| Minnesota | X | X | X | X | X | |
| Wisconsin | | | X | X | X | Peak hour volume, ADT |

Table A.5. Highway Data Required by State Indirect Source Review Regulations (Cont)

| Jurisdiction | Volume: Average 1,8,24 hr. vehicles/time period | Volume: Maximum 1,8,24 hr. vehicles/time period | Speeds miles/hr. | Capacity vehicles/day | Right-of-way description | Other |
|---|---|---|---|---|---|---|
| Region VII | | | | | | |
| Nebraska | | | | | | General info. |
| Region IX | | | | | | |
| Nevada | X | X | X | X | X | |
| Region X | | | | | | |
| Idaho | | | | | | General info. |
| Oregon | X | X | X | | X | Impact on other modes |
| Puget Sound | | | | | | General info. |

Table A.6. Conditions Requiring Disapproval of a Permit Application under Indirect Source Review Regulations

| Jurisdiction | Violation of Applicable Ambient Standards | Air Quality Degradation | Violation of Other Applicable Regulations |
|---|---|---|---|
| Federal | CO | | X |
| Region I | | | |
| Connecticut | Any | X | X |
| New Hampshire | Any | X | |
| Maine | | | X |
| Region II | | | |
| New York | CO, Ox, $NO_2$ | | X |
| Region III | | | |
| Virginia | CO | | |
| West Virginia | Any | | |
| Region IV | | | |
| Alabama | Any | | X |
| Florida | Any | | |
| Kentucky | Any | | X |
| North Carolina | Any | | X |
| Region V | | | |
| Minnesota | CO | | X |
| Wisconsin | CO | | X |
| Region VII | | | |
| Nebraska | Any | | |
| Region IX | | | |
| Nevada | Any | | X |
| Region X | | | |
| Idaho | Any | | X |
| Oregon | Any | | |
| Puget Sound | CO | X | |

Table A.7. Implementation of State Indirect Source Review Regulations [a]

| Jurisdiction | Estimated Number of Projects Reviewed [b] | Types of Projects Reviewed | Personpower (Person-years) |
|---|---|---|---|
| Region I | | | |
| Connecticut | 16 | Highways, shopping malls, race tracks | 4 [c] |
| Region II | | | |
| New York | 10 | Shopping centers, office buildings, highways | 1 |
| Region III | | | |
| Virginia | 16 | Highways, shopping centers | <1 |
| Region IV | | | |
| Florida | 300 | Highways, parking garages | 8 |
| Kentucky | 40 | Not available | 1 |
| North Carolina | 15 | Highways, parking related projects | 1 |
| Region V | | | |
| Wisconsin | 25 | Highways, parking garages | 1 |
| Minnesota | 25 | Highways, parking related projects | 1/4 |
| Region IX | | | |
| Nevada | 12 | Resort hotels, highways | <1 |
| Region X | | | |
| Oregon | 75 | Highways, shopping centers | <1 |
| Puget Sound | 19 | Shopping centers, highways | 2 |

[a] Nebraska's regulation is not included as no permits have been issued.

[b] Since the regulation was enacted.

[c] Number of staff; also have environmental impact statement responsibilities.

Table A.8. Agencies Administering State Indirect Source Review Regulations

| State | Administering Agency |
|---|---|
| Region I | |
| Connecticut | Air Compliance Section<br>Department of Environmental Protection<br>State Office Building<br>Hartford, Connecticut 06115 |
| New Hampshire | New Hampshire Air Pollution Control Agency<br>61 S. Spring Street<br>Concord, New Hampshire 03301 |
| Maine | Department of Environmental Protection<br>Augusta, Maine 04330 |
| Region II | |
| New York | New York Department of Environmental Conservation<br>50 Wolf Road<br>Albany, New York 12205 |
| Region III | |
| Virginia | State Air Pollution Control Board<br>Room 1106<br>Ninth Street Office Building<br>Richmond, Virginia 23219 |
| West Virginia | West Virginia Air Pollution Control Commission<br>1558 Washington Street, E.<br>Charleston, West Virginia 25311 |
| Region IV | |
| Alabama | Air Pollution Control Commisaion<br>State Office Building<br>Montgomery, Alabama 36104 |
| Florida | Department of Pollution Control<br>Tallahassee Bank Building<br>Suite 300, 315 S. Calhoun Street<br>Tallahassee, Florida 32301 |
| Kentucky | Department for Natural Resources and Environmental Protection<br>Division of Air Pollution Control<br>275 East Main Street<br>Frankfort, Kentucky 40601 |
| North Carolina | Department of Natural and Economic Resources<br>P.O. Box 27048<br>Raleigh, North Carolina 27611 |

