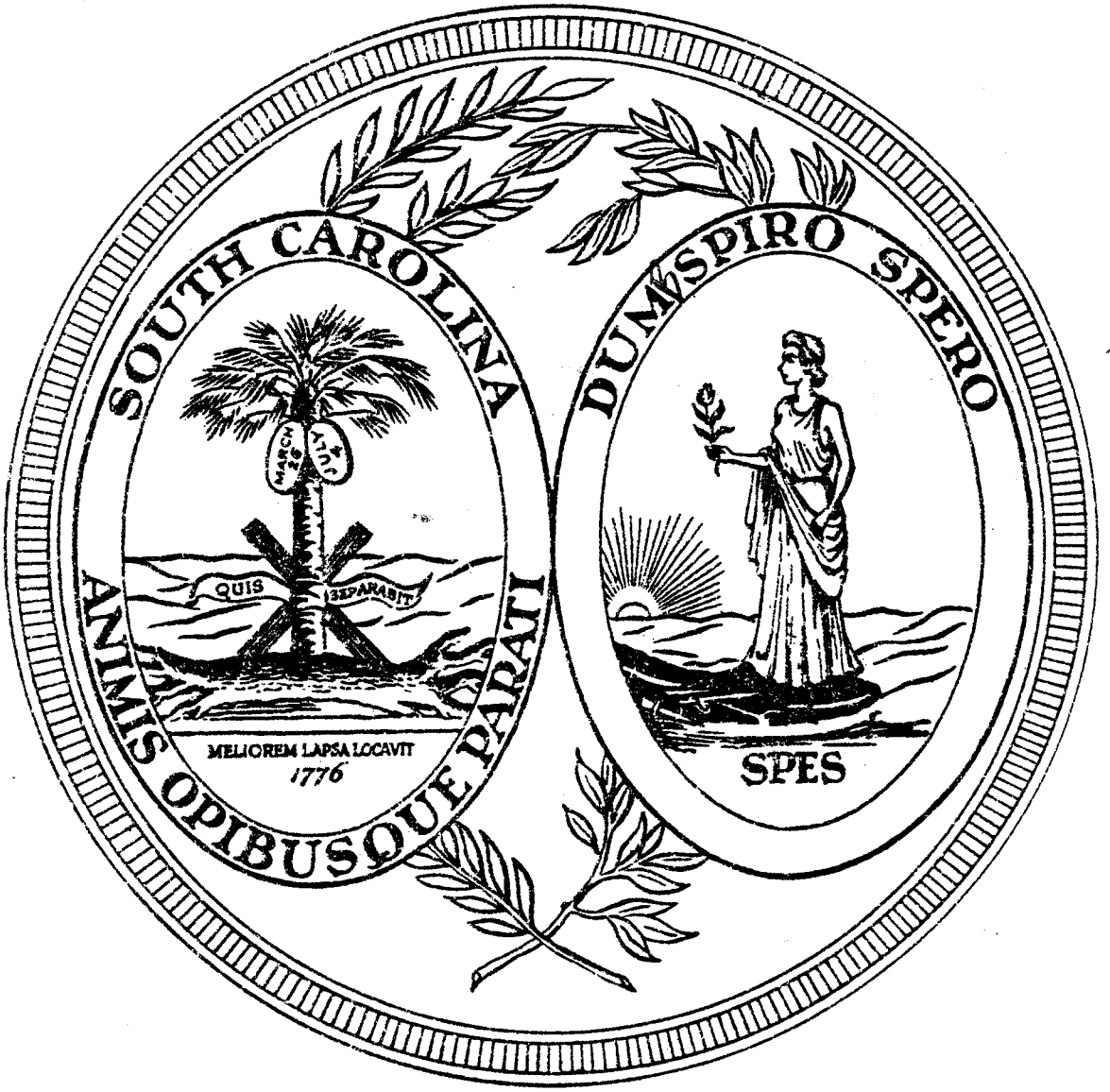
# SOUTH CAROLINA

# AIR QUALITY IMPLEMENTATION PLAN




SOUTH CAROLINA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL CONTROL

# AIR QUALITY IMPLEMENTATION PLAN

STATE OF SOUTH CAROLINA

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South Carolina Department of Health and Environmental Control

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# INTRODUCTION

## Background

South Carolina's Air Quality Implementation Plan was originally developed in late 1971, and approved by EPA in May, 1972, according to the mandates of the 1970 Amendments to the Clean Air Act. Its purpose has been to serve as a blueprint and timetable to the state in its quest for attainment and maintenance of the five national ambient air quality standards. These standards were to be attained by July, 1975. It has accomplished its purpose,for the most part, although new problems not addressed by the original plan have surfaced.

Three small areas in South Carolina have stubbornly resisted attainment of the total suspended particulate (TSP) standard, while a newly recognized and a growing problem with photochemical oxidants ($O_x$) is being seen at the three monitoring sites operated by the Department of Health and Environmental Control. Additionally, minor contraventions of the carbon monoxide (CO) standard have occurred occasionally at two sites. Obviously additional measures are needed to bring about the necessary reductions.

Congress saw the need for mid-course corrections to programs for achieving acceptable air quality. South Carolina's problems are matched or exceeded in virtually every state in our country. The 1977 Amendments to the Clean Air Act were passed in August, 1977 to provide the necessary basis for these corrections.

This is presented as a major revision to the South Carolina Air Quality Implementation Plan, responding to the requirements of the new legislation to tighten up existing controls and to enter new areas of control as required to assure not only the attainment of standards, but their maintenance, as well.

Part D of the Clean Air Act as amended requires that plans for those areas of a state not having attained the oxidant or carbon monoxide standards must contain provisions for transportation control measures, in addition to stationary source controls. If the state is unable to demonstrate attainment by December 31, 1982, despite the application of all reasonably available measures, it may obtain an extension up to December 31, 1987, provided the plan contains among other features a specific schedule for implementation of a motor vehicle emission control inspection and maintenance program. Such is the case in South Carolina's two major urban areas of Columbia and Charleston.

Section 174 of Part D also requires that local governments be involved in planning of transportation control measures. Accordingly, in the Columbia area, the Central Midlands Regional Planning Council has been appointed as the agency responsible for transportation measures for air quality improvements, while the Berkeley-Charleston-Dorchester Planning Council will do the same for the Charleston area. Those plans, while adopted separately, will accompany this plan, for completeness and ready reference. Additionally, the South Carolina Department of Highways and Public Transportation is responsible for the vehicle inspection and maintenance planning and implementation features of the overall state plan, and that portion will also be presented with this.

Monitoring of air quality continues to be necessary to determine if the plan is working or if additional revisions are necessary. One section of the plan describes the comprehensive methods and network system to perform this function.

During periods of adverse meteorology, a preconceived plan of action which will prevent a dangerous build-up of pollutants must be devised. Such is included in the plan. Actions to be taken to avoid visibility restrictions are also included, as well as emergency monitoring in the event of chemical fires and other catastrophes.

The successful conduct of an air pollution control program depends to a large extent upon the ability to prevent pollution before it gets started. This plan provides a description of the permit system to be used in doing just that, to the extent that such is possible.

Regulations and standards require that tests be performed to determine whether the regulations and standards are being met. A description of the methods and procedures to be used is contained in that section dealing with source evaluation.

Another section shows the resources determined to be necessary to carry out the provisions of the plan. Any such projection is limited in its accuracy beyond a short time span and even then cannot take into account unforeseen developments. By any measure, however, it can be seen that the resource demands are considerable.

Much of the plan is based on detailed data which is furnished in an appendix. This appendix will not receive wide circulation and is, hence, printed as a separate document. However, it can be made available to anyone having a specific interest in its contents, which includes tabular data, laws, regulations, agency policies and similar material.

No plan of this scope and complexity can escape the need for revisions from time to time. Consequently, such revisions will be made to reflect changes in national standards, improved technology, additional criteria, laws or state and national policies. Even at this writing additional requirements are under consideration which may result in revisions in the immediate future. Under any circumstances the process of revision will be performed in accordance with the provisions of 40 CFR 51.6.

## LEGAL AUTHORITY

No plan for attaining a goal, the attainment of which is dependent upon regulatory action, can be used with any degree of effectiveness unless the legal framework is strong. Consequently, the Requirements for Preparation, Adoption, and Submittal of Implementation Plans, 40 CFR51, as amended, define the necessary statuatory powers which must be immediately available to states to carry out the responsibilities to the Clean Air Act.

40 CFR51.11 (a) sets forth six specific requirements for state authority. The South Carolina Pollution Control Act, Act 1157 of 1970, as amended, hereinafter referred to as Act 1157, provides the State's Authority to respond to these requirements. The Attorney General of the State of South Carolina has given an opinion as to the adequacy of South Carolina laws, as follows:

| Legal Authority Required 40 CFR51 | Adequacy of S.C. Law | S.C. Statutes Involved |
|---|---|---|
| (1) "Adopt emission standards and limitations..." | Adequate | Act 1157, Sec. 2,Sec. 8, Sec. 10. |
| (2) "Enforce applicable laws, regulations, and standards, and seek injunctive relief." | Adequate | Act 1157, Sec. 9, Paras. (1), (3), (4), (5), Sec. 24, Sec. 27, Sec. 28, Sec. 35. |
| (3) "Abate pollutant emissions on an emergency basis... comparable to the Administrator under Section 303 of the Act." | Adequate | Act 1157, Sec. 32. |
| (4) "Prevent construction, modification... where emissions will prevent attainment or maintenance of a national standard." | Adequate | Act 1157, Sec. 9, Para. (5), Sec. 14, Sec. 15. |

| Legal Authority Required 40CFR51 | Adequacy of S.C. Law | S.C. Statutes Involved |
|---|---|---|
| (5) "Obtain information necessary to determine whether air pollution sources are in compliance..., including authority to require record keeping and to make inspections and conduct tests of air pollution sources." | Adequate | Act 1157,Sec.9, Paras. (10), (20), (22), & (23.1). |
| (6) "Require owners or operators of stationary sources to install, maintain and use emission monitoring devices and to make periodic reports to the state...; also to make such data available to the public..." | Adequate | Act 1157,Sec. 9, Paras. (20) and (22), Sec. 30. |

The Criteria for Approval of 1979 SIP revisions, published in the Federal Register for May 19, 1978 at page 21673 requires that necessary legal authority for inspection and maintenance of motor vehicles be obtained by June 30, 1979. Plans are currently underway to seek the introduction and passage of the statutory authority to conduct such a program.

PUBLIC HEARINGS

The South Carolina Pollution Control Act provides for prior notice and public hearings prior to action by the Board of Health and Environmental Control concerning adoption of regulations and standards, adoption or modification of final compliance dates, and other specified legal actions.

Additionally, Act 176 of 1977 enacted by the South Carolina General Assembly requires, among other things, that at least thirty days public notice be given before adoption, amendment or repeal of any rule. It also requires that the substance of the intended action or a description of the subjects and issues involved be made known. While this act escapes the actual requirement for a

public hearing in each case, the two Acts taken together do impose the requirement of a thirty days' notice public hearing, assuring compliance with the requirements of 40 CFR 51.4 as amended.

PUBLIC AVAILABILITY OF INFORMATION

The South Carolina Pollution Control Act provides for the public availability of any records, report or information obtained under the provisions of the Act. However, upon a showing satisfactory to the Department that records, reports or information, other than effluent or emission data, if made public would divulge methods or processes entitled to protection as trade secrets of the source, the Department shall consider such data confidential.

All source data are kept on file at the offices of the Bureau of Air Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina and are available to the public at this location, Monday through Friday, between the hours of 8:30 a.m. and 5:00 p.m. Such data are retained in the Permit, Source Test, and Emission Inventory Files.

The files contain information as to the source emissions, and these emissions are depicted in comparison to the applicable emission standards or limitations as stated in the Air Pollution Control Regulations and Standards for the State of South Carolina.

# INTERGOVERNMENTAL COOPERATION

## INTERSTATE

The matter of interstate intergovernmental cooperation in the instances of Interstate Air Quality Control Regions has taken the form of the exchange of necessary information between the South Carolina Department of Health and Environmental Control and the North Carolina Department of Natural and Economic Resources in the case of the Metropolitan Charlotte Air Quality Control Region, and the Georgia Department of Natural Resources' Air Quality Control Section in the cases of the Augusta-Aiken Interstate Air Quality Control Region and the Savannah-Beaufort Interstate Air Quality Control Region. To date, these accomplishments have been effected by exchanges of letters, telephone conferences and meetings between members of the respective technical staffs.

Letters have also been exchanged between all parties pledging all types of cooperation and the willingness to furnish all requested data. Plans have it that South Carolina will send, routinely, ambient air quality data, new source information, changes in standards and regulations, and other pertinent knowledge unless specifically requested to not do so.

Nowhere in this plan is the need for interstate cooperation more necessary than during air pollution episodes. Such has been planned and pledged, and the South Carolina Air Pollution Episode Operations Manual describes in detail the method of accomplishing this.

## PREVENTION OF SIGNIFICANT DETERIORATION

The requirements for prevention of significant deterioration now in effect make it necessary for adjoining states to share the incremental

increase of TSP and $SO_2$ allowed under Part C of the Clean Air Act. In addition to the close co-operation stated above, South Carolina will observe all of the interstate coordinations required under Section 126 of the Clean Air Act.

The Bureau of Air Quality Control also maintains liaison with the State Department of Highways and Public Transportation, Regional Planning Councils, Councils of Government, and other State and local agencies as necessary to formulate Environmental Impact Statements, Air Quality Maintenance Plans and similar air quality plans of statewide impact and interest. In this connection, the following statement is made:

CONSULTATION AND PLANNING

In order to comply with the requirements of Section 174 of the Clean Air Act Amendments of 1977 and to ensure the active participation of affected state agencies and local elected officials, a series of conferences and forums were conducted during January and February, 1978. These meetings were held in order to explain the impact of a non-attainment designation, discuss State Implementation Plan revision requirements, and solicit the cooperation and assistance of other state agencies and local elected officials in the plan development and implementation. All conferences and forums were arranged and chaired by the Office of the Governor of South Carolina.

On January 12, 1978, a conference was held between the Governor, members of the Governor's staff, and representatives of the Department of Health and Environmental Control, the Department of Highways and Public Transportation, the State Development Board, the Energy Management Office, and the State Ports Authority. Attendees were briefed on the content and impact of the Clean Air Act Amendments and plans were developed to involve local elected officials in the planning process.

On January 16, 1978, a preliminary conference was held between representatives of the Governor's office, the Department of Health and Environmental Control, the Rock Hill Mayor, the Rock Hill City Manager, the York County Planning Commission and the Catawba Regional Planning Council concerning the non-attainment designation of York County.

On January 17, 1978, a preliminary conference was held between representatives of the Governor's office, the Department of Health and Environmental Control, Richland and Lexington Counties, the Central Midlands Regional Planning Council, and the cities of Columbia, Lexington and Cayce. The attendees were briefed on the impact of the non-attainment designation of Richland and Lexington Counties.

On January 20, 1978, a preliminary conference was held with representatives of the Governor's office, the Department of Health and Environmental Control, the Berkeley, Charleston, Dorchester Regional Planning Council, Charleston County, and North Charleston. The attendees were briefed on the impact of the non-attainment designation of Charleston and Berkeley Counties.

On February 23, 1978, a planning conference was held, in the Governor's office, between the Governor's staff and representatives of the Department of Health and Environmental Control, the Department of Highways and Public Transportation, the State Development Board, and Richland, Lexington, Charleston, Berkeley and York Counties. This meeting was to provide a final briefing on the non-attainment status of the affected counties, and to discuss the forums to be held in each area.

On February 23, 24, and 28, 1978, forums were held in the cities of Columbia, Charleston, and York respectively. Representatives of all affected city and county governments were invited, and the meetings were open to the public. All attendees were briefed on the non-attainment designation impact, the Clean Air Act requirements, and the State Implementation Plan revision requirements. Local elected officials were invited, and encouraged to participate in the planning and implementation of necessary controls to attain standards for carbon monoxide and photochemical oxidants in their respective areas.

On March 30, 1978, after continued coordination and consultation with state and local officials, and after joint resolutions of the affected local governments, the Governor made the following designations: (see Appendix I).

Not in 5 submittal

DISTRICT OFFICES

The State is divided into 12 districts to assist in the administration of the air quality control program. The counties included in each district are depicted in Figure 3-1. Not

# CONTROL STRATEGY

The essence of implementation planning is the formulation of effective control strategies. A complete control strategy includes a survey of the State's existing air quality, a detailed inventory of emissions from all pollution sources, control measures that must be taken to achieve and maintain air quality standards and a timetable for compliance with the control measures.

This Control Strategy section is presented in two parts; Part I, Pre-1979 Control Strategy Development, and; Part II, 1979 Control Strategy Development.

## PART I

## Pre-1979 Control Strategy Development

The pre-1979 control strategies presented in this part represent the combined efforts of the State of South Carolina, the Environmental Protection Agency, and TRW Systems Group. The goal of the strategies was to provide the basis for regulations that will reduce source emissions to levels that allow ambient air quality to meet national secondary standards and, at the same time, minimize the technical and economic burden to all concerned.

The state agency submitted to the EPA Administrator through the Atlanta Region IV office, an implementation plan as required by the Clean Air Act in January, 1972. This plan contained a section such as this entitled Control Strategy which was based on computations performed by the TRW group. After extensive review and modification by both the

State of South Carolina Pollution Control Authority and EPA the results as presented previously were considered incorrect. With considerable effort and consultation concerning the data base of the previous study, errors were corrected in certain point source parameters and significant revision to the control strategy for both particulates and sulfur oxides were made. Revisions and final results were presented in August, 1972, in replacement of the former control strategy section submitted January 30, 1972, to EPA.

After the submission in August, 1972, of the revised control strategy, it was determined that the control strategies as applied to $SO_2$ emissions were unnecessarily restrictive in some cases. More accurate $SO_2$ emission estimates were made through a comprehensive emissions inventory visitation program conducted by the Department of Health and Environmental Control.

In addition to this, ambient air quality data for $SO_2$ used in the original control strategy development were based on measuring methods ($PbO_2$ Cylinder Method) which are no longer in use by the State of South Carolina. It has been shown that this method reported $SO_2$ ambient air quality levels 3 to 4½ times greater than those actually present, as shown below:

TABLE: Comparison in Sulfur Dioxide Levels - Two Methods
North Charleston Fire Station

| | $SO_2$ Estimate by Sulfation Rate(ppm,avg) | $SO_2$ West-Gaeke(ppm,avg) |
|---|---|---|
| February, 1971 | 0.024 | 0.008 |
| March, 1971 | 0.022 | 0.005 |
| May, 1971 | 0.066 | 0.015 |

For these reasons, it was felt that a further revision to the control strategy for $SO_2$ was necessary. Pertinent regulations, as presented in the January, 1974, submission, are now applicable to this control strategy section and are sufficient to produce attainment of national standards as shown in this section.