Table A.8. Agencies Administering State Indirect Source Review Regulations (Cont)

| State | Administering Agency |
|---|---|
| Region V | |
| Minnesota | Minnesota Pollution Control Agency<br>717 Delaware St., S.E.<br>Minneapolis, Minnesota 55440 |
| Wisconsin | Division of Environmental Protection<br>Department of Natural Resources<br>P.O. Box 450<br>Madison, Wisconsin 53701 |
| Region VII | |
| Nebraska | Department of Environmental Control<br>Box 94653 State House Station<br>Lincoln, Nebraska 68509 |
| Region IX | |
| Nevada | Commission of Environmental Protection<br>201 S. Fall Street<br>Carson City, Nevada 89701 |
| Region X | |
| Idaho | Department of Environmental and Community Services<br>Statehouse<br>Boise, Idaho 83720 |
| Oregon | Department of Environmental Quality<br>1234 S.W. Morrison Street<br>Portland, Oregon 97205 |
| Puget Sound | Puget Sound Air Pollution Control Authority<br>410 W. Harrison Street<br>P.O. Box 9863<br>Seattle, Washington 98109 |

# APPENDIX B

## Detailed Summary of Proposed Airport Construction Projects, 1977-87

Table B.1. Airport Activity Proposed for 1977-1987

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Change in Airport Size Due to Project, 1977-1987: Annual Operations (000) | Air Quality Control Region (AQCR) | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| | Region II | | | | | | |
| NA | Stewart Airport<br>Newburgh, NY<br>- Eastern | New airport | 8.000 | 168 | 161 | AQCR | Yes |
| | Region III | | | | | | |
| 14 | International<br>Philadelphia, PA<br>- Eastern | Terminal expansion<br>Parking facilities<br>3 runway extensions | 6.624 | 65 | 45 | Statewide AQMA | No |
| 15 | Greater Pittsburgh<br>Pittsburgh, PA<br>- Eastern | New terminal<br>New parking areas | 6.598 | 80 | 197 | Statewide AQMA | No |
| 39 | Dulles International<br>Washington, DC<br>- Eastern | Terminal expansion | 2.250 | 3 | 47 | AQCR AQMA | No |
| | Region IV | | | | | | |
| 33 | McCoy AFB<br>Orlando, FL<br>- Southern | New 10,000' runway<br>Terminal addition | 2.662 | 28 | 48 | None | Yes |
| 24 | International<br>Tampa, FL<br>- Southern | Runway extension<br>from 8700' to 9000' | 4.528 | 44 | 52 | AQMA | Yes |

Table B.1. (Cont.)

| FY 1974 Rank[a] | Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| | EPA Region | | | | | | |
| 31 | Hollywood Int'l<br>Ft. Lauderdale, FL<br>- Southern | New terminal | 2.948 | 29 | 50 | None | Yes |
| 2 | Hartsfield/Atlanta Int'l<br>Atlanta, GA<br>- Southern | New 8-26 runway<br>Extend runway 9-27 | 21.828 | 184 | 56 | AQCR | No |
| 36 | Greater Cincinnati<br>Covington, KY<br>- Southern | New runway<br>Runway extension from 8200' to 9000' | 2.456 | 36 | 79 | County AQMA | Yes |
| 42 | Douglas Municipal<br>Charlotte, NC<br>- Southern | New runway<br>New terminal | 2.094 | 28 | 167 | County | Yes |
| | Region V | | | | | | |
| 21 | Hopkins<br>Cleveland, OH<br>- Great Lakes | New runway | 5.182 | 55 | 174 | Statewide | No |
| 46 | Port Columbus<br>Columbus, OH<br>- Great Lakes | Terminal expansion | 1.836 | 24 | 176 | Statewide | No |

Table B.1. (Cont.)

| FY 1974 Rank[a] | Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Change in Airport Size Due to Project, 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant[b] Problem (area) | State Review |
|---|---|---|---|---|---|---|---|
| | EPA Region | | | | | | |
| 38 | Weir-Cook Indianapolis, IN - Great Lakes | New 12,000' runway | 2.278 | 72 | 80 | Statewide AQMA | No |
| 41 | Gen. Mitchell Milwaukee, WI - Great Lakes | Terminal expansion | 2.110 | 33 | 239 | Statewide AQMA | Yes |
| 18 | Minneapolis-St. Paul International Minneapolis, MN - Great Lakes | Runway extension of 2200' Terminal expansion Parking facilities | 5.998 | 53 | 131 | Statewide | Yes |
| 12 | Metro Wayne Detroit, MI - Great Lakes | New 10,500' runway | 3.649 | 72 | 123 | Statewide | No |
| | Region VI | | | | | | |
| 26 | International New Orleans, LA - Southwest | Access road | 4.116 | 39 | 106 | AQCR | No |
| 19 | Regional Airport Dallas/Ft. Worth, TX - Southwest | Construct 2 new runways Extend runway | 10.642 | 125 | 215 | AQMA | No |

Table B.1. (Cont.)

| FY 1974 Rank[a] | Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due Due to Project, 1977-1987: Million Annual Passengers | Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| | EPA Region | | | | | | |
| 44 | International<br>San Antonio, TX<br>- Southwest | Extend runway 3-21 to 8300'<br>Access road | 1.956 | 21 | 217 | AQMA | No |
| 20 | Houston Intercontinental<br>Houston, TX<br>- Southwest | New 12,000' runway<br>2 extensions from 9400' to 12,000'<br>Terminal expansion | 2.786 | 49 | 216 | AQMA | No |
| | Region VII | | | | | | |
| 28 | International<br>Kansas City, MO<br>- Central | N-S runway | 4.286 | 52 | 94 | None | No |
| 17 | Lambert-St. Louis International<br>St. Louis, MO<br>- Central | New airport | 7.820 | 83 | 70 | AQCR<br>AQMA | No |
| | Region VIII | | | | | | |
| 35 | International<br>Salt Lake City, UT<br>- Rocky Mountain | Runway extension from 10,000' to 12,100' | 2.464 | 26 | 220 | None | No |
| | Region IX | | | | | | |
| 27 | International<br>San Diego, CA<br>- Western | Terminal expansion | 3.896 | 32 | 29 | AQCR<br>AQMA | No |

Table B.1. (Cont.)

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| 5 | International San Francisco, CA - Western | Terminal expansion | 14.220 | 124 | 30 | AQCR AQMA | No |
| 45 | Municipal San Jose, CA - Western | Terminal expansion | 1.876 | 23 | 30 | AQCR AQMA | No |
| 3 | International Los Angeles, CA - Western | Addition of new terminal satellite | 21.278 | 131 | 24 | AQCR AQMA | No |
| 40 | Metro Oakland International Oakland, CA - Western | Terminal expansion | 2.174 | 31 | 30 | AQCR AQMA | No |
| 29 | Sky Harbor Municipal Phoenix, AZ - Western | Runway extension New runway Terminal expansion | 3.650 | 39 | 15 | SMSA AQMA | No |
| 11 | Honolulu Int'l Honolulu, HI - Pacific | New 12,000' runway Expand terminal and parking | 7.838 | 50 | 60 | None | No |
| | Region X | | | | | | |
| 22 | Tacoma-Seattle Seattle, WA - Northwest | Parking facility | 5.138 | 48 | 229 | None | Yes |

[a] Rank for FY74 with respect to enplaned passengers, published by FAA.

[b] AQMA indicates that the airport is in an Air Quality Maintenance Area designated for oxidants; other entries indicate the area covered by a SIP revision, for oxidants, required for 1977 or 1978.