The State of South Carolina is divided into ten air quality control regions. Two regions, Charleston and Greenville-Spartanburg, were selected as example regions on the basis of pollutant measurement, industrial development, and population. The Charleston metropolitan area and the Greenville-Spartanburg area were selected as example regions for sulfur dioxide, and the Greenville-Spartanburg area for particulates. The example regions are areas that require the maximum control efforts in South Carolina to reach desired air quality levels. If a strategy can meet air standards in these regions, the same strategy will allow attainment of these standards statewide when applied to all other regions. In support of this conclusion, reference is made to NEDS Point Source Report by Counties and County Emission Summaries, on file in EPA, Region IV, Office of Air Programs. These show that the source densities and sulfur dioxide emissions are greatest in these areas.

The various control strategies considered were tested using the Air Quality Display Model (AQDM) program and the Federal Register proportional model to determine if they were adequate to meet national ambient air quality standards. Descriptions of the pre-1979 Charleston and Greenville-Spartanburg strategies attempted and the resulting air quality are presented in Appendix C. Additional studies to determine the

effects of $SO_2$ emissions from all power plants in the State of South Carolina were made by the application of a 24-hour Power Plant Model which was performed by EPA, Region IV, personnel. The results of this model will be briefly described later in this chapter.

PARTICULATE STRATEGY TESTING

The formulated control strategies for particulates were tested in the Greenville-Spartanburg AQCR using a proportional calculation as described in CFR 51.13 (e) (2), December 23, 1971. The results of the particulate testing will be discussed here.

PARTICULATE STRATEGY FORMULATIONS

Control strategy formulation for the example region was based mainly on limiting particulate emissions from process industries, fuel burning equipment and incinerators. Strategies that would require conformance by residential and area sources were ruled out because of the difficulty in enforcement and in determining adequacy using the testing techniques. The detailed data base required to prove adequacy of strategies based on specific area source reductions does not exist. As a result, strategies that limit emissions from processes or fuel burning without regard to size, are conservative because their adequacy is proved only by emission reduction in major point sources when, in fact, many of the area sources will also be reduced by the application of the appropriate regulations.

PARTICULATE EMISSIONS FROM PROCESS INDUSTRIES

The most effective method of limiting particulate emissions from process industries, is with a regulation which restricts emission rates as a function of process weight. The main reasons the process weight regulation is effective are as follows:

1) It removes dilutions and stack height as a factor in meeting emission standards.

2) It allows for more equitable restrictions between various size industries.

3) It is more direct without confusion since it applies to many industrial types.

The process weight regulation was developed by the Los Angeles County Air Pollution Control District from a study of many industries located there. Well-controlled and operated plants served as a basis for determining the degree of control that is technically and economically feasible. The Los Angeles process weight curve formed an envelope above these industries to a maximum allowable emissions limitation of 40 pounds per hour. The Los Angeles curve is shown in Figure 4-1 as Curve 1. Other regions have made studies comparable to that of Los Angeles County for industries under their respective jurisdictions with close results. The process weight curve which has been considered by most states is Curve II, developed for the San Francisco area. States considering this curve are those which have relatively low population and industrial densities. These states have found that this slightly less restrictive regulation satisfies their present requirements and still gives margin for growth.

The EPA has suggested a process weight regulation curve (Curve III) derived from all these studies as a potential strategy. It is the most restrictive regulation of all those displayed. However, essentially all the well-controlled industrial plants can technically meet its limitations.

Uncontrolled emissions rates for industries in the Charleston and Greenville-Spartanburg regions are plotted in Figure 4-1. Curve IV was arbitrarily drawn so as to bound most of the industries from below.

PARTICULATE EMISSIONS FROM FUEL BURNING EQUIPMENT

A well-known method for limiting particulate emissions from fuel burning equipment is with a regulation which restricts emissions as a function of plant heat capacity. Control strategies were developed using this approach.

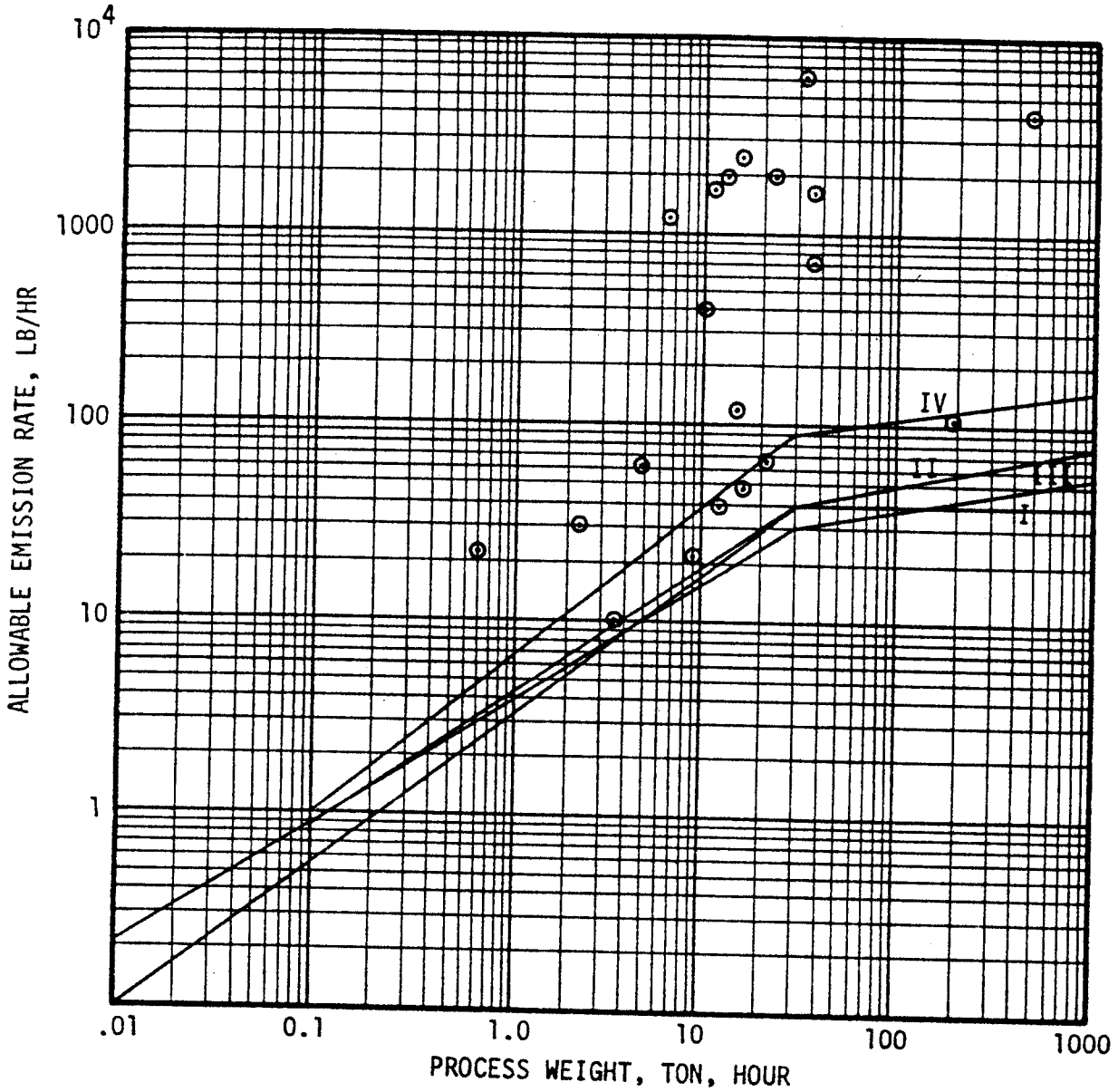



FIGURE 4-1. PROCESS INDUSTRY STRATEGY CURVES

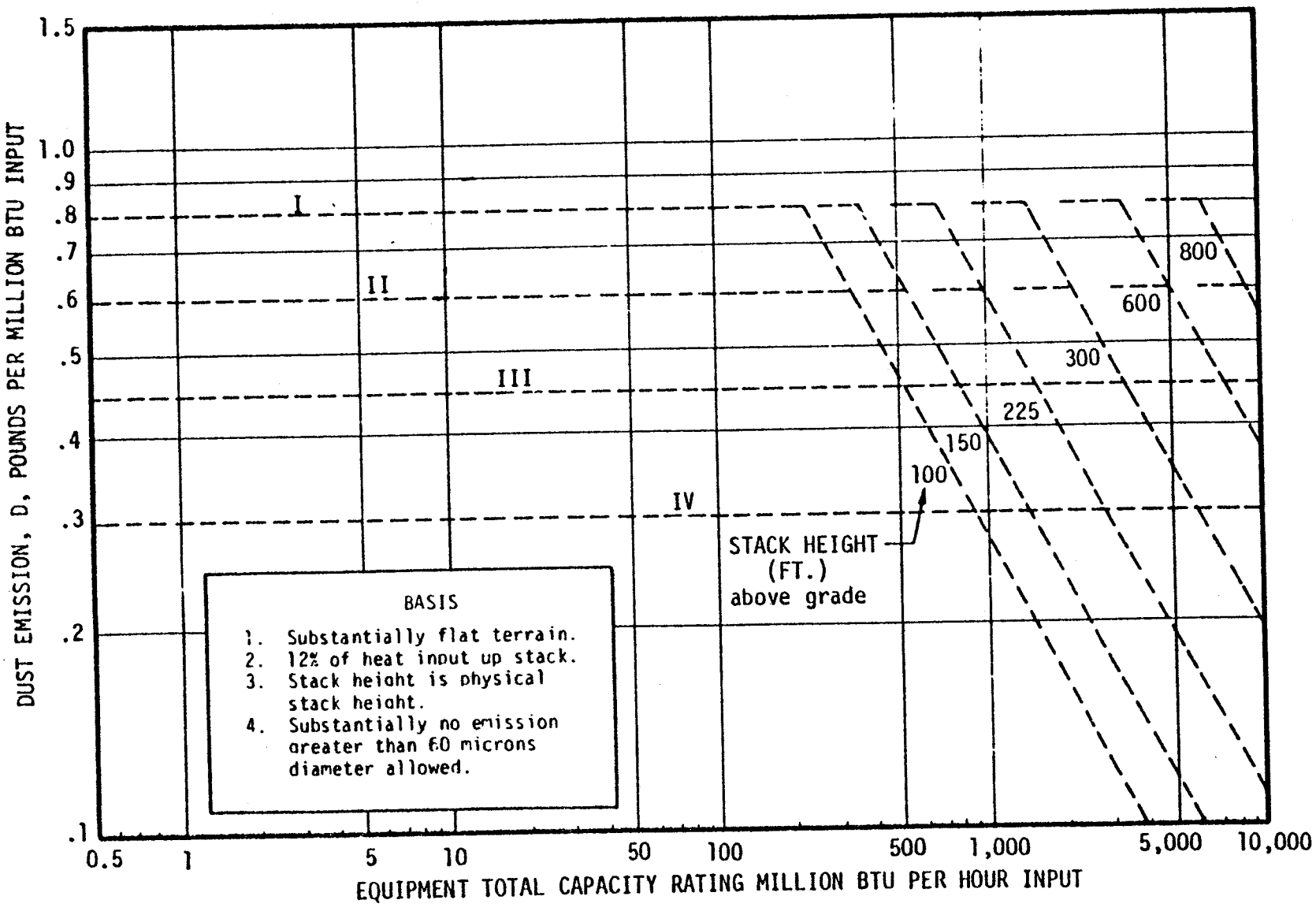



FIGURE 4-2. PARTICULATE EMISSIONS FOR FUEL BURNING OPERATIONS

The control strategies for limiting emissions from fuel burning operations are shown in Figure 4-2. Curve II is presently being implemented by the South Carolina Department of Health and Environmental Control. Curve IV is for reasonable maximum control (when employing both the dry filter and wet impingers of the full EPA sampling train) and is taken from the Federal Register. Curve III is an intermediate strategy between the South Carolina Curve II and EPA Curve IV.

Each of the above strategies except Curve IV were tested in conjunction with the process weight type strategies.

PARTICULATE EMISSIONS FROM INCINERATORS

There are no major incinerator operations in either of the example regions, nor in the entire State, therefore, strategies for incineration were not tested. However, the South Carolina Department of Health and Environmental Control requires that all incinerators limit particulate emissions in flue gas discharged to the environment to 0.50 pounds per million BTU's input to the incinerator, exclusive of auxiliary fuel.

OTHER PARTICULATE EMISSIONS STRATEGIES

Some industries, which are technically process industries, have characteristics that require special regulations because of the nature of their process. Open mining and gravel pits are examples of these. The Department of Health and Environmental Control has tested regulations for these industries based either on maximum technology available to control emissions or on enforcement techniques available to ensure regulation compliance. These regulations are enumerated in Standard No. 5 of Appendix I and in Table 4-1.

Strategies based on these regulations were tested in conjunction with the other source type strategies.

REGION 202, GREENVILLE-SPARTANBURG

The Greenville-Spartanburg area was divided into a grid network as shown

in Figure 4-3. The area sources were divided into 114 grid sectors, the size depending upon the area source strength. The emission rates for each of these grids are listed in Appendix C. The source data were taken from the Emission Inventory Computer Printout, Appendix C.

GREENVILLE-SPARTANBURG PARTICULATE CONTROL STRATEGY RESULTS

Utilizing the proportional model as described in 40 CFR 51.13(e)(2), a rollback was performed on the highest hi-vol sampler in Region 202. From Table 4-3 the value was 112.3 ug/$m^3$ in 1970. Total emissions for the region can be broken down into area source contributions as found in Appendix C and point source emissions also listed in Appendix C. From Table 4-2, the total point source emissions in 1970 were 282.9 tons/day. Total area source emissions in 1970 were 24.3 tons/day. It was assumed that no area source reduction in emissions could be assumed but rather an increase due to growth can be expected. Therefore, present decrease in air quality was attributed to point source reductions. Background concentration in this area was considered to be 30 ug/$m^3$. Accordingly, the percent reduction required to achieve the secondary national ambient air quality standard of 60 ug/$m^3$ is 63.5 percent.

The proportional calculations show that, using Standard 2, Section I, in conjunction with Standard 5 on process industries, a 77.7 percent reduction in total emissions is obtained. A comfortable margin of 14 percent remains to cover industrial growth and expansion in this region.

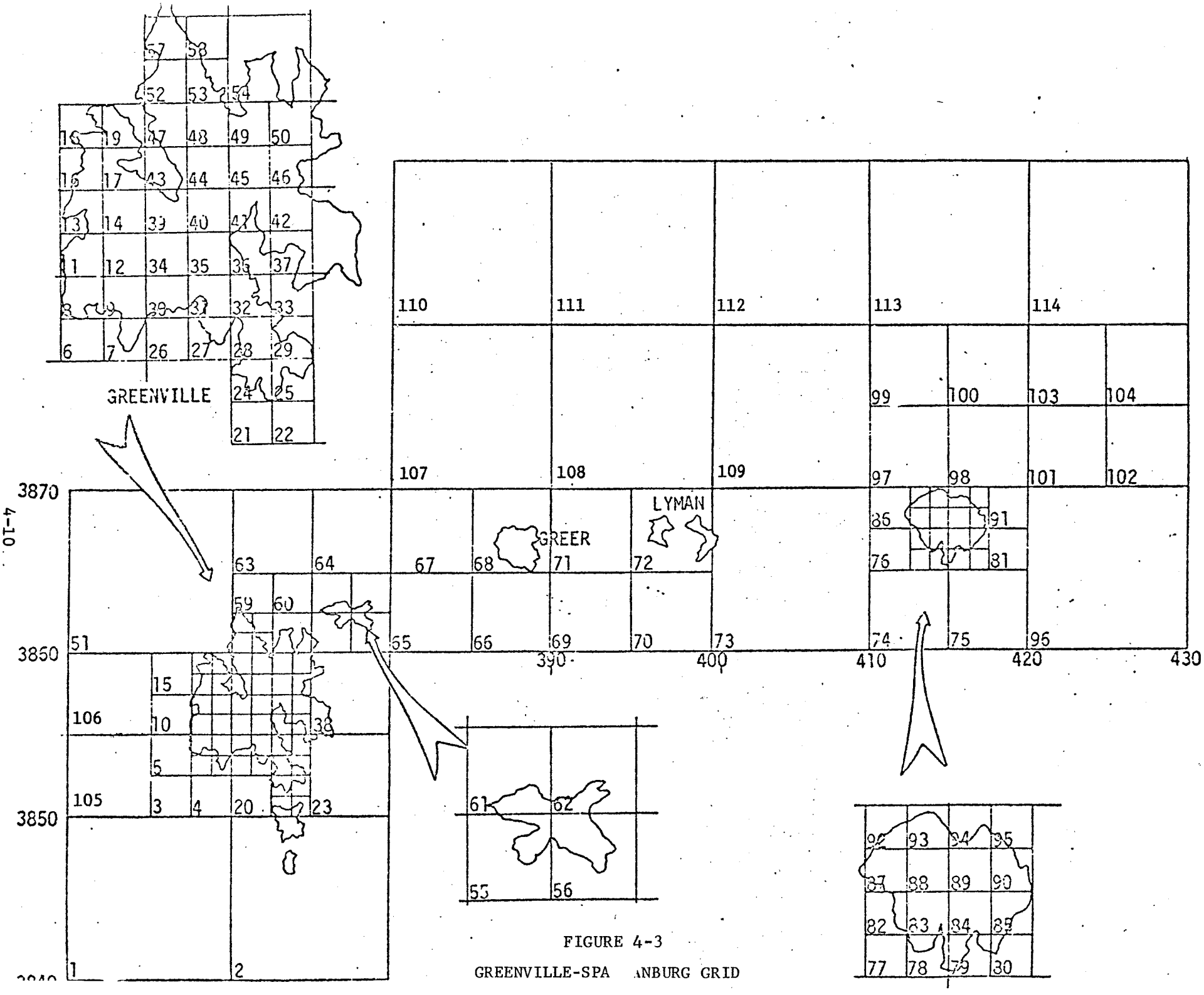



FIGURE 4-3

GREENVILLE-SPA ANBURG GRID

TABLE 4-1

PARTICULATES STRATEGY SUMMARY

Strategy 1

a. Particulate emissions from fuel burning sources limited to 0.45 lb/per million BTU fuel heating value as in Fig. 4-2.
b. Particulate emissions from processes limited to curve II of Figure 4-1.

Strategy 2

a. Particulate emissions from fuel burning sources limited to 0.60 lb/per million BTU fuel heating value as in Figure 4-2
b. Particulate emissions from processes to curve II of Figure 4-1.