Table B.2. Airport Activity: Growth in Place

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Airport Growth 1977-1987: Million Annual Passengers | Airport Growth 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|
| | Region I | | | | | |
| 43 | Bradley International<br>Windsor Locks, CT<br>- New England | 2.080 | 27 | 42 | Statewide<br>AQMA | Yes |
| 9 | Boston-Logan Int'l<br>Boston, MA<br>- New England | 9.858 | 90 | 119 | Statewide<br>AQMA | No |
| | Region II | | | | | |
| 16 | International<br>Newark, NJ<br>- Eastern | 6.090 | 58 | 43 | AQCR<br>AQMA | No |
| 37 | Greater Buffalo Int'l<br>Buffalo, NY<br>- Eastern | 2.432 | 33 | 162 | AQCR | Yes |
| 4 | Kennedy International<br>New York, NY<br>- Eastern | 18.380 | 126 | 43 | AQCR<br>AQMA | Yes |
| 6 | LaGuardia<br>New York, NY<br>- Eastern | 12.676 | 93 | 43 | AQCR<br>AQMA | Yes |
| 25 | Puerto Rico Int'l<br>San Juan, PR<br>- Southern | 4.182 | 24 | 244 | None | No |

Table B.2. (Cont.)

| FY 1974[a] Rank | Airport City, State - FAA Region | Airport Growth 1977-1987: Million Annual Passengers | Airport Growth 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|
| | **Region III** | | | | | |
| 34 | Baltimore Washington Int'l<br>Baltimore, MD<br>- Eastern | 2.194 | 31 | 115 | Statewide AQMA | No |
| 8 | National<br>Washington, DC<br>- Eastern | 6.432 | 1 | 47 | AQCR AQMA | No |
| | **Region IV** | | | | | |
| 30 | Memphis International<br>Memphis, TN<br>- Southern | 3.500 | 47 | 18 | None | No |
| 7 | International<br>Miami, FL<br>- Southern | 11.174 | 101 | 50 | None | Yes |
| | **Region V** | | | | | |
| 1 | O'Hare International<br>Chicago, IL<br>- Great Lakes | 30.066 | 24 | 67 | Statewide AQMA | No |
| | **Region VIII** | | | | | |
| 10 | Stapleton International<br>Denver, CO<br>- Rocky Mountain | 9.486 | 90 | 36 | AQMA | No |

Table B.2. (Cont.)

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Airport Growth 1977-1987: Million Annual Passengers | Airport Growth 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|
| | Region IX | | | | | |
| 23 | McCarran Int'l Las Vegas, NV - Western | 5.080 | 45 | 13 | AQMA | Yes |

[a] Rank for FY74 with respect to enplaned passengers, published by FAA.

[b] AQMA indicates that the airport is in an Air Quality Maintenance Area designated for oxidants; other entries indicate the area covered by a SIP revision, for oxidants, required for 1977 or 1978.

Table B.3. Proposed Air Carrier Airport Construction Projects Included Under Alternative Size Criteria

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Change in Airport Size Due to Project, 1977-1987: Annual Operations (000) | Air Quality Control Region (AQCR) | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| | Region III | | | | | | |
| 59 | Norfolk Regional<br>Norfolk, VA<br>- Eastern | Runway extension | 1.300 | 16[d] | 223 | Statewide | Yes |
| | Region IV | | | | | | |
| 50 | Metropolitan<br>Nashville, TN<br>- Southern | Runway extension<br>New terminal | 1.472[c] | 24 | 208 | Metro. Area | No |
| 47 | Standiford Field<br>Louisville, KY<br>- Southern | Runway extension from 7800' to 9000' | 1.582[c] | 26 | 78 | County | Yes |
| 66 | Birmingham Municipal<br>Birmingham, AL<br>- Southern | Runway extension to 6500' | 1.076 | 18[d] | 4 | None | Yes |
| | Region V | | | | | | |
| 53 | James M. Cox<br>Dayton, OH<br>- Great Lakes | Cargo expansion<br>New runway | 1.428[c] | 25 | 173 | Statewide | No |

Table B.3. (Cont.)

| FY 1974 Rank[a] | Airport City, State - FAA Region | Proposed Project | Change in Airport Size Due to Project, 1977-1987: Million Annual Passengers | Change in Airport Size Due to Project, 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|---|
| | EPA Region | | | | | | |
| | Region VI | | | | | | |
| 64 | Tulsa International Tulsa, OK - Southwest | Runway extension Parking lot | 1.136 | 19[d] | 186 | AQMA AQCR | No |
| | Region IX | | | | | | |
| 49 | Kahului/Maui Kahului, HI - Pacific | Terminal expansion | 1.574[c] | 16[d] | 60 | None | No |
| 52 | Sacramento Metropolitan Sacramento, CA - Western | New runway | 1.456[c] | 14 | 28 | AQCR AQMA | No |

[a]Rank for FY74 with respect to enplaned passengers, published by FAA.