Strategy 3

a. Particulate emissions from fuel burning sources limited to 0.45 lb/per million BTU fuel heating value as in Figure 4-2
b. Particulate emissions from processes other than quarry or gravel operations limited to curve II of Figure 4-1
c. Particulate emissions from quarry and gravel operations limited to the following:
   1. 50 percent of storage pile emissions
   2. 5 percent of crushing and screening emissions
   3. 15 percent of handling emissions

Strategy 4

a. Particulate emissions from fuel burning sources limited to 0.60 lb/per million BTU fuel heating value as in Figure 4-2
b. Particulate emissions from processes other than quarry or gravel operations limited to curve II of Figure 4-1.
c. Particulate emissions from quarry and gravel operations limited to the following:
   1. 50 percent of storage pile emissions
   2. 5 percent of crushing and screening emissions
   3. 15 percent of handling emissions

TABLE 4-2

PARTICULATE EMISSIONS SUMMARY TONS/DAY

GREENVILLE-SPARTANBURG AQCR

| STRATEGY | AREA SOURCES | POINT SOURCES |
|---|---|---|
| 1970 | 24.3 | 282.9 |
| #1 | 29.0 | 35.1 |
| #2 | 29.0 | 39.5 |
| #3 | 29.0 | 27.9 |
| #4 | 29.0 | 32.2 |

TABLE 4-3. GREENVILLE-SPARTANBURG AIR QUALITY DATA

| Pollutant | Sample Location | Sample Interval (months) | Start Date | End Date | Number Samples | Max 24 hr. | Annual Arith. Mean | Standard Deviation | Annual Geometric Mean | Geo. Std. Dev. |
|---|---|---|---|---|---|---|---|---|---|---|
| Particulate | N 3819.0 E 348.3 | 12 | 700115 | 701207 | 18 | 413.2 | 131.5 | 88.5 | 112.3 | 1.72 |
| | N 3867.6 E 413.8 | 11 | 700202 | 701228 | 23 | 160.2 | 103.2 | 37.1 | 96.0 | 1.46 |
| | N 3857.5 E 372.5 | 12 | 700104 | 701229 | 50 | 188.5 | 82.9 | 37.3 | 74.6 | 1.59 |
| | N 3844.6 E 384.8 | 12 | 700104 | 701229 | 52 | 79.5 | 51.6 | 16.2 | 48.9 | 1.41 |
| | N 3866.7 E 387.8 | 12 | 700104 | 701229 | 52 | 158.7 | 69.3 | 12.5 | 54.9 | 1.72 |
| | N 3859.3 E 370.3 | 12 | 700104 | 701229 | 53 | 238.3 | 76.4 | 37.5 | 69.1 | 1.57 |
| | N 3859.7 E 377.0 | 12 | 700104 | 701229 | 53 | 80.1 | 44.8 | 14.6 | 42.5 | 1.39 |
| | N 3880.1 E 375.9 | 12 | 700104 | 701229 | 49 | 87.0 | 34.6 | 16.4 | 31.0 | 1.60 |
| $SO_2$ | N 3857.5 E 372.5 | 12 | 730104 | 731230 | 60 | 36.0 | 5.0 | | 3.0 | 2.75 |
| | N 3844.6 E384.8 | 12 | 730104 | 731230 | 61 | 39.0 | 5.0 | | 3.0 | 2.75 |
| | N3857.8 E 371.1 | 12 | 730104 | 731220 | 61 | 62.0 | 6.0 | | 4.0 | 2.46 |
| | N 3880.1 E 371.1 | 12 | 730104 | 731220 | 61 | 14.0 | 3.0 | | 3.0 | 1.00 |
| | N 3859.7 E 377.0 | 12 | 730104 | 731220 | 60 | 6.0 | 3.0 | | 3.0 | 1.00 |
| | N 3861.4 E 344.0 | 12 | 730104 | 731220 | 61 | 18.0 | 3.0 | | 3.0 | 1.00 |
| | N 3866.7 E 387.8 | 12 | 730104 | 731220 | 61 | 64.0 | 7.0 | | 4.0 | 2.88 |
| | N 3867.6 E 413.8 | 12 | 730128 | 731220 | 57 | 67.0 | 9.0 | | 4.0 | 3.57 |

## CONCLUSIONS FROM PARTICULATE STRATEGY TESTING

Table 4-4 summarizes the results of application of each strategy listed in Table 4-1 and Figure 4-1. Strategy 2 is adequate to achieve a 77.7 percent reduction in particulate emissions. Standard 2, Section I and Standard 5 effecting this strategy can be found in Appendix I.

TABLE 4-4

PROPORTIONAL MODELLING

RESULTS - GREENVILLE-SPARTANBURG

| STRATEGY | % REDUCTION OBTAINED | PROJECTED REGION EMISSIONS T/D |
|---|---|---|
| 1. | 79.1 | 64.1 |
| 2. | 77.7 | 68.5 |
| 3. | 81.5 | 56.9 |
| 4. | 80.0 | 61.2 |

## AMENDMENT TO PARTICULATE CONTROL STRATEGY

This amendment to the Particulate Control Strategy has been added to comply with control strategy requirements as they relate to a revision in an emission regulation.

Regulation 62.6, Standard No. 2 (previously Regulation 2.6, Standard No. 2) was revised on December 14, 1976, in order to comply with a judicial ruling concerning Section 110 (a) (2) (b) of the Clean Air Act. This ruling requires primary reliance on "emission limitations" to attain the National Ambient Air Quality Standards rather than dispersion enhancement techniques such as stack height emission factors. This strategy is intended to demonstrate that the revision will not interfere with the attainment or maintenance of the NAAQS. The stack height particulate emission factors which were eliminated were applicable to fuel burning operations of 250 mm BTU/hr or greater heat input. Demonstration of continuing attainment and maintenance of the NAAQS required an analysis of the effects on air quality resulting from the change in emissions for affected facilities.

Table I is a list of affected facilities including their mm BTU/hr heat input, stack height, allowable particulate emission rate and emissions in lbs/hr under the previous and present regulations. The net increase or decrease for each facility is also listed.

There are 5 facilities indicated in Table I where allowable emissions increased due to the elimination of the stack height factor from the regulation. Two facilities (International Paper in Georgetown and the Hagood Plant in Charleston) have been restricted by permit conditions to emit no more than the previous emission limit due to particulate attainment problems in Georgetown and Charleston.

Modelling results from the modelling effort for the $SO_2$ emission revision (page 4-18) for 4 of the 5 facilities which were allowed increases were used for Table II. The predicted maximum $SO_2$ concentrations were converted to particulate concentrations by the following equation:

$$\frac{SO_2 \text{ Max Concentration } (ug/m^3)}{SO_2 \text{ Emission Rate (lbs/mmBTU)}} = \frac{\text{Part. Max Concentration } (ug/m^3)}{\text{Part. Emission Rate (lbs/mmBTU)}}$$

The resulting maximum particulate concentrations are listed in Table II.

Using a background of 25 $ug/m^3$, the maximum predicted 24-hour particulate concentration of 114 $ug/m^3$ is still below the secondary ambient air quality standard.

The remaining facility allowing an increase was the South Carolina Industries plant which was allowed an additional 10 lb/hr. This amounts to an increase of 1.5% over the previous allowable rate. Due to the isolated location of the plant, the attainment of standards in the area, and the insignificant increase in the allowable rate, an independent air quality analysis of this facility was not performed.

Table I
Allowable Emissions

| | mmBTU/hr | St. Ht. | Previous lbs/mmBTU | Previous lbs/hr | Present lbs/mmBTU | Present lbs/hr |
|---|---|---|---|---|---|---|
| Urquhart | 820 | (200) | .59 | 484 | .6 | 492 |
| | 820 | (200) | .59 | 484 | .6 | 492 |
| | 1100 | (200) | .48 | 528 | .6 | 660 |
| | | | | 1496 | | 1644 |
| | Net Increase of 148 lbs/hr | | | | | |
| Robinson | 1677 | (250) | .5 | 839 | .515 | 864 |
| | Net Increase of 25 lbs/hr | | | | | |
| Lee | 1107 | (213) | .48 | 531 | .6 | 664 |
| | 1107 | (213) | .48 | 531 | .6 | 664 |
| | 1048 | (213) | .42 | 692 | .52 | 857 |
| | | | | 1754 | | 2185 |
| | Net Increase of 431 lbs/hr | | | | | |
| Canadys | 1161 | (200) | .46 | 534 | .6 | 697 |
| | 1161 | (200) | .46 | 534 | .6 | 697 |
| | 1692 | (200) | .46 | 778 | .51 | 863 |
| | | | | 1846 | | 2257 |
| | Net Increase of 411 lbs/hr | | | | | |
| International Paper | 1314 | (250) | .58 | 762 | Permitted at Previous Rate | |
| | 342.8 | (250) | .60 | 206 | | |
| | | | | 868 | | |
| Hagood | 1327 | (125) | .44 | 584 | Permitted at Previous Rate | |
| | | | | 584 | | |
| Wateree | 2880 | (300) | .49 | 1411 | .37 | 1066 |
| | 2880 | (300) | .49 | 1411 | .37 | 1066 |
| | | | | 2822 | | 2132 |
| | Net Decrease of 690 lbs/hr | | | | | |
| Williams | 5250 | (400) | .38 | 1995 | .22 | 1155 |
| | Net Decrease of 840 lbs/hr | | | | | |
| S.C. Industries | 501 | (138) | .58 | 291 | .6 | 301 |
| | 413 | (125) | .60 | 372 | .6 | 372 |
| | | | | 663 | | 673 |
| | Net Increase of 10 lbs/hr | | | | | |
| Winyah | 2660 | (400) | .6 | 1596 | .385 | 1024 |
| | 2772 | (400) | .1 | 277 | .1 | 277 |
| | | | | 1873 | | 1301 |
| | Net Decrease of 572 lb/hr | | | | | |



(12/14/76)

Table I
(continued)

| | |
|---|---|
| Overall increases total | 1025 lb/hr |
| decreases total | 2102 lb/hr |
| Statewide Decreases of | 1077 lb/hr |

Table II
Maximum Predicted Concentrations

| | Background ($ug/m^3$) | 24-Hour Concentrations ($ug/m^3$) | Total $ug/m^3$ |
|---|---|---|---|
| Urquhart | 25.0 | 88.7 | 113.7 |
| Robinson | 25.0 | 10.6 | 35.6 |
| Lee | 25.0 | 85.8 | 110.8 |
| Canadys | 25.0 | 37.5 | 62.5 |

SULFUR DIOXIDE EMISSIONS

Standards for control of $SO_2$ are usually formulated on an industry-by-industry basis. Fuel-burning operations represent the largest single source of $SO_2$, consequently, these operations have been given the most attention. Standards take the form of either a limitation on the allowable sulfur content of the fuel burned, or a limitation on the pounds of sulfur dioxide which can be emitted per million BTU's of heat input value of fuel. The latter Standard allows flue gas desulfurization, whereas, the former guarantees air quality by its nature. The availability of low sulfur fuels being limited, the latter standard is preferable.

Strategies were developed based on the limitation of sulfur dioxide emissions per million BTU's input and are discussed in this section. These strategies were applied using mathematical diffusion modelling techniques. These techniques are as follows:

1) 24-hour Power Plant Model
2) Air Quality Display Model

A brief description of the diffusion modelling methodology used is included in this section and it should be noted that the control strategies were developed in accordance with the requirements given in sections 420.13 and 420.14 of the August 14, 1971, Federal Register (republished in November 25, 1971, Federal Register as 51.13 and 51.14).

STRATEGY I

24-Hour Power Plant Model

I. Model Description

All power plants in the State of South Carolina were evaluated by using the 24-hour Power Plant Model, by personnel of the EPA, Region IV. This model is used to estimate concentrations due to sources at a single location for averaging times of 1 hours, 24 hours, and 1 year, with emphasis on the 24-hour value.

The model is a Gaussian plume model using diffusion coefficients based on Turner (1970). Concentrations are estimated for each hour of the year based on the wind direction (in increments of ten degrees), wind speed, mixing height, and Pasquill stability class. For the 1-and-24-hour values, it is assumed that the pollutant does not "decay" significantly between the source and the receptors because of the short travel time involved. Also, decay depends on a number of meteorological variables and might well be insignificant when the meteorological conditions occur which lead to highest $SO_2$ concentrations.

Meteorological data for 1964 were used. The reasons for this choice are: (1) Data from earlier years did not have sufficient resolution in the wind direction, and (2) data from subsequent years are readily available on magnetic tape for every third hour only.

Mixing height data were obtained from the twice-a-day upper air observations made at the nearest upper air station. Hourly mixing heights were estimated by the model using the objective interpolation scheme.

To simulate the effect of elevated terrain in the vicinity of these plant sites, a ground-plane displacement procedure was used in the modelling analysis. This procedure consists of adjusting (decreasing) the effective height of the plant stacks by an amount equal to the difference in elevation between the plant site and the average surrounding terrain. This "reduced" stack height is input to the diffusion model described above.

Since only power plant operations were being modelled, it was not possible, in general, to calibrate the model using measured air quality data. The calculated values of concentration are considered to be reasonable estimates of anticipated concentrations using best available modelling techniques. Where interactions between power plants are significant, supplementary calculations are made to account for the impact of two or more facilities.

II. Source Data

Data for power plants were taken directly from the Federal Power Commission (FPC Form 67) and converted to the computer format required by the model. Base year data were obtained for 1971 operations, the latest year for which Form 67 was available.

Emission data input to the single-source model is based on average monthly operations for each month of the year. Of course, the level of power plant operations varies from day to day; however, the FPC data are only available on a monthly basis. A power plant could quite possibly operate at near maximum rated capacity for twenty-four hours, especially in an industrialized region. Such operations would not be apparent from the monthly data. If these operations were coincident with the days of highest predicted concentrations, the model's maximum predictions could be significantly low.

Therefore, modelling results are presented in this report for two situations, as follows:

Nominal Load Case - This presents maximum concentrations calculated by the model based upon average monthly emission rates.

Maximum Load Case - This case was calculated assuming the plant to be operating at 95 percent of rated capacity during the day. To allow for the case where a plant might operate above 95% capacity for short periods of time, a ten percent safety factor was added to the computed concentration.

Ground-level concentrations arising from nominal and maximum operating loads can be expected to differ due to the joint effect of changes in emission rates, with corresponding changes in stack gas exit velocity and temperature. The interaction of these factors can produce higher concentrations under either nominal or maximum load conditions. Modelling of both cases permits a reasonable estimate of the range of possible values and identification of the maximum concentration case. Regulation changes are based on this highest predicted concentration, whether from the nominal or maximum case.

III. Results Summary

A table is presented below summarizing the results of the 24-hour model, when applied to the power plants shown:

SOUTH CAROLINA 24-HR. EPA MODELLING RESULTS ($SO_2$)

| Plant | Stack Height (Meters) | | Background $SO_2$ $ug/m^3$ | Allowed Emissions Lbs. $SO_2/10^6$BTU | | | Projected Maxim. 24-hr Concentra. Strat. I($ugm/M^3$) |
|---|---|---|---|---|---|---|---|
| | Physical | Adjusted | | SIP Pres | Strat I | 24-Hr Model | |
| Canadys | 61 | 61 | 25 | 2.3 | 3.5 | 5.1 | 257 |
| Grainger | 91.5 | 91.5 | 25 | 2.3 | 3.5 | >10 | 69 |
| Haygood | 38.1 | 38.1 | 25 | 2.3 | 2.3 | 6.2 | 97 |
| Jefferies | 91.5 | 91.5 | 25 | 2.3 | 3.5 | 4.5 | 314 |
| Lee | 65 | 55 | 25 | 2.3 | 2.3 | 2.24 | 372 |
| McMeekin | 76.2 | 33.5 | 25 | 2.3 | 3.5 | 3.4 | 376 |
| Robinson | 76.2 | 76.2 | 25 | 2.3 | 3.5 | >10 | 97 |
| Urquhart | 61.0 | 30.5 | 25 | 2.3 | 2.3 | 2.3 | 356 |
| Wateree | 91.5 | 91.5 | 25 | 2.3 | 3.5 | >10 | 108 |
| Williams | 122 | 122 | 25 | 2.3 | 3.5 | >10 | 112 |

Included in this table are columns showing the allowed $SO_2$ emissions and the predicted maximum ground level concentrations, using proposed revisions to South Carolina's sulfur dioxide emission limits. These revisions have been adopted the Board of Health and Environmental Control, and are contained in Appendix I (Revised). The maximum ground level concentrations were calculated by simple ratio and proportion estimates and are adjusted to include background levels. A survey of existing ambient air quality throughout the State (Appendix H) indicates that a background level of 25 $\mu gm/M^3$ is appropriate.

IV. Terrain Factors

Review of U. S. Geogogical Survey Topographical Maps in the vicinity of each power plant reveals that, with the exceptions of Urquhart, McMeekin, and Lee Steam Plants, the terrain is essentially flat, or with such minor change in elevation as to warrant no stack height adjustments to account for these features. Some modifications appeared necessary in the three cases indicated however.

Urquhart - This plant is located at Beech Island, South Carolina, in the Savannah River valley, a few miles southeast of Augusta, Georgia. The valley characteristics plus the proximity to the fall-line provide topographical features warranting some stack height adjustments.

EPA, Region IV, personnel provided computer runs at three different stack heights, making no allowances for background. The results are shown:

| Stack Height Adjusted to ft. | Max. Predicted 24-hr. Concentration Using Present Fuels (2.6 $\#SO_2/10^6BTU$) $\mu gm/M^3$ | $\#SO_2/10^6BTU$ needed for |
|---|---|---|
| 50 | 685 | 1.4 |
| 120 | 295 | 3.2 |
| 200 | 122 | 7.8 |

Careful study of the topographical features of the terrain show that a

100 foot stack height adjustment (30.5 meters) is appropriate and reasonable. An interpolation between points on a plot of these points yields an allowed discharge of 2.6 lbs. of $SO_2$ per $10^6$BTU. Applying an allowance for a background of 25 $\mu gm/M^3$ of $SO_2$, the allowed discharge is 2.42 lbs. of $SO_2/10^6$BTU.

From this it is concluded that the short term sulfur dioxide standard can be met with the proposed revision of 2.3 lb. $SO_2/10^6$BTU.

McMeekin - McMeekin Plant is located approximately 10 miles northwest of Columbia, South Carolina, downslope behind Lake Murray Dam. The two stacks are each 200 feet, located at about elevation 250 feet above sea level. The dam itself is the dominant topographical feature which would require stack height adjustment, being 390 feet at one end.

Review of the maps indicate that this height is appropriate and reasonable. McMeekin was initially run with a stack height adjustment of 100 feet (i.e. an effective stack height of 150 feet). The maximum 24-hour concentration predicted by the model was 100 $ug/m^3$. Without allowing for background, McMeekin could burn 5.56% S coal (8.47 lbs $SO_2/10^6$BTU) and still meet the ambient standard of 365 $ug/m^3$.

McMeekin was re-run with a stack height adjustment of 150 feet (i.e. an effective stack height of 100 feet). The maximum 24-hour concentration predicted was 264 $ug/m^3$. Without allowing for background, McMeekin could burn 2.13% S coal (3.24 lbs. $SO_2/10^6$BTU) and still meet the standard.

| Effective Stack Height | #$SO_2/10^6$BTU Allowable |
|---|---|
| 150 ft. | 8.47 |
| 100 ft. | 3.24 |

Interpolation between these values for an effective stack height of 110 feet and allowing for a background of 25 $\mu gm/M^3$ permits a discharge of 3.4 lbs. of $SO_2/10^6$BTU. It is concluded that the proposed revision will allow attainment of the short term (24-hour) $SO_2$ standard of 365 $\mu gm/M^3$.

Lee Steam Station - The Lee Steam Plant is located in the Saluda River valley near Williamston, South Carolina, in the Piedmont section of the State. This area is typified by rolling hills which account for the need to make stack height adjustments. It is essentially rural in nature.

Lee was initially run by EPA - Region IV with no stack height adjustment. The maximum 24-hour concentration predicted by the model was 203.5 $\mu gm/M^3$. Without considering background, Lee could burn 1.98% S coal (3.2 lbs. $SO_2/10^6$BTU) and still meet the ambient standard.

Three additional runs were made for Lee Plant with stack height adjustments of 33 ft, 66 ft., and 100 ft. Results are tabulated below:

| Stack Ht. Adjustment (feet) | Effective Stack Hgt. (feet) | Max 24-Hr. per Model $ug/m^3$ | Background $ug/m^3$ | % S Allowable per Model (inc. background) | $\#SO_2/10^6$BTU Allow. per Model (inc. background) |
|---|---|---|---|---|---|
| 0 | 213 | 203.5 | 25 | 1.84 | 2.98 |
| 33 | 180 | 269.0 | 25 | 1.39 | 2.24 |
| 66 | 147 | 364.0 | 25 | 1.03 | 1.66 |
| 100 | 113 | 529.0 | 25 | 0.71 | 1.14 |

A comparison of the terrain elevations and predicted concentrations was used to select the appropriate stack height adjustment.

A maximum ground level 24-hour concentration of 269 $\mu gm.m^3$ was predicted at a receptor 2.3 km from the Lee Plant where a terrain adjustment of 10 meters (33 feet) applies. The background of 25 $\mu gm/M^3$ was estimated based on a review of all 24-hour samples covering the year 1973 (Appendix H).

To determine whether proposed state regulations would protect ambient standards based on modelling results, the following procedure was used to convert expected concentrations into allowable emission rates.

$$R_{(allowable)} = R_{(present)} \times \frac{S-B}{C}$$

where

$R_{(allowable)}$ = Emission Rate ($\#SO_2/10^6$BTU) which would not violate standards

$R_{(present)}$ = Emission Rate ($\#SO_2/10^6$BTU) under present conditions in which modelling is based

C = Maximum 24-hour concentration predicted by the model ($ug/m^3$)

S = Twenty-four hour short-term standard (365 $ug/m^3$)

B = Background at plant ($ug/m^3$)

$R_{(allowable)} = 1.78 \times \frac{365.25}{269}$

$R_{(allowable \text{ at Lee Plant})} = 2.24 \ \#SO_2/10^6 BTU$

VIII. Conclusions

Proposed regulations of 2.3 lbs $SO_2/10^6$BTU are adequate to maintain short-term ambient air standards for Lee Steam Plant.

AQDM MODEL CALIBRATION

Normally the AQDM computer model is calibrated for a specific region by requesting the model to calibrate the pollutant concentration at several specific locations. Statistical compensation data (best fit line slope, regression coefficient, statistical significance) is then generated for use with all subsequent computer modelling in that region to compensate for regional peculiarities not usually accounted for in the modelling. The most recent calibration data for the State of South Carolina was used in the control strategy development originally submitted on August 1, 1972, and indicated using a slope = 0.852, intercept = 0.0. However, as earlier indicated, this was based on ambient air quality data which was found to be inaccurate at best and 7½ to 10 times the actual $SO_2$ levels present. For this reason calibration was not attempted for the purposes of this AQDM Model. Instead, what is considered to be a conservative estimate of a slope = 0.50, intercept = 0.0 was used in both the Greenville-Spartanburg and Charleston example regions, based upon wide experience by others which shows the slope to range from 0.3 to 0.7.

The Air Quality Display Model (AQDM) is based on the work of Martin and Tikvart, the basic output being in the form of calculated long-term average pollutant concentrations at ground level. Concentrations for short periods (1 hour, 8 hours, etc.) are estimated by use of a statistical technique known

as Larsen's Transforms.

The downwind concentrations are calculated from a set of point and area sources on the basis of the Pasquill point source equation. Inherent in the model is the calculation of "plume rise" due to buoyancy, jetting of plume and other factors, resulting in an "effective stack height" when added to the physical stack height.

The meteorological factors influencing the ground-level concentrations are quite complex. For a source which emits at a constant rate the basic equation can be modified to yield estimates of long-term (annual or seasonal) average concentrations using stability wind rose data. This format tabulates the frequency of occurrence for each wind direction and wind speed class for the time period under consideration, being further subdivided according to atmospheric stability classes.

No further attempt has been to describe the mathematical methods employed by the AQDM Model due to the many intricacies involved. It should be noted however that the model program was developed by the Environmental Protection Agency and is maintained in the computer data banks of Optimum Systems Incorporated 5272 River Road, Bethesda, Maryland. The necessary data discussed throughout this section was imput and the results received through a medium-speed terminal maintained by the Department of Health and Environmental Control.

STRATEGY II - GREENVILLE-SPARTANBURG AQDM MODELLING

Due to the large size of the area concerned, three separate grid networks were used in the Greenville-Spartanburg region. It should be pointed out, however, that all sources of $SO_2$ emissions (not including area sources) and the same meteorological data were applied to each grid area. Each grid area will be described later in this section.

Sources of $SO_2$ emissions from individual sources were determined from a comprehensive emissions inventory visitation program conducted by the Department of Health and Environmental Control, the Greenville County Health Department

and the Spartanburg County Pollution Control Authority. A list of the sources used in each grid area along with their locations, stack parameters and present emission rates can be seen in Tables 4-5 through 4-7.

Emissions from sources used in this strategy attempt were calculated on an allowable emission rate of 3.5 $\#SO_2/10^6$BTU input as shown in Tables 4-5 through 4-7. It should be noted, however, that this value represents the maximum allowable emission rate and it is not expected that all of the concerned sources would operate under these conditions at any one time. It should also be noted that a rate of 3.5 $\#SO_2/10^6$BTU was also applied to the Lee Steam Station as a further effort to insure that ambient air quality in the Greenville-Spartanburg example region would not be jeopardized. (As previously mentioned, however, Lee Steam Station cannot be allowed to emit more than 2.3 $\#SO_2/10^6$BTU as a result of the 24-Hour Power Plant Model).

The meteorological data used in the analysis is presented in Appendix C. The data is based on a 5-year record of hourly observations at the Greenville-Spartanburg airport and was obtained through the U. S. Department of Commerce, Environmental Data Service. The data is a 480 unit frequency distribution matrix which combines the percentage frequencies of 16 wind directions, 6 wind speed classes and 6 atmospheric stability categories. The annual mean afternoon mixing layer height used in the analysis was 1550 meters. The ambient pressure used was 983 millibars. The average temperature used was 289°K.

The area sources for each grid area were divided into grid sectors, as shown in Figure 4-3, the size depending upon the area source strength. The emission rates for each grid sector in each grid area are listed in Appendix C. The origin of pollutants for area sources is space heating, fuel combustion in homes and businesses, industrial emissions too small to be included as point sources, etc. The source data used was taken from the Emissions Inventory Computer Printout (Appendix G).

Grid Map Sources

Table 4-5

| | NAME | ACCR NO. | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PARTICULATE | SO2 | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Abney Mills | 202 | 1200 | | | Textile | 366.5 | 3871.5 | 33.2 | 1.2 | 10.0 | 500 | 450 | 300 | 980 |
| 2 | Cone Mills - American Spinning | 202 | 1200 | 0005 | 01 | Textile | 371.0 | 3859.8 | 45.7 | 2.4 | 1.5 | 449 | 72 | 38 | 117 |
| 3 | Judson Mills | 202 | 1200 | 0028 | 01 | Textile | 369.5 | 3855.6 | 38.1 | 2.4 | 6.1 | 533 | 3 | 33 | 143 |
| 4 | Cone Mills - Union Bleachery | 202 | 1200 | 0009 | Total | Textile | 369.7 | 3860.8 | 23.8 | 1.8 | 4.7 | 455 | 51 | 472 | 1703 |
| 5 | J. P. Stevens - Duncan | 202 | 1200 | 0014 | Total | Textile | 369.6 | 3852.3 | 45.7 | 1.8 | 4.9 | 602 | 3 | 20 | 254 |
| 6 | W. R. Grace - Crosvec | 202 | 1200 | 0024 | Total | Plastic | 383.1 | 3845.7 | 22.8 | 0.6 | 1.7 | 505 | 4 | 27 | 242 |
| 7 | Mervich Pharmacal | 202 | 1200 | | | Drugs | 374.8 | 3844.4 | 18.9 | 0.9 | 3.1 | 477 | 2 | 29 | 225 |
| 8 | W. R. Grace - Zonolite | 202 | 1200 | | | Vermiculite | 368.4 | 3867.0 | 22.8 | 0.6 | 7.6 | 383 | 40 | 2 | 5 |
| 9 | LTV Electronics | 202 | 1200 | 0001 | Total | Aircraft | 374.2 | 3846.5 | 18.2 | 0.6 | 14.6 | 588 | 5 | 27 | 137 |
| 10 | Duke Power - Lee | 202 | 0200 | 0004 | Total | Utility | 365.5 | 3839.0 | 42.7 | 1.7 | 50.0 | 421 | 3315 | 13260 | 42,780 |
| 11 | J. P. Stevens - Monaghan | 202 | 1200 | 0015 | 01 | Textile | 369.7 | 3859.0 | 64.0 | 2.7 | 4.0 | 588 | 1 | 11 | 102 |
| 12 | Steel Heddle | 202 | 1200 | 0008 | Total | Textile Mach. | 375.7 | 3862.7 | 19.4 | 0.7 | 18.2 | 485 | 3 | 8 | 105 |
| 13 | Saco-Lowell | 202 | 1200 | 0002 | Total | Textile Mach. | 358.0 | 3855.0 | 14.6 | 1.1 | 9.2 | 488 | 0 | 28 | 216 |
| 14 | Mayley Mills | 202 | 1200 | 0029 | Total | Textile | 363.1 | 3876.5 | 21.3 | 0.9 | 8.5 | 505 | 4 | 36 | 248 |
| 15 | Fiber Industries | 202 | 1200 | 0025 | Total | Textile | 381.3 | 3853.9 | 18.3 | 1.2 | 14.8 | 533 | 31 | 271 | 1601 |
| 16 | Crown Metro | 202 | 1200 | | | Chemical | 374.8 | 3846.3 | 19.1 | 0.5 | 9.8 | 477 | 1 | 9 | 58 |
| 17 | J. P. Stevens - Victor | 202 | 1200 | 0006 | 01 | Textile | 389.0 | 3865.7 | 38.1 | 2.3 | 2.5 | 644 | 78 | 29 | 134 |
| 18 | Lyman Printing & Finishing | 202 | 2060 | 0018 | Total | Textile | 397.0 | 3868.0 | 66.5 | 3.1 | 7.9 | 410 | 32 | 292 | 3348 |
| 19 | J. P. Stevens - Riverine | 202 | 1200 | 0022 | Total | Textile | 382.6 | 3864.6 | 45.7 | 1.2 | 8.8 | 602 | 13 | 116 | 767 |
| 20 | Southern Wood Piedmont | 202 | 2060 | 0009 | Total | Treated Poles | 407.0 | 3873.0 | 38.1 | 1.5 | 11.0 | 410 | 404 | 69 | 250 |
| 21 | Carotell | 202 | 1200 | 0013 | 03 | Paperboard | 383.7 | 3864.5 | 15.2 | 1.6 | 6.6 | 477 | 2 | 0 | 1386 |
| 22 | Celanese Plastics | 202 | 1200 | 0026 | Total | Polyester Film | 384.5 | 3865.2 | 6.1 | 0.6 | 14.0 | 613 | 2 | 0 | 292 |
| 23 | Duke Power - Tiger | 202 | 2060 | 0004 | Total | Utility | 395.0 | 3868.6 | 61.6 | 4.0 | 6.0 | 505 | 1502 | 1903 | 4209 |
| 24 | Greenville-Spartanburg Airport | 202 | 1200 | | | Aircraft | 389.0 | 3860.8 | 7.6 | 9.8 | 9.8 | 289 | 3 | 3 | 1 |
| 25 | J. P. Stevens - Greer | 202 | 1200 | 0020 | 01 | Textile | 386.2 | 3869.3 | 35.1 | 1.4 | 3.2 | 672 | 7 | 7 | 40 |
| 26 | J. P. Stevens - Apalache | 202 | 1200 | 0023 | Total | Textile | 389.7 | 3864.3 | 39.5 | 1.2 | 1.9 | 519 | 6 | 6 | 43 |
| 27 | Bigelow-Sanford - Landrum | 202 | 2060 | 0012 | Total | Textile | 392.0 | 3892.4 | 2.2 | 1.1 | 7.8 | 499 | 130 | 130 | 207 |
| 28 | Firestone Steel Products | 202 | 2060 | 0007 | Total | Stainless Stl | 408.5 | 3879.9 | 1.8 | 0.8 | 12.2 | 477 | 8 | 8 | 405 |
| 29 | W. R. Grace - Duncan | 202 | 2060 | 0014 | Total | Plastic | 397.4 | 3865.1 | 1.1 | 0.3 | 10.0 | 510 | 0 | 0 | 50 |
| 30 | Indian Head, Inc. | 202 | 2060 | 0002 | Total | Textile | 409.2 | 3888.2 | 5.6 | 0.7 | 6.3 | 447 | 5 | 5 | 88 |
| 31 | Inman Mills - Inman | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 19.0 | 0.6 | 7.1 | 485 | 1 | 1 | 113 |
| 32 | Inman Mills - Saybrook | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 1.1 | 0.4 | 6.9 | 485 | 6 | 6 | 35 |
| 33 | Mead Containers | 202 | 2060 | | | Paper | 406.2 | 3874.1 | 5.6 | 0.5 | 40.0 | 473 | 0 | 1 | 43 |
| 34 | Milliken Chemical | 202 | 2060 | | | Chemical | 402.9 | 3876.5 | 7.6 | 0.5 | 4.6 | 505 | 1 | 5 | 65 |
| 35 | Nylon Chemical | 202 | 2060 | 0001 | 01 | Chemical | 401.9 | 3877.0 | 4.8 | 0.5 | 12.2 | 449 | 1 | 3 | 542 |
| 36 | Union Camp Corp. | 202 | 2060 | | | Paper | 402.5 | 3866.5 | 12.2 | 0.8 | 11.4 | 474 | 15 | 1 | 96 |
| 37 | Reeves Brothers - Fairforest | 202 | 2060 | 0019 | Total | Textile | 411.0 | 3865.8 | 60.9 | 3.0 | 4.2 | 477 | 46 | 545 | 545 |
| 38 | Hoechst Fibers | 202 | 2060 | 0015 | Total | Synthetic Fbr | 421.5 | 3876.9 | 32.0 | 1.0 | 12.9 | 527 | 201 | 1483 | 5096 |
| 39 | Chertan Minerals | 202 | 2060 | | | Mineral | 428.7 | 3864.0 | 9.2 | 0.6 | 5.1 | 616 | 5 | 10 | 10 |

Table 4-5. Contin.

Grid One Sources

| ROOM NO. | NAME | AQCR NO. | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PRESENT PART. | PRESENT $SO_2$ | CONTROL STRATEGY ALLOW. $SO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | American Fast Print | 202 | 2060 | | | Textile | 414.7 | 3873.2 | 5.4 | 0.4 | 5.5 | 410 | 3 | 3 | 23 |
| 41 | Arkwright Mills #1 | 202 | 2060 | | | Textile | 415.5 | 3864.4 | 6.1 | 0.4 | 6.9 | 477 | 9 | 27 | 6 |
| 42 | Arkwright Mills #3 | 202 | 2060 | | | Textile | 415.3 | 3864.1 | 7.3 | 0.6 | 7.1 | 477 | 7 | 1 | 14 |
| 43 | Blackman Uhlmer | 202 | 2060 | | | Chemical | 422.5 | 3864.9 | 4.5 | 0.6 | 5.9 | 480 | 26 | 2 | 50 |
| 44 | Clements Lumber | 202 | 2060 | 0010 | Total | Lumber | 410.9 | 3860.6 | 5.4 | 0.4 | 3.2 | 588 | 1 | 5 | 11 |
| 45 | Deering Milliken Research | 202 | 2060 | 0022 | Total | Research | 412.6 | 3871.7 | 3.7 | 0.5 | 5.6 | 471 | 3 | 17 | 128 |
| 46 | Flowers Baking | 202 | 2060 | | | Bakery | 411.6 | 3871.3 | 6.7 | 0.5 | 9.2 | 435 | 2 | 3 | 59 |
| 47 | Metromont Materials | 202 | 2060 | | | Concrete | 411.1 | 3871.0 | 7.6 | 0.6 | 3.1 | 485 | 1 | 15 | 24 |
| 48 | Pacolet Mills | 202 | 2060 | 0021 | 01 | Textile | 431.0 | 3863.5 | 27.4 | 2.5 | 3.1 | 477 | 5 | 5 | 114 |
| 49 | Phillips Fibers | 202 | 2060 | | | Synthetic Fbr. | 411.6 | 3869.1 | 12.1 | 0.8 | 10.7 | 480 | 4 | 30 | 259 |
| 50 | Sloan Construction Products | 202 | 2060 | 0003 | 01 | Asphalt | 428.5 | 3863.4 | 15.3 | 3.1 | 3.1 | 330 | 30 | 1 | 1 |
| 51 | Southern Railway | 202 | 2060 | | | Box Car Repair | 410.3 | 3871.8 | 9.1 | 0.5 | 9.1 | 527 | 51 | 5 | 90 |