[b]AQMA indicates that the airport is in an Air Quality Maintenance Area designated for oxidants; other entries indicate the area covered by a SIP revision, for oxidants, required for 1977 or 1978.

[c]Passenger growth over 1.3 million

[d]Operations grow to 50,000

Table B.4. Proposed Air Carrier Airport Growth in Place Included Under Alternative Size Criteria

| FY 1974 Rank[a] | EPA Region / Airport City, State - FAA Region | Airport Growth 1977-1987: Million Annual Passengers | Airport Growth 1977-1987: Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|
| | Region II | | | | | |
| 51 | Rochester Monroe<br>Rochester, NY<br>- Eastern | 1.464[c] | 20 | 160 | AQCR | Yes |
| 58 | Hancock<br>Syracuse, NY<br>- Eastern | 1.316[c] | 15[d] | 158 | None | Yes |
| | Region IV | | | | | |
| 48 | International<br>Jacksonville, FL<br>- Southern | 1.584[c] | 18[d] | 49 | Study Underway | Yes |
| 62 | Palm Beach International<br>West Palm Beach, FL<br>- Southern | 1.218 | 15[d] | 50 | None | Yes |
| | Region VI | | | | | |
| 55 | Albequerque International<br>Albequerque, NM<br>- Southwest | 1.402[c] | 19[d] | 152 | AQMA | No |
| 57 | Will Rogers World<br>Oklahoma City, OK<br>- Southwest | 1.328[c] | 21 | 184 | AQMA<br>AQCR | No |

Table B.4. (Cont.)

| FY 1974 Rank[a] | EPA Region<br>Airport<br>City, State<br>- FAA Region | Airport Growth 1977-1987<br>Million Annual Passengers | Annual Operations (000) | Air Quality Control Region | Oxidant Problem[b] (area) | State Review |
|---|---|---|---|---|---|---|
| | Region VII | | | | | |
| 56 | Eppley<br>Omaha, NB<br>- Central | 1.390[c] | 19[d] | 85 | None | Yes |
| | Region IX | | | | | |
| 54 | Hollywood-Burbank<br>Burbank, CA<br>- Western | 1.414[c] | 13 | 24 | AQMA<br>AQCR | No |
| 60 | Orange County<br>Santa Ana, CA<br>- Western | 1.304[c] | 12 | 24 | AQMA<br>AQCR | No |

[a]Rank for FY74 with respect to enplaned passengers, published by FAA.

[b]AQMA indicates that the airport is in an Air Quality Maintenance Area designated for oxidants; other entries indicate the area covered by a SIP revision, for oxidants, required for 1977 or 1978.

[c]Passenger growth over 1.3 million

[d]Operations grow to 50,000

REFERENCES

1. Federal Register, July 9, 1974, pp. 25292 - 25301.

2. Connecticut Administrative Regulation, Department of Environmental Protection. Abatement of Air pollution in Environment Reporter, p. 331: 501.

3. Ibid.

4. Terminal Area Forecasts, 1977-1987, U.S. Department of Transportation, FAA, Office of Aviation Policy, FAA-AVP-76-5, Washington, D.C., January, 1976.

5. U.S. FAA headquarters, regional and district office personnel, personal communications, summer, 1976.

6. U.S. EPA regional office personnel, personal communications, summer, 1976.

7. Airport planning commissions, personal communications, summer, 1976.

8. M. Sherman, P. Brown, L. Conley, M. Senew, R. Cirillo, "The Air Pollution Strategy Resource Estimator, Volume II Methodology Report", Argonne National Laboratory, Report to U.S. EPA, Argonne, IL, January, 1977.

DRAFT

## ACKNOWLEDGMENTS

We would like to express our thanks to the U.S. EPA-OTLUP staff for their technical and organizational assistance in this study. Several people at the North Carolina branch of EPA, including J. A. Tikvart and D. Sanchez, have also been of assistance because of their careful reviews of early memoranda. Several EPA Regional Office staffs, especially those of Regions II and V, have assisted at several stages in this work, giving us data on airports and information on other contacts. FAA Great Lakes Region was invaluable for obtaining copies of the forecast activity at airports and helping to develop the technique for identifying airports likely to have construction projects in the next ten years.

Most important, we thank Toni Baltas for her patient and accurate typing of this report.