Grid Two Sources

Table 4-6

| I.D. | NAME | ASCR NO | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | J. P. Stevens - Victor | 202 | 1200 | 0006 | 01 | Textile | 389.0 | 3865.7 | 38.1 | 2.3 | 2.5 | 644 | 78 | 29 | 134 |
| 2 | Lyman Printing & Finishing | 202 | 2060 | 0018 | Total | Textile | 397.0 | 3868.0 | 66.5 | 3.1 | 7.9 | 410 | 32 | 292 | 3348 |
| 3 | J. P. Stevens - Riverine | 202 | 1200 | 0022 | Total | Textile | 382.6 | 3864.6 | 45.7 | 1.2 | 8.8 | 602 | 13 | 116 | 767 |
| 4 | Southern Wood Piedmont | 202 | 2060 | 0009 | Total | Treated Poles | 407.9 | 3873.0 | 38.1 | 1.5 | 11.0 | 410 | 404 | 69 | 250 |
| 5 | Carotell | 202 | 1200 | 0013 | 03 | Paperboard | 383.7 | 3864.5 | 15.2 | 1.6 | 6.6 | 477 | 2 | 0 | 1386 |
| 6 | Celanese Plastics | 202 | 1200 | 0026 | Total | Polyester Film | 384.6 | 3865.2 | 6.1 | 0.6 | 14.0 | 613 | 2 | 0 | 292 |
| 7 | Duke Power - Tiger | 202 | 2060 | 0004 | Total | Utility | 395.0 | 3868.6 | 61.6 | 4.0 | 6.0 | 505 | 1502 | 1903 | 4209 |
| 8 | Greenville-Spartanburg Airport | 202 | 1200 | | | Aircraft | 389.0 | 3860.8 | 7.6 | 9.8 | 9.8 | 289 | 3 | 0 | 1 |
| 9 | J. P. Stevens - Greer | 202 | 1200 | 0020 | 01 | Textile | 386.2 | 3868.3 | 35.1 | 1.4 | 3.2 | 672 | 7 | 14 | 40 |
| 10 | J. P. Stevens - Apalache | 202 | 1200 | 0023 | Total | Textile | 389.7 | 3864.3 | 30.5 | 1.2 | 1.9 | 519 | 6 | 16 | 43 |
| 11 | Bigelow-Sanford - Landrum | 202 | 2060 | 0012 | Total | Textile | 392.0 | 3892.4 | 2.2 | 1.1 | 7.8 | 499 | 130 | 1 | 207 |
| 12 | Firestone Steel Products | 202 | 2060 | 0007 | Total | Stainless Stl. | 408.5 | 3870.9 | 1.8 | 0.8 | 12.2 | 477 | 8 | 3 | 405 |
| 13 | W. R. Grace - Duncan | 202 | 2060 | 0014 | Total | Plastic | 397.4 | 3865.1 | 1.1 | 0.3 | 100.0 | 510 | 0 | 2 | 50 |
| 14 | Indian Head, Inc. | 202 | 2060 | 0002 | Total | Textile | 409.2 | 3888.2 | 5.6 | 0.7 | 6.3 | 447 | 5 | 60 | 88 |
| 15 | Inman Mills - Inman | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 19.0 | 0.6 | 7.1 | 485 | 1 | 15 | 113 |
| 16 | Inman Mills - Saybrook | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 1.1 | 0.4 | 6.9 | 485 | 6 | 1 | 35 |
| 17 | Mead Containers | 202 | 2060 | | | Paper | 406.2 | 3874.1 | 5.6 | 0.5 | 40.0 | 473 | 0 | 1 | 43 |
| 18 | Milliken Chemical | 202 | 2060 | | | Chemical | 402.9 | 3876.5 | 7.6 | 0.5 | 4.6 | 505 | 1 | 5 | 65 |
| 19 | Sylvan Chemical | 202 | 2060 | 0001 | 01 | Chemical | 401.9 | 3877.0 | 4.8 | 0.5 | 12.2 | 449 | 1 | 3 | 542 |
| 20 | Union Camp Corp. | 202 | 1200 | | | Paper | 402.5 | 3866.5 | 12.2 | 0.8 | 11.4 | 474 | 15 | 1 | 96 |
| 21 | Abney Mills | 202 | 1200 | | | Textile | 366.5 | 3871.5 | 33.2 | 1.2 | 10.0 | 500 | 450 | 300 | 980 |
| 22 | Cone Mills - American Spinning | 202 | 1200 | 0005 | 01 | Textile | 371.0 | 3859.8 | 45.7 | 2.4 | 1.5 | 449 | 72 | 38 | 117 |
| 23 | Judson Mills | 202 | 1200 | 0028 | 01 | Textile | 369.5 | 3855.6 | 38.1 | 2.4 | 6.1 | 533 | 3 | 33 | 143 |
| 24 | Cone Mills - Union Bleachery | 202 | 1200 | 0009 | Total | Textile | 369.7 | 3860.8 | 23.8 | 1.8 | 4.7 | 455 | 51 | 472 | 1703 |
| 25 | J. P. Stevens - Dunean | 202 | 1200 | 0014 | Total | Textile | 369.6 | 3852.3 | 45.7 | 1.8 | 4.9 | 602 | 3 | 20 | 254 |
| 26 | W. R. Grace - Cryovac | 202 | 1200 | 0024 | Total | Plastic | 383.1 | 3845.7 | 22.8 | 0.6 | 1.7 | 505 | 4 | 27 | 242 |
| 27 | Norwich Pharmacal | 202 | 1200 | | | Drugs | 374.8 | 3844.4 | 18.9 | 0.9 | 3.1 | 477 | 2 | 29 | 225 |
| 28 | W. R. Grace - Zonolite | 202 | 1200 | | | Vermiculite | 368.4 | 3867.0 | 22.8 | 0.6 | 7.6 | 383 | 40 | 2 | 5 |
| 29 | LTV Electronics | 202 | 1200 | 0001 | Total | Aircraft | 374.2 | 3846.5 | 18.2 | 0.6 | 14.6 | 588 | 5 | 27 | 137 |
| 30 | Duke Power - Lee | 202 | 0200 | 0004 | Total | Utility | 365.5 | 3839.0 | 42.7 | 1.7 | 50.0 | 421 | 3315 | 13260 | 42,780 |
| 31 | J. P. Stevens - Monaghan | 202 | 1200 | 0015 | 01 | Textile | 369.7 | 3859.0 | 64.0 | 2.7 | 4.0 | 588 | 1 | 11 | 102 |
| 32 | Steel Heddle | 202 | 1200 | 0008 | Total | Textile Mach. | 375.7 | 3862.7 | 19.4 | 0.7 | 18.2 | 485 | 3 | 8 | 105 |
| 33 | Saco-Lowell | 202 | 1200 | 0002 | Total | Textile Mach. | 358.0 | 3855.0 | 14.6 | 1.1 | 9.2 | 488 | 0 | 28 | 216 |
| 34 | Gayly Mills | 202 | 1200 | 0029 | Total | Textile | 363.1 | 3876.5 | 21.3 | 0.9 | 8.5 | 505 | 4 | 36 | 248 |
| 35 | Fiber Industries | 202 | 1200 | 0025 | Total | Textile | 381.3 | 3853.9 | 18.3 | 1.2 | 14.8 | 533 | 31 | 271 | 1601 |
| 36 | Crown Metro | 202 | 1200 | | | Chemical | 374.8 | 3846.3 | 19.1 | 0.5 | 9.8 | 477 | 1 | 9 | 58 |
| 37 | Reeves Bros. - Fairforest Finish | 202 | 2060 | 0019 | Total | Textile | 411.0 | 3865.8 | 60.9 | 3.0 | 4.2 | 477 | 46 | 545 | 545 |
| 38 | Hoescht Fibers | 202 | 2060 | 0015 | Total | Synthetic Fbr | 421.5 | 3876.9 | 32.0 | 1.0 | 12.9 | 527 | 201 | 1483 | 5096 |

Grid Two Sources

Table 4-6. Contin.

| MAP NO. | NAME | AQCR NO | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PRESENT PART. | PRESENT $SO_2$ | CONTROL STRA ALLOW. $SO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | Spartan Minerals | 202 | 2060 | | | Mineral | 428.7 | 3864.0 | 9.2 | 0.6 | 5.1 | 616 | 5 | 10 | 10 |
| 40 | American Fast Print | 202 | 2060 | | | Textile | 414.7 | 3873.2 | 5.4 | 0.4 | 5.5 | 410 | 3 | 3 | 23 |
| 41 | Arkwright Mills #1 | 202 | 2060 | | | Textile | 415.5 | 3864.4 | 6.1 | 0.4 | 6.9 | 477 | 9 | 27 | 6 |
| 42 | Arkwright Mills #3 | 202 | 2060 | | | Textile | 415.3 | 3864.1 | 7.3 | 0.6 | 7.1 | 477 | 7 | 1 | 14 |
| 43 | Blackman Uhlmer | 202 | 2060 | | | Chemical | 422.5 | 3864.9 | 4.5 | 0.6 | 5.9 | 480 | 26 | 2 | 50 |
| 44 | Clements Lumber | 202 | 2060 | 0010 | Total | Lumber | 410.9 | 3860.6 | 5.4 | 0.4 | 3.2 | 588 | 1 | 5 | 11 |
| 45 | Deering Milliken Research | 202 | 2060 | 0022 | Total | Research | 412.6 | 3871.7 | 3.7 | 0.5 | 5.6 | 471 | 3 | 17 | 128 |
| 46 | Flowers Baking | 202 | 2060 | | | Bakery | 411.6 | 3871.3 | 6.7 | 0.5 | 9.2 | 435 | 2 | 3 | 59 |
| 47 | Metromont Materials | 202 | 2060 | | | Concrete | 411.1 | 3871.0 | 7.6 | 0.6 | 3.1 | 485 | 1 | 15 | 24 |
| 48 | Pacolet Mills | 202 | 2060 | 0021 | 01 | Textile | 431.0 | 3863.5 | 27.4 | 2.5 | 3.1 | 477 | 5 | 5 | 114 |
| 49 | Phillips Fibers | 202 | 2060 | | | Synthetic Fbr | 411.6 | 3869.1 | 12.1 | 0.8 | 10.7 | 480 | 4 | 30 | 259 |
| 50 | Sloan Construction Products | 202 | 2060 | 0003 | 01 | Asphalt | 428.5 | 3863.4 | 15.3 | 3.1 | 3.1 | 330 | 30 | 1 | 1 |
| 51 | Southern Railway | 202 | 2060 | | | Box Car Repair | 410.3 | 3871.8 | 9.1 | 0.5 | 9.1 | 527 | 51 | 5 | 90 |

Grid Three Sources

Table 4-7

| [illegible] NO. | NAME | AQCR NO | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PRESENT PART. | PRESENT $SO_2$ | CONTROL STR. ALLOW. $SO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Reeves Bros. Fairforest Finishing | 202 | 2060 | 0019 | Total | Textile | 411.0 | 3865.8 | 60.9 | 3.0 | 4.2 | 477 | 46 | 545 | 545 |
| 2 | Hoescht Fibers | 202 | 2060 | 0015 | 01 | Polyester Fbr | 421.5 | 3876.9 | 30.5 | 1.2 | 10.7 | 583 | 10 | 126 | 423 |
| 3 | Hoescht Fibers | 202 | 2060 | 0015 | 02 | Polyester Fbr | 421.5 | 3876.9 | 30.5 | 1.2 | 10.7 | 583 | 10 | 126 | 423 |
| 4 | Hoescht Fibers | 202 | 2060 | 0015 | 03 | Polyester Fbr | 421.5 | 3876.9 | 53.3 | 1.1 | 10.7 | 533 | 20 | 252 | 845 |
| 5 | Hoescht Fibers | 202 | 2060 | 0015 | 04 | Polyester Fbr | 421.5 | 3876.9 | 33.5 | 0.6 | 10.7 | 633 | 2 | 21 | 70 |
| 6 | Hoescht Fibers | 202 | 2060 | 0015 | 05 | Polyester Fbr | 421.5 | 3876.9 | 33.5 | 0.6 | 10.7 | 633 | 2 | 21 | 70 |
| 7 | Hoescht Fibers | 202 | 2060 | 0015 | 06 | Polyester Fbr | 421.5 | 3876.9 | 33.5 | 0.6 | 10.7 | 633 | 2 | 21 | 70 |
| 8 | Hoescht Fibers | 202 | 2060 | 0015 | 07 | Polyester Fbr | 421.5 | 3876.9 | 46.3 | 0.9 | 10.7 | 633 | 2 | 21 | 70 |
| 9 | Hoescht Fibers | 202 | 2060 | 0015 | 08 | Polyester Fbr | 421.5 | 3876.9 | 46.3 | 0.9 | 10.7 | 633 | 2 | 21 | 70 |
| 10 | Hoescht Fibers | 202 | 2060 | 0015 | 09 | Polyester Fbr | 421.5 | 3876.9 | 46.3 | 0.9 | 10.7 | 633 | 4 | 45 | 149 |
| 11 | Hoescht Fibers | 202 | 2060 | 0015 | 10 | Polyester Fbr | 422.5 | 3877.4 | 30.5 | 1.2 | 10.7 | 533 | 13 | 171 | 572 |
| 12 | Hoescht Fibers | 202 | 2060 | 0015 | 11 | Polyester Fbr | 422.5 | 3877.4 | 30.5 | 1.2 | 10.7 | 533 | 13 | 171 | 572 |
| 13 | Hoescht Fibers | 202 | 2060 | 0015 | 12 | Polyester Fbr | 422.5 | 3877.4 | 30.5 | 1.2 | 10.7 | 583 | 12 | 156 | 522 |
| 14 | Hoescht Fibers | 202 | 2060 | 0015 | 13 | Polyester Fbr | 422.5 | 3877.4 | 54.9 | 1.8 | 10.7 | 755 | 12 | 156 | 522 |
| 15 | Hoescht Fibers | 202 | 2060 | 0015 | 14 | Polyester Fbr | 422.5 | 3877.4 | 54.9 | 1.2 | 10.7 | 450 | 14 | 175 | 587 |
| 16 | Spartan Minerals | 202 | 2060 | | | Mineral | 428.7 | 3864.0 | 9.2 | 0.6 | 5.1 | 616 | 5 | 10 | 10 |
| 17 | American Fast Print | 202 | 2060 | | | Textile | 414.7 | 3873.2 | 5.4 | 0.4 | 5.5 | 410 | 3 | 3 | 23 |
| 18 | Arkwright Mills #1 | 202 | 2060 | | | Textile | 415.3 | 3864.4 | 6.1 | 0.4 | 6.9 | 477 | 9 | 27 | 6 |
| 19 | Arkwright Mills #3 | 202 | 2060 | | | Textile | 415.3 | 3864.1 | 7.3 | 0.6 | 7.1 | 477 | 7 | 1 | 14 |
| 20 | Blackman Uhlmer | 202 | 2060 | | | Chemical | 422.5 | 3864.9 | 4.5 | 0.6 | 5.9 | 480 | 26 | 2 | 50 |
| 21 | Clements Lumber | 202 | 2060 | 0010 | Total | Lumber | 410.9 | 3860.6 | 5.4 | 0.4 | 3.2 | 588 | 1 | 5 | 11 |
| 22 | Deering Milliken Research | 202 | 2060 | 0022 | Total | Research | 412.6 | 3871.7 | 3.7 | 0.5 | 5.6 | 471 | 3 | 17 | 128 |
| 23 | Flowers Baking | 202 | 2060 | | | Bakery | 411.6 | 3871.3 | 6.7 | 0.5 | 9.2 | 435 | 2 | 3 | 59 |
| 24 | Metromont Materials | 202 | 2060 | | | Concrete | 411.1 | 3871.0 | 7.6 | 0.6 | 3.1 | 485 | 1 | 15 | 24 |
| 25 | Pacolet Mills | 202 | 2060 | 0021 | 01 | Textile | 431.0 | 3863.5 | 27.4 | 2.5 | 3.1 | 477 | 5 | 5 | 114 |
| 26 | Phillips Fibers | 202 | 2060 | | | Synthetic Fbr | 411.6 | 3869.1 | 12.1 | 0.8 | 10.7 | 480 | 4 | 30 | 259 |
| 27 | Sloan Construction Products | 202 | 2060 | 0003 | 01 | Asphalt | 428.5 | 3863.4 | 15.3 | 3.1 | 3.1 | 330 | 30 | 1 | 1 |
| 28 | Southern Railway | 202 | 2060 | | | Box Car Repair | 410.3 | 3871.8 | 9.1 | 0.5 | 9.1 | 527 | 51 | 5 | 90 |
| 29 | J. P. Stevens - Victor | 202 | 1200 | 0006 | 01 | Textile | 389.0 | 3865.7 | 38.1 | 2.3 | 2.5 | 644 | 78 | 29 | 134 |
| 30 | Lyman Printing & Finishing | 202 | 2060 | 0018 | Total | Textile | 397.0 | 3868.0 | 66.5 | 3.1 | 7.9 | 410 | 32 | 292 | 3348 |
| 31 | J. P. Stevens - Riverine | 202 | 1200 | 0022 | Total | Textile | 383.6 | 3864.6 | 45.7 | 1.2 | 8.8 | 602 | 13 | 116 | 767 |
| 32 | Southern Wood Piedmont | 202 | 2060 | 0009 | Total | Treated Poles | 407.9 | 3873.0 | 38.1 | 1.5 | 11.0 | 410 | 404 | 69 | 250 |
| 33 | Carotell | 202 | 1200 | 0013 | 03 | Paperboard | 383.7 | 3864.5 | 15.2 | 1.6 | 6.6 | 477 | 2 | 0 | 1386 |
| 34 | Celanese Plastics | 202 | 1200 | 0026 | Total | Polyester Fbr | 384.6 | 3865.2 | 6.1 | 0.6 | 14.0 | 613 | 2 | 0 | 292 |
| 35 | Duke Power - Tiger | 202 | 2060 | 0004 | Total | Utility | 395.0 | 3868.6 | 61.6 | 4.0 | 6.0 | 505 | 1502 | 1903 | 4209 |
| 36 | Greenville - Spartanburg Airport | 202 | 1200 | | | Aircraft | 389.0 | 3860.8 | 7.6 | 9.8 | 9.8 | 289 | 3 | 0 | 1 |
| 37 | J. P. Stevens - Greer | 202 | 1200 | 0020 | 01 | Textile | 386.2 | 3868.3 | 35.1 | 1.4 | 3.2 | 672 | 7 | 14 | 40 |

Page 2.

Grid Three Sources

Table 4-7. Contin.

| ID. NO. | NAME | AQCR NO. | CO. NO. | PLANT I.D. NO. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PRESENT EMIT. $SO_2$ | CONTROL STRA ALLOW. $SO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | J. P. Stevens - Apalache | 202 | 1200 | 0023 | Total | Textile | 389.7 | 3864.3 | 30.5 | 1.2 | 1.9 | 519 | 6 | 16 | 43 |
| 39 | Bigelow-Sanford - Landrum | 202 | 2060 | 0012 | Total | Textile | 392.0 | 3892.4 | 2.2 | 1.1 | 7.8 | 499 | 130 | 1 | 207 |
| 40 | Firestone Steel Products | 202 | 2060 | 0007 | Total | Stainless Stl | 408.5 | 3870.9 | 1.8 | 0.8 | 12.2 | 477 | 8 | 3 | 405 |
| 41 | W. R. Grace - Duncan | 202 | 2060 | 0014 | Total | Plastic | 397.4 | 3865.1 | 1.1 | 0.3 | 100.0 | 510 | 0 | 2 | 50 |
| 42 | Indian Head, Inc. | 202 | 2060 | 0002 | Total | Textile | 409.2 | 3888.2 | 5.6 | 0.7 | 6.3 | 447 | 5 | 60 | 88 |
| 43 | Inman Mills - Inman | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 19.0 | 0.6 | 7.1 | 485 | 1 | 15 | 113 |
| 44 | Inman Mills - Saybrook | 202 | 2060 | | | Textile | 399.7 | 3878.0 | 1.1 | 0.4 | 6.9 | 485 | 6 | 1 | 35 |
| 45 | Mead Containers | 202 | 2060 | | | Paper | 406.2 | 3874.1 | 5.6 | 0.5 | 40.0 | 473 | 0 | 1 | 43 |
| 46 | Milliken Chemical | 202 | 2060 | | | Chemical | 402.9 | 3876.5 | 7.6 | 0.5 | 4.6 | 505 | 1 | 5 | 65 |
| 47 | Sylvan Chemical | 202 | 2060 | 0001 | 01 | Chemical | 401.9 | 3877.0 | 4.8 | 0.5 | 12.2 | 449 | 1 | 3 | 542 |
| 48 | Union Camp Corp. | 202 | 2060 | | | Paper | 402.5 | 3866.5 | 12.2 | 0.8 | 11.4 | 474 | 15 | 1 | 96 |
| 49 | Abney Mills | 202 | 1200 | | | Textile | 366.5 | 3871.5 | 33.2 | 1.2 | 10.0 | 500 | 450 | 300 | 980 |
| 50 | Cone Mills - American Spinning | 202 | 1200 | 0005 | 01 | Textile | 371.0 | 3859.8 | 45.7 | 2.4 | 1.5 | 449 | 72 | 38 | 117 |
| 51 | Judson Mills | 202 | 1200 | 0028 | 01 | Textile | 369.5 | 3855.6 | 38.1 | 2.4 | 6.1 | 533 | 3 | 33 | 143 |
| 52 | Cone Mills - Union Bleachery | 202 | 1200 | 0009 | Total | Textile | 369.7 | 3860.8 | 23.8 | 1.8 | 4.7 | 455 | 51 | 472 | 1703 |
| 53 | J. P. Stevens - Dunean | 202 | 1200 | 0014 | Total | Textile | 369.6 | 3852.3 | 45.7 | 1.8 | 4.9 | 602 | 3 | 20 | 254 |
| 54 | W. R. Grace - Cryovac | 202 | 1200 | 0024 | Total | Plastic | 383.1 | 3845.7 | 22.8 | 0.6 | 1.7 | 505 | 4 | 27 | 242 |
| 55 | Norwich Pharmacal | 202 | 1200 | | | Drugs | 374.8 | 3844.4 | 18.9 | 0.9 | 3.1 | 477 | 2 | 29 | 225 |
| 56 | W. R. Grace - Zonolite | 202 | 1200 | | | Vermiculite | 368.4 | 3867.0 | 22.8 | 0.6 | 7.6 | 383 | 40 | 2 | 5 |
| 57 | LTV Electronics | 202 | 1200 | 0001 | Total | Aircraft | 374.2 | 3846.5 | 18.2 | 0.6 | 14.6 | 588 | 5 | 27 | 137 |
| 58 | Duke Power - Lee | 202 | 0200 | 0004 | Total | Utility | 365.5 | 3839.0 | 42.7 | 1.7 | 50.0 | 421 | 3315 | 13,260 | 42780 |
| 59 | J. P. Stevens - Monaghan | 202 | 1200 | 0015 | 01 | Textile | 369.7 | 3859.0 | 64.0 | 2.7 | 4.0 | 588 | 1 | 11 | 102 |
| 60 | Steel Heddle | 202 | 1200 | 0008 | Total | Textile Mach | 375.7 | 3862.7 | 19.4 | 0.7 | 18.2 | 485 | 3 | 8 | 105 |
| 61 | Saco-Lowell | 202 | 1200 | 0002 | Total | Textile Mach | 358.0 | 3855.0 | 14.6 | 1.1 | 9.2 | 488 | 0 | 28 | 216 |
| 62 | Gayly Mills | 202 | 1200 | 0029 | Total | Textile | 363.1 | 3876.5 | 21.3 | 0.9 | 8.5 | 505 | 4 | 36 | 248 |
| 63 | Fiber Industries | 202 | 1200 | 0025 | Total | Textile | 381.3 | 3853.9 | 18.3 | 1.2 | 14.8 | 533 | 31 | 271 | 1601 |
| 64 | Crown Metro | 202 | 1200 | | | Chemical | 374.8 | 3846.3 | 19.1 | 0.5 | 9.8 | 477 | 1 | 9 | 58 |

GRID AREA I - GREENVILLE AREA

This grid network encompasses the area between UTM coordinates 360-380 East and 3840-3870 North as can be seen in Figure 4-3.

Source and sampling station locations are shown in Figure 4-4. Sources located in Figure 4-4 refer by their number to those sources listed in Table 4-5. (It should be noted that only those sources actually located in the grid area are represented in Figure 4-4).

The AQDM Model calculated $SO_2$ concentrations at 150 receptor locations (or every two kilometers) in the grid area in addition to the three sampling locations. These calculated $SO_2$ concentrations are listed in Appendix C.

GRID AREA II - GREER AREA

This grid network encompasses the area between UTM coordinates 380-410 East and 3860-3890 North as can be seen in Figure 4-3.

Source and sampling station locations are shown in Figure 4-5. Sources located in Figure 4-5 refer by their number to those sources listed in Table 4-6. (It should be noted that only those sources actually located in the grid area are represented in Figure 4-5). Sampling station locations may be referred by their number to Table 4-3.

The AQDM Model calculated $SO_2$ concentrations at 225 receptor locations (or every two kilometers) in the grid area in addition to the one sampling station location. These calculated concentrations are listed in Appendix C.

GRID AREA III - SPARTANBURG AREA

This grid network encompasses the area between UTM coordinates 410-430 East and 3860-3890 North as can be seen in Figure 4-3.

Source and sampling station locations are shown in Figure 4-6. Sources located in Figure 4-6 refer by their number to those sources listed in Table 4-7. (It should be noted that only those sources actually located in the grid area are represented in Figure 4-6).

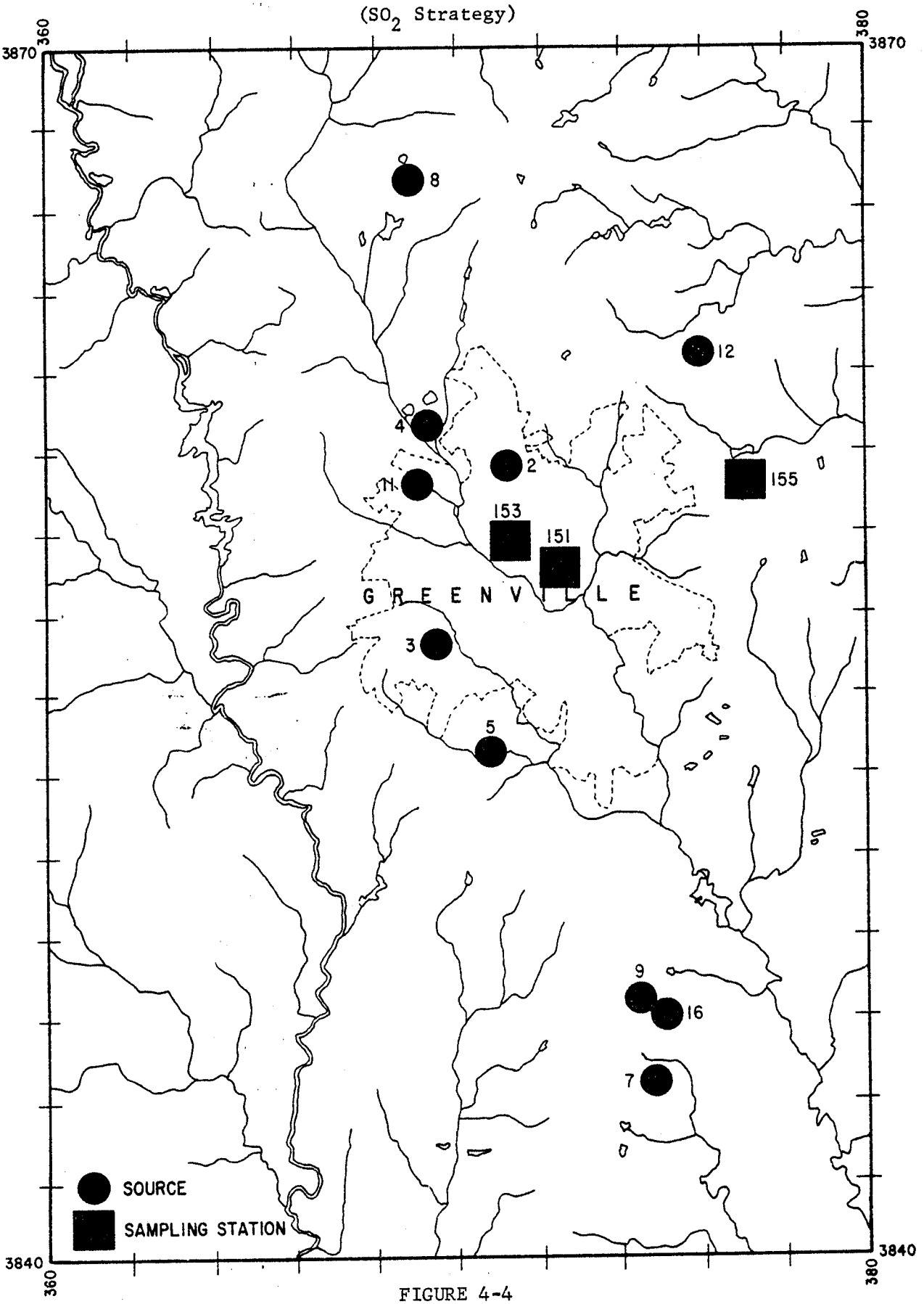



FIGURE 4-4

**SOURCE AND SAMPLING STATION LOCATIONS**

GRID AREA I - GREENVILLE AREA

($SO_2$ Strategy)

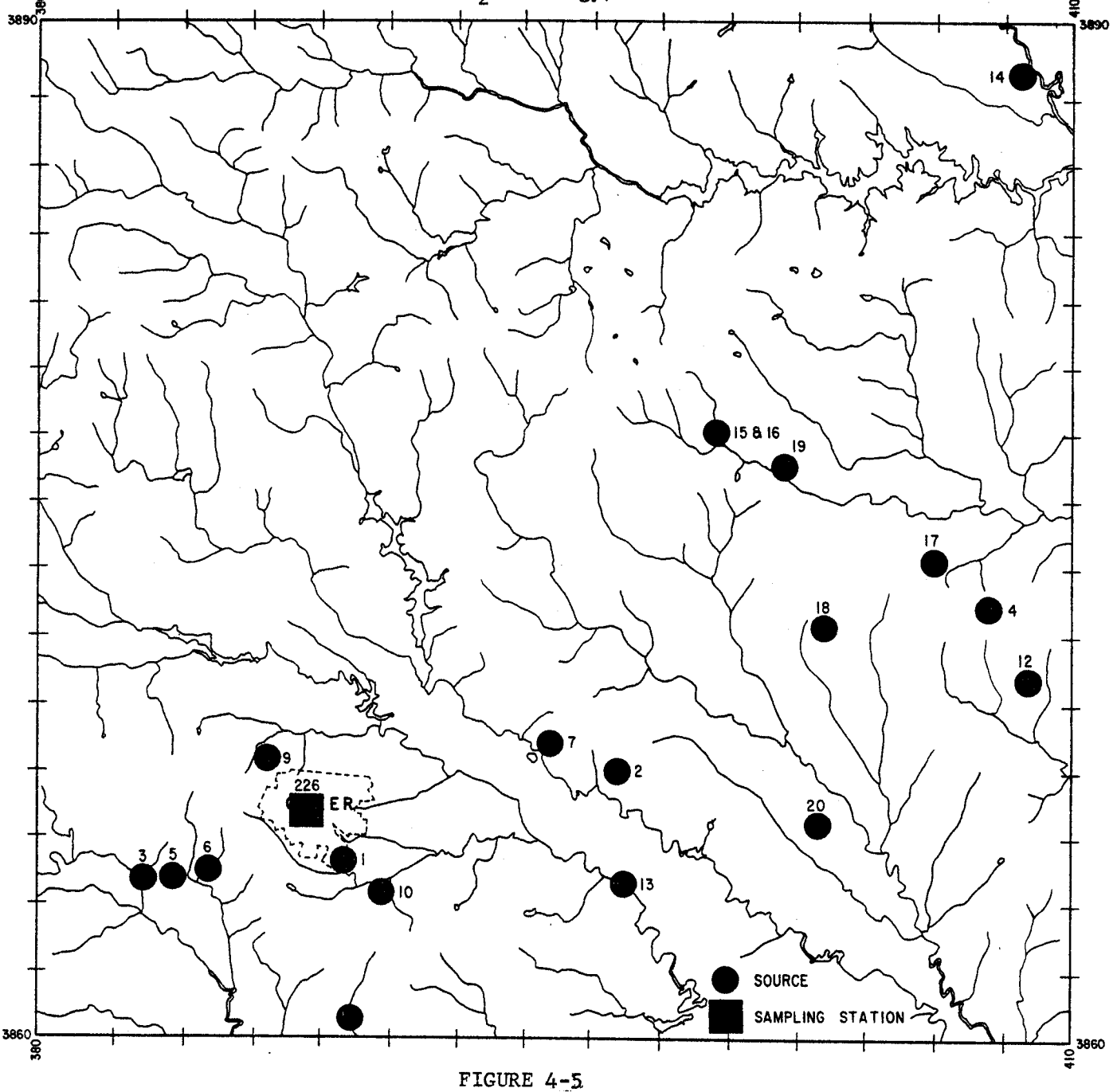



FIGURE 4-5

**SOURCE AND SAMPLING STATION LOCATIONS**

GRID AREA II - GREER AREA

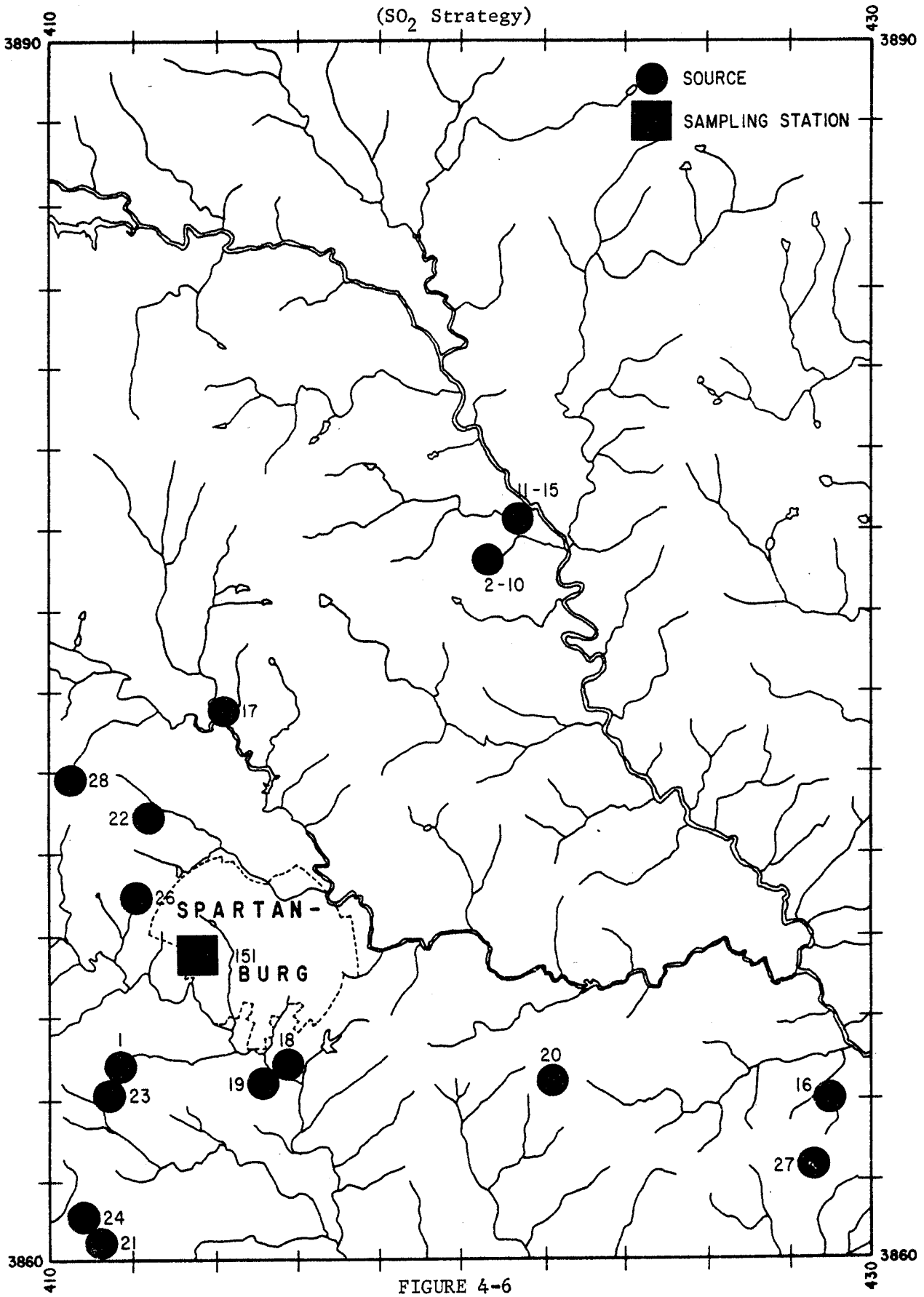



FIGURE 4-6

**SOURCE AND SAMPLING STATION LOCATIONS**

GRID AREA III - SPARTANBURG AREA

The AQDM Model calculated $SO_2$ concentrations at 150 receptor locations (or every two kilometers) in the grid area in addition to the one sampling station location. These calculated concentrations are listed in Appendix C.

STRATEGY III

CHARLESTON AQDM MODELLING

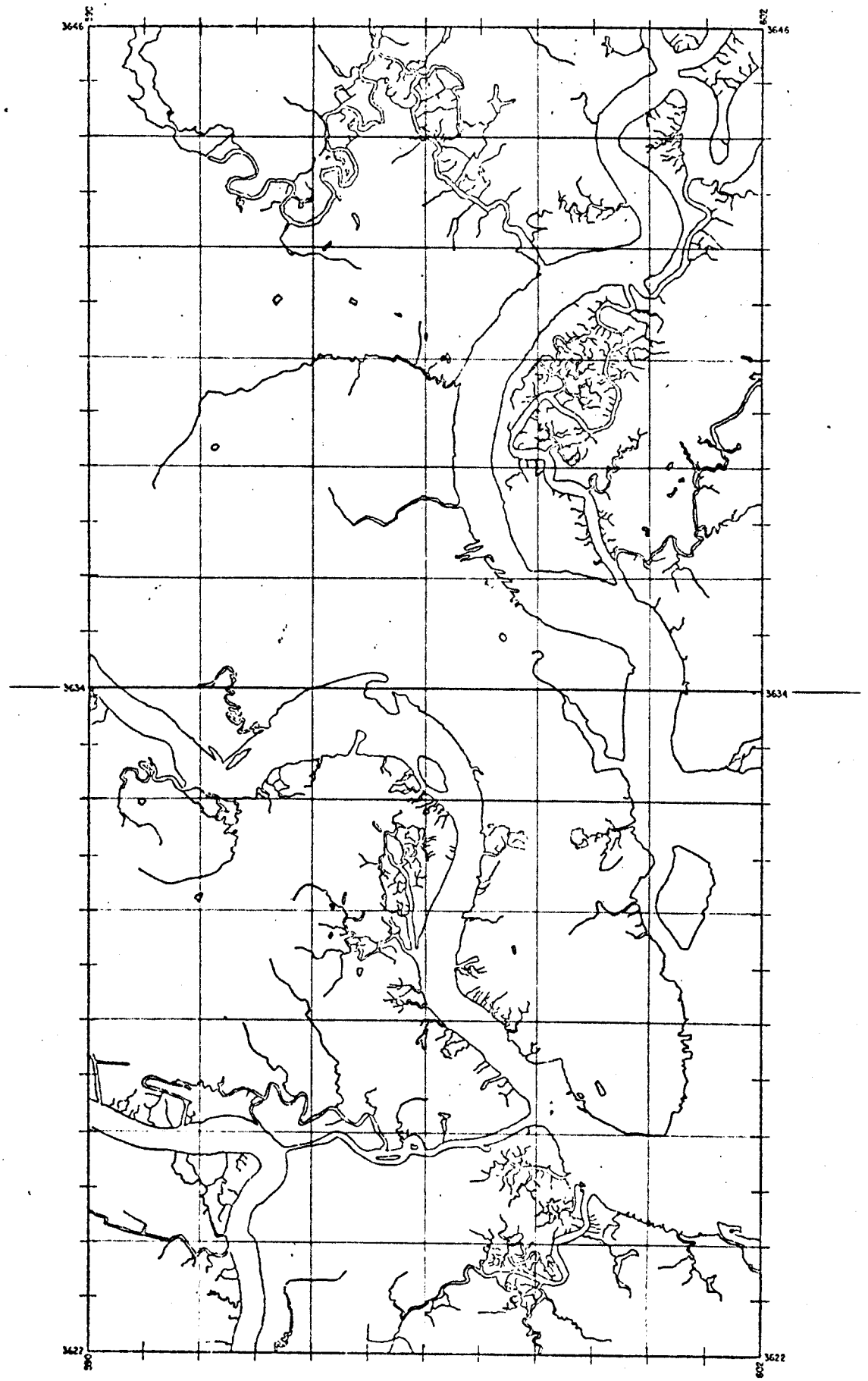
(GRID AREA IV - CHARLESTON)

A grid network as shown in Figure 4-7 was applied to the Charleston area. This network encompasses the area between UTM coordinates 590-602 East and 3622-3646 North. The area sources were divided into 44 grid sectors, as shown in Figure 4-8, the size depending upon the area source strength. The emission rates for each of these grids are listed in Appendix C. The origin of pollutants for area sources are space heating from fuel combustion in homes and businesses, industrial emissions too small to be included as point sources, etc. The source data used was taken from the Emissions Inventory Computer Printout (Appendix G).

Sources of $SO_2$ emissions were determined from a comprehensive emission inventory visitation program conducted by the Department of Health and Environmental Control and the Charleston County Health Department. A list of the sources used in the AQDM model along with their location, stack parameters, and present emission rates can be seen in Table 4-9.

Emissions from sources used in this strategy attempt were calculated on an allowable emission rate of 2.3 $\#SO_2/10^6$BTU input as shown in Table 4-9, with the exception of the two power plants located outside of the grid area which were considered for their possible effects on ambient air quality. These emissions from these two sources were based on the results of the 24-Hour Power Plant Model (3.5 $\#SO_2/10^6$BTU) - (The Hagood power plant emissions were calculated on an allowable emission rate of 2.3 $\#SO_2/10^6$BTU due to its size and location).

Source and sampling station locations are shown in Figure 4-9. Sources located in Figure 4-9 refer by their number to those sources listed in Table 4-9. (It should be noted that only those sources actually located in the




CHARLESTON - GRID AREA IV

FIGURE 4-7

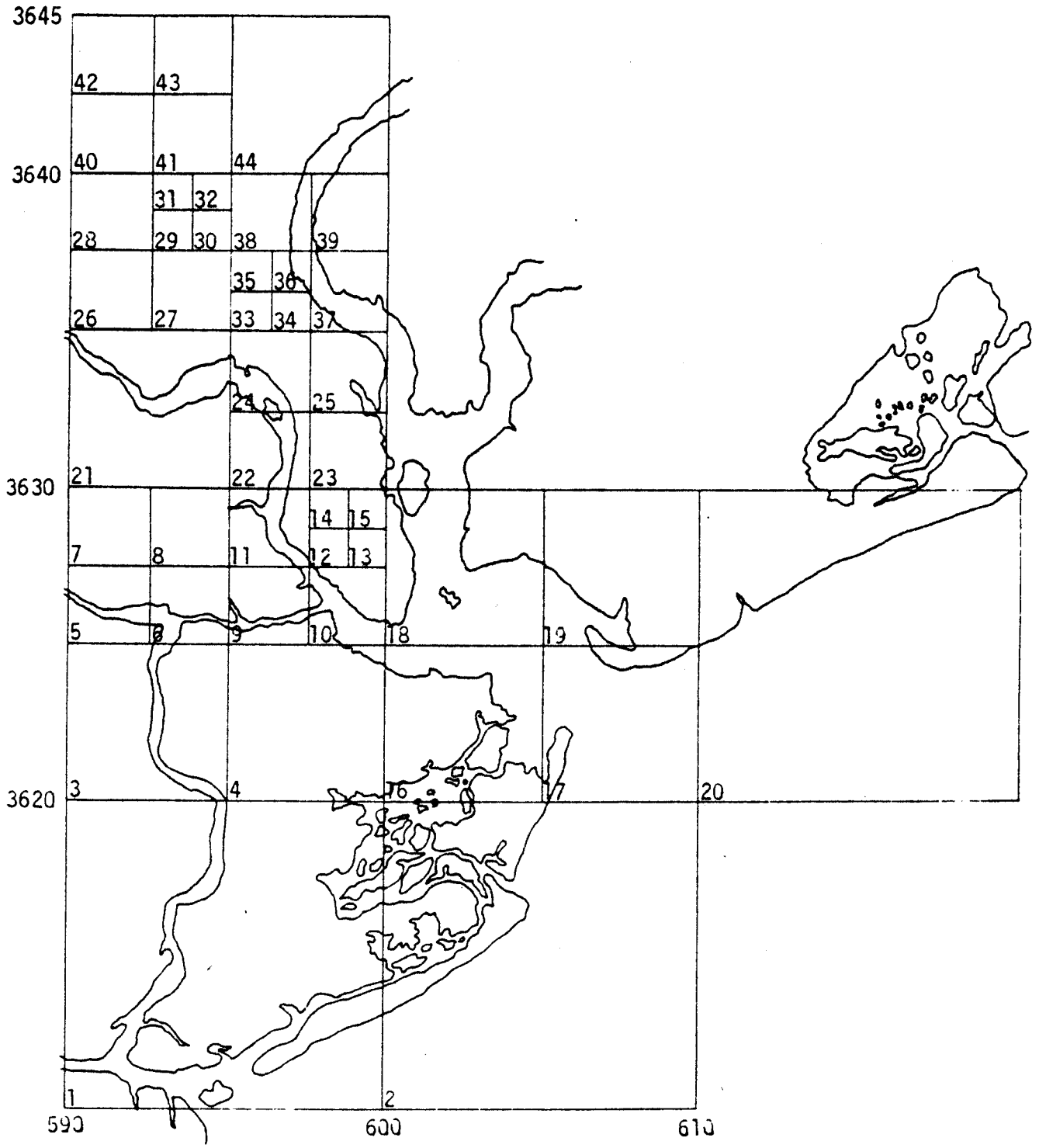



FIGURE 4-8

CHARLESTON GRID NETWORK

Charleston Sources

Table 4-9

| VEM I.D. | NAME | AQCR NO. | CO. NO. | PLANT I.D. No. | POINT I.D. NO. | TYPE | UTM X | UTM Y | STACK HT. | STACK DIA. | STACK VEL. | STACK TEMP. | PRESENT PART. | PRESENT $SO_2$ | CONTROL STD ALLOW. $SO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Humble Oil - Asphalt | 199 | 0560 | 0015 | 01 | Asphalt | 598.5 | 3631.7 | 18.3 | 1.2 | 9.8 | 522 | 10 | 0 | NA |
| 2 | Humble Oil - Boilers | 199 | 0560 | 0015 | Total | Asphalt | 598.5 | 3631.7 | 14.3 | 1.2 | 9.8 | 616 | 39 | 588 | 896 |
| 3 | Raybestos Manhattan | 199 | 0560 | 0016 | Total | Asbestos | 595.8 | 3638.7 | 18.3 | 1.2 | 9.5 | 505 | 10 | 163 | 219 |
| 4 | Raybestos Manhattan | 199 | 0560 | 0016 | 03 | Asbestos | 595.8 | 3638.7 | 15.2 | 1.2 | 9.5 | 302 | 1 | 0 | NA |
| 5 | W. R. Grace | 199 | 0560 | 0014 | 01 | Chemical | 598.4 | 3632.6 | 19.8 | 0.4 | 4.9 | 330 | 38 | 0 | NA |
| 6 | W. R. Grace | 199 | 0560 | 0014 | 02 | Chemical | 598.4 | 3632.6 | 16.8 | 0.7 | 12.1 | 311 | 3 | 0 | NA |
| 7 | W. R. Grace | 199 | 0560 | 0014 | 03 | Chemical | 598.4 | 3632.6 | 45.7 | 1.0 | 10.0 | 333 | 8 | 0 | NA |
| 8 | W. R. Grace | 199 | 0560 | 0014 | 04 | Chemical | 598.4 | 3632.6 | 45.7 | 1.2 | 10.0 | 348 | 6 | 623 | 335 |
| 9 | Mobile Chemical | 199 | 0560 | 0011 | Total | Chemical | 596.8 | 3633.3 | 19.5 | 1.2 | 5.2 | 422 | 7 | 86 | 336 |
| 10 | Mobile Chemical | 199 | 0560 | 0011 | Total | Chemical | 596.8 | 3633.3 | 14.0 | 0.9 | 7.6 | 312 | 8 | 0 | NA |
| 11 | Agrico Chemical | 199 | 0560 | 0010 | Total | Chemical | 597.6 | 3631.7 | 25.0 | 1.1 | 12.9 | 319 | 65 | 1 | NA |
| 12 | Airco Alloys | 199 | 0560 | 0018 | Total | Ferro Alloys | 598.4 | 3633.5 | 30.5 | 3.7 | 12.2 | 358 | 66 | 0 | NA |
| 13 | SCE&G - Haygood | 199 | 0560 | 0029 | Total | Utility | 597.1 | 3632.5 | 38.1 | 3.4 | 14.3 | 425 | 61 | 6321 | 9618 |
| 14 | Charleston Naval Shipyard | 199 | 0560 | 0002 | Total | Ship Repair | 595.8 | 3636.0 | 76.3 | 3.9 | 5.2 | 533 | 165 | 1390 | 3043 |
| 15 | Etiwan Fertilizer | 199 | 0560 | | | Chemical | 599.1 | 3632.5 | 3.0 | 9.8 | 7.0 | 293 | 600 | 0 | NA |
| 16 | Amerada Hess, Inc. | 199 | 0560 | | | Petroleum | 596.3 | 3638.1 | 7.9 | 0.4 | 9.5 | 471 | 61 | 65 | 98 |
| 17 | Gulf Oil | 199 | 0560 | | | Petroleum | 598.8 | 3632.6 | 12.2 | 0.5 | 9.5 | 450 | 8 | 126 | 192 |
| 18 | Charleston AFB Aircraft | 199 | 0560 | | | Aircraft | 590.0 | 3640.1 | 201.0 | 9.1 | 9.1 | 294 | 183 | 0 | NA |
| 19 | Westvaco | 199 | 0560 | 0008 | 17 | Paper | 596.4 | 3640.2 | 29.3 | 2.0 | 17.9 | 477 | 863 | 3306 | 5030 |
| 20 | Westvaco | 199 | 0560 | 0008 | 18 | Paper | 596.4 | 3640.2 | 29.3 | 2.0 | 17.9 | 477 | 863 | 3306 | 5030 |
| 21 | Westvaco | 199 | 0560 | 0008 | 16 | Paper | 596.4 | 3640.2 | 35.7 | 1.8 | 17.8 | 539 | 300 | 1150 | 1750 |
| 22 | Westvaco | 199 | 0560 | 0008 | 15 | Paper | 596.4 | 3640.2 | 39.6 | 2.4 | 18.6 | 494 | 672 | 2575 | 3918 |
| 23 | Westvaco | 199 | 0560 | 0008 | 19 | Paper | 596.4 | 3640.2 | 57.0 | 3.0 | 12.6 | 477 | 863 | 3306 | 5030 |
| 24 | Citadel | 199 | 0560 | 0007 | Total | Education | 597.1 | 3629.1 | 43.6 | 2.0 | 6.1 | 293 | 16 | 224 | 341 |
| 25 | Charleston AFB - Boilers | 199 | 0560 | 0019 | Total | Aircraft | 588.4 | 3640.2 | 20.7 | 2.1 | 3.8 | 505 | 66 | 1488 | 2264 |
| 26 | Verona Chemical | 199 | 0420 | | | Chemical | 600.0 | 3650.0 | 15.2 | 1.6 | 2.5 | 533 | 11 | 1040 | 1503 |
| 27 | Bird & Son | 199 | 0560 | | | Asphalt | 592.8 | 3633.8 | 18.9 | 0.8 | 9.1 | 491 | 22 | 319 | 463 |
| 28 | Banks Construction | 199 | 0560 | 0009 | 01 | Asphalt | 592.5 | 3636.2 | 6.1 | 3.1 | 9.1 | 338 | 10 | 20 | 94 |
| 29 | Sanders Bros. Construction | 199 | 0560 | | | Asphalt | 592.3 | 3638.1 | 18.3 | 0.9 | 9.1 | 321 | 7 | 3 | 15 |
| 30 | Truluck Construction | 199 | 0560 | 0004 | 01 | Asphalt | 592.3 | 3636.2 | 1.7 | 0.9 | 5.8 | 324 | 3 | 6 | 12 |
| 31 | United Piece Dye Works | 199 | 0560 | | | Textile | 591.4 | 3642.6 | 16.8 | 1.2 | 9.1 | 505 | 7 | 331 | 679 |
| 32 | Medical University | 199 | 0560 | | | Education | 598.4 | 3627.7 | 45.7 | 1.8 | 7.9 | 490 | 3 | 189 | 277 |
| 33 | Commission Public Works | 199 | 0560 | | | Sewage Treat. | 598.5 | 3625.0 | 14.0 | 0.8 | 13.1 | 344 | 13 | 3 | 38 |
| 34 | SCPSA - Jefferies | 199 | 0420 | 0003 | 01 | Utility | 594.2 | 3678.7 | 53.3 | 4.0 | 25.4 | 400 | 14 | 3402 | 5906 |
| 35 | SCPSA - Jefferies | 199 | 0420 | 0003 | 02 | Utility | 594.2 | 3678.7 | 53.3 | 4.0 | 25.4 | 400 | 14 | 3402 | 5906 |
| 36 | SCPSA - Jefferies | 199 | 0420 | 0003 | 03 | Utility | 594.2 | 3678.7 | 91.4 | 4.0 | 25.4 | 407 | 1765 | 6975 | 13526 |
| 37 | SCPSA - Jefferies | 199 | 0420 | 0003 | 04 | Utility | 594.2 | 3678.7 | 91.4 | 4.0 | 25.4 | 407 | 1765 | 6975 | 13526 |
| 38 | SCE&G - Williams | 199 | 0420 | | | Utility | 599.9 | 3653.5 | 121.9 | 8.5 | 15.2 | 403 | 176 | 48466 | 76069 |

($SO_2$ Strategy)

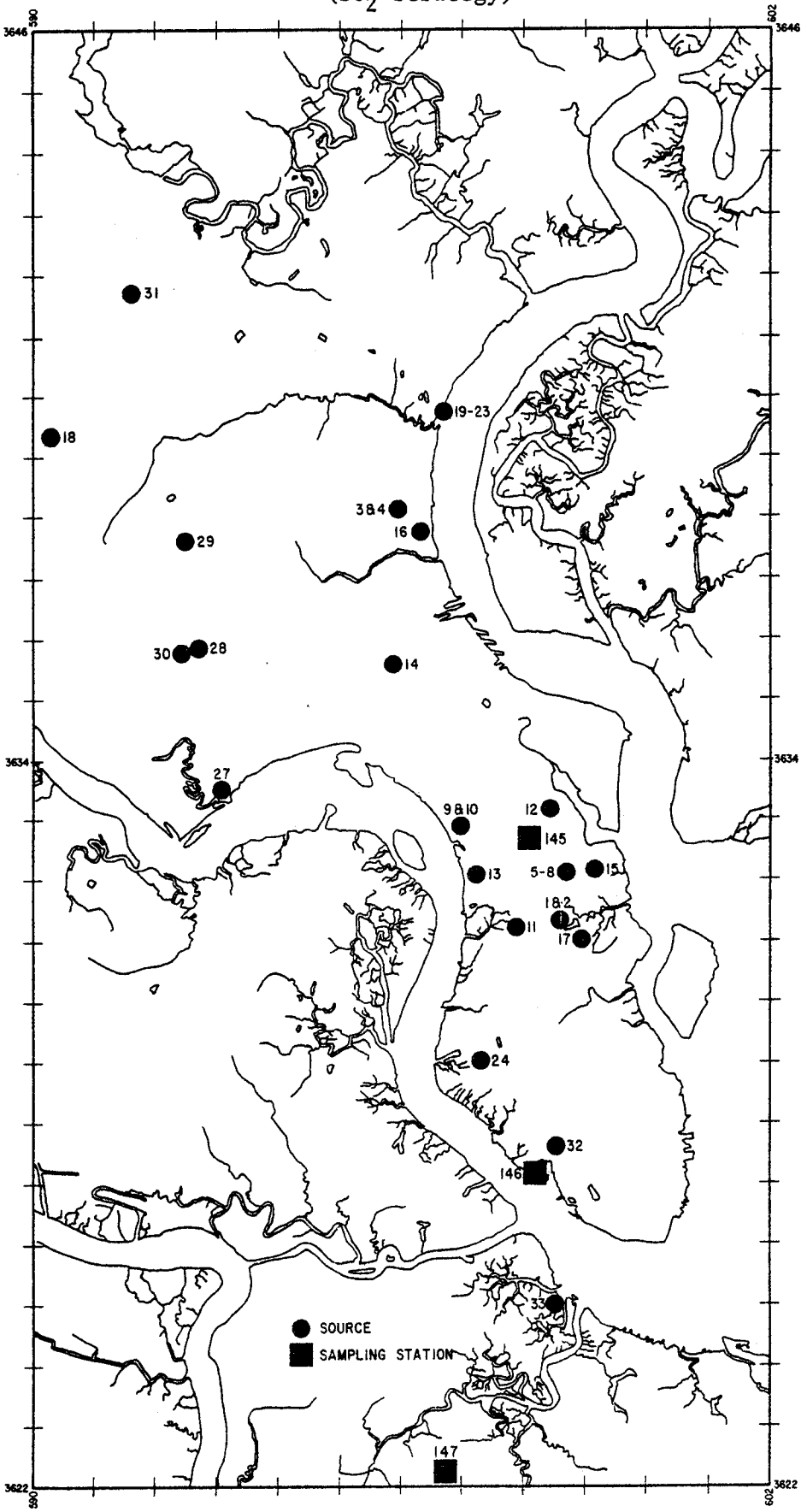



FIGURE 4-9

**SOURCE AND SAMPLING STATION LOCATIONS**

GRID AREA IV - CHARLESTON AREA

grid area are represented in Figure 4-9). Sampling station locations may be referred by their number to Table 4-8.

The AQDM model calculated $SO_2$ concentrations at 288 receptor locations (or every one kilometer) in the grid area in addition to the three sampling station locations. (Note: In order to obtain this number of receptor locations it was necessary to run the AQDM Model twice). These calculated concentrations are listed in Appendix C.

The meteorological data used in the analysis are presented in Appendix C. These data are based on a 5-year record of hourly observations at the Charleston Air Force Base and was obtained through the U. S. Department of Commerce, Environmental Data Service. These data are a 480 unit frequency distribution matrix which combines the percentage frequencies of 16 wind directions, 6 wind speed classes and 6 atmospheric stability categories. The annual mean afternoon mixing layer height used in the analysis was 1330 me s The ambient pressure used was 1016 millibars. The average temperature used was 291°K.

In addition to the AQDM modelling in the Charleston area, a portion of Berkeley County surrounding the Jeffries Steam Plant and the Williams Station was examined to determine any effects of Charleston sources. The gridded area is shown in Figure C-10 in Appendix C, and encloses the area between UTM coordinates 586-610 East and 3646-3691 North. This provides receptor sizes in the grid of 3 kilometers. Area sources from the Charleston area were not included, as they tend to affect only nearby areas, but all point sources were.

STRATEGY I - RESULTS

The results of the 24-Hour Power Plant Model has been discussed earlier in this section. Briefly, all power plant operations in the State of South Carolina could be allowed to emit 3.5 $\#SO_2/10^6$BTU. The only exceptions noted

were the Lee Steam Station and the Urquhart Station. These exceptions were caused by the combination of their exceptional size and topographical features of the terrain.

STRATEGY II - RESULTS

From the calculated $SO_2$ concentrations at the receptor locations indicated by the AQDM models run in the Greenville-Spartanburg area, isopleth maps showing the $SO_2$ distribution were drawn. These are shown in Figures 4-10, 4-11, and 4-12 respectively.

All concentrations calculated were well below National Ambient Air Quality Standards, as indicated by the respective isopleth maps. Maximum 3-hour and 24-hour concentrations calculated by the model also were not in excess of standards. These results are shown in tabular form in Appendix C.

Therefore, it is felt that the strategy of 3.5 $\#SO_2/10^6$BTU was valid and appropriate.

STRATEGY III - RESULTS

From the calculated $SO_2$ concentrations at the receptor locations indicated by the AQDM Models run in the Charleston grid area, an isopleth map was drawn. (See Figure 4-13).

All concentrations calculated were well below National Ambient Air Quality Standards. Maximum 3-hour and 24-hour concentrations calculated by the model also were not in excess of standards. These results are shown in tabular form in Appendix C.

Therefore, it is felt that the strategy applied in the Charleston grid area was valid and appropriate. It was further determined that sources in the category between the classification of area source and those individual sources used in the AQDM Model could be allowed to emit 3.5 $\#SO_2/10^6$BTU air quality in the Charleston area.

The results of the AQDM in Berkeley County are contained in Table C-18 of Appendix C. They show no distinctive features, the highest concentration predicted being 22.5 ugm/$M_3$ in the vicinity of the Williams Plant. No isopleth maps were prepared, in the absence of significant results.

It is further concluded that the Charleston Strategy will allow compliance with standards.

TABLE 4-8. CHARLESTON AIR QUALITY DATA

| Pollutant | Sample Location | Sample Interval (months) | Start Date | End Date | Number Samples | Max 24 hr. | Annual Arith. Mean | Standard Deviation | Annual Geometric Mean | Geo. Std. Dev. |
|---|---|---|---|---|---|---|---|---|---|---|
| Particulate | N 3627.4 E 598.1 | 12 | 700105 | 701208 | 62 | 159.8 | 58.3 | 31.1 | 51.6 | 2.30 |
| | N 3633.0 E 598.0 | 12 | 700105 | 701230 | 101 | 750.9 | 214.0 | 95.5 | 197.7 | 2.71 |
| | N 3631.6 E 598.0 | 10 | 700105 | 701019 | 21 | 474.2 | 182.4 | 126.9 | 144.0 | 2.58 |
| | N 3631.0 E 497.6 | 12 | 700105 | 701230 | 66 | 192.4 | 61.5 | 32.9 | 54.8 | 2.50 |
| | N 3631.7 E 597.3 | 12 | 700105 | 701222 | 86 | 560.6 | 108.8 | 102.4 | 76.5 | 2.25 |
| | N 3638.5 E 595.6 | 12 | 700105 | 701230 | 119 | 165.4 | 70.8 | 30.2 | 62.5 | 1.81 |
| | N 3640.4 E 596.6 | 12 | 700105 | 701222 | 130 | 352.9 | 131.2 | 68.7 | 113.5 | 1.72 |
| | N 3631.9 E 595.4 | 12 | 700105 | 701230 | 82 | 137.8 | 50.9 | 23.4 | 46.4 | 1.54 |
| | N 3632.4 E 597.0 | 12 | 700105 | 701217 | 92 | 199.1 | 64.3 | 36.5 | 56.2 | 1.67 |
| | N 3627.4 E 600.4 | 8 | 700105 | 700901 | 59 | 395.4 | 138.9 | 101.3 | 112.4 | 2.53 |
| | N 3627 E 600.5 | 11 | 700209 | 701221 | 59 | 321.2 | 142.9 | 87.4 | 110.6 | 1.74 |
| $SO_2$ | N 3633.0 E 598.0 | 12 | 730102 | 731230 | 51 | 60.0 | 5.0 | | 3.0 | 2.75 |
| | N 3627.4 E 598.1 | 12 | 730104 | 731230 | 61 | 77.0 | 5.0 | | 3.0 | 2.75 |
| | N 3622.1 E 596.7 | 12 | 730103 | 731230 | 55 | 67.0 | 5.0 | | 3.0 | 2.75 |
| | N 3631.6 E 608.2 | 12 | 730104 | 731230 | 55 | 112.0 | 7.0 | | 3.0 | 3.68 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

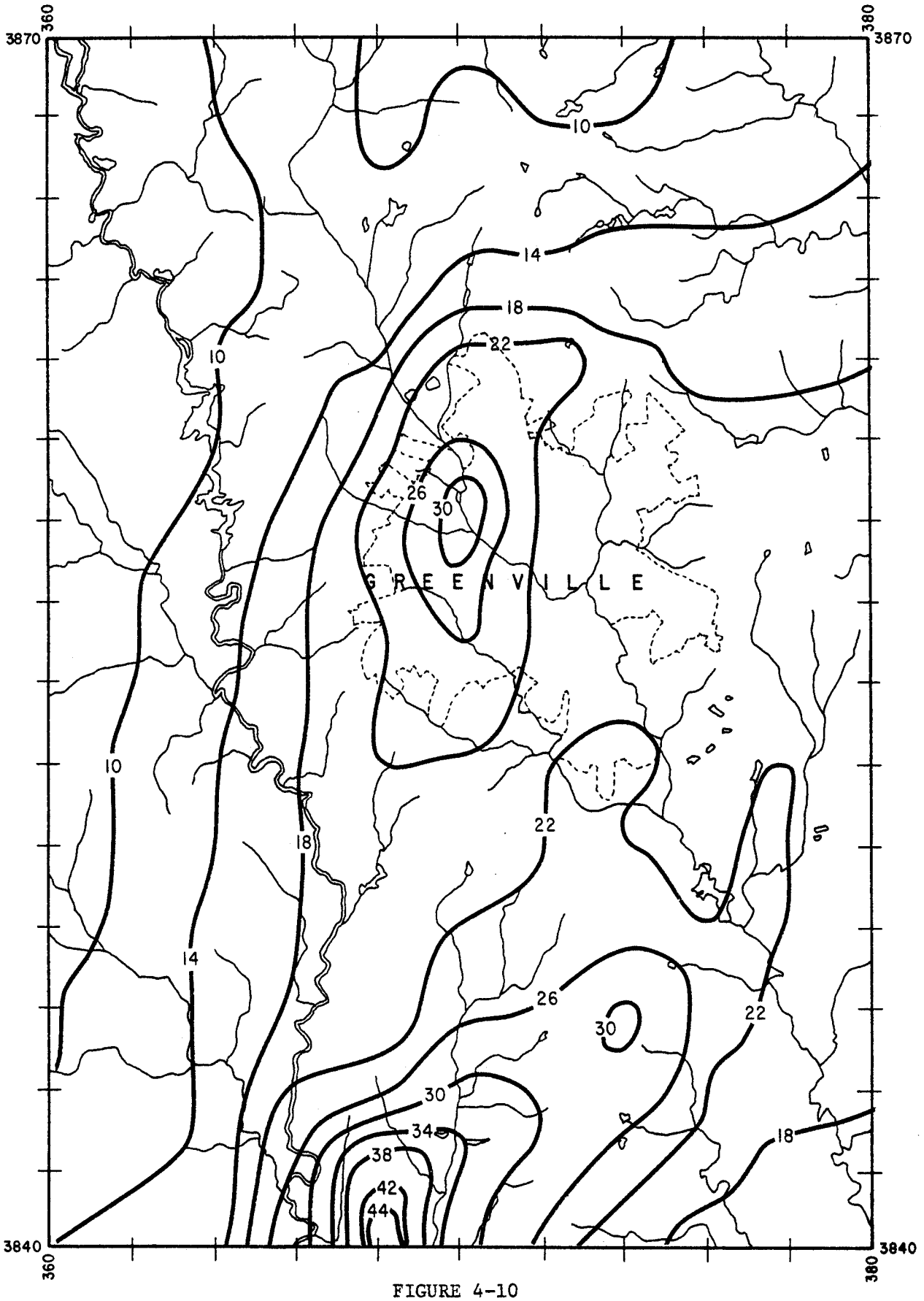



FIGURE 4-10

**ISOPLETH MAP SHOWING SO2 DISTRIBUTION**

GRID AREA I - GREENVILLE AREA

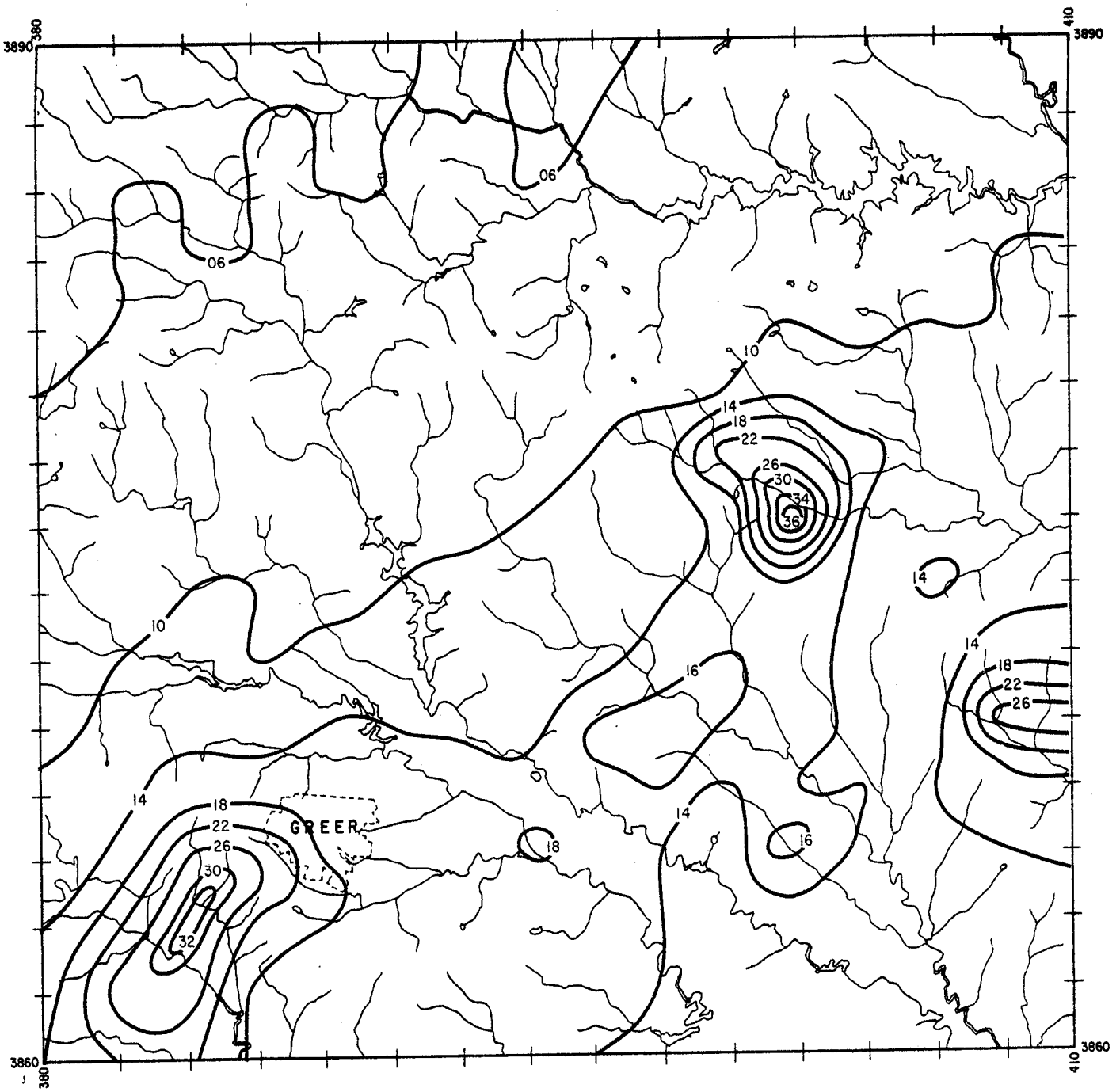



FIGURE 4-11

**ISOPLETH MAP SHOWING SO2 DISTRIBUTION**

GRID AREA II - GREER AREA

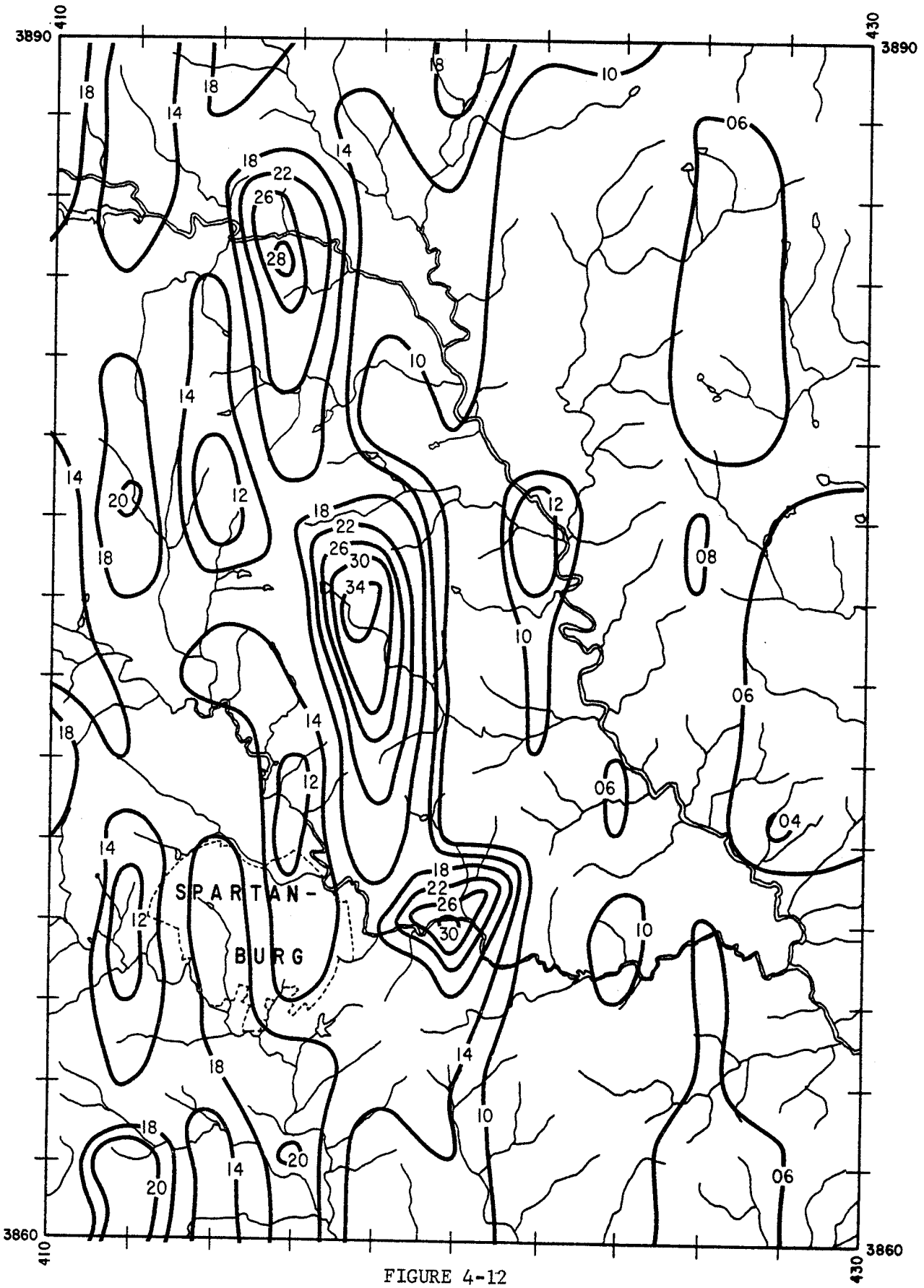



FIGURE 4-12

**ISOPLETH MAP SHOWING SO2 DISTRIBUTION**

GRID AREA III - SPARTANBURG AREA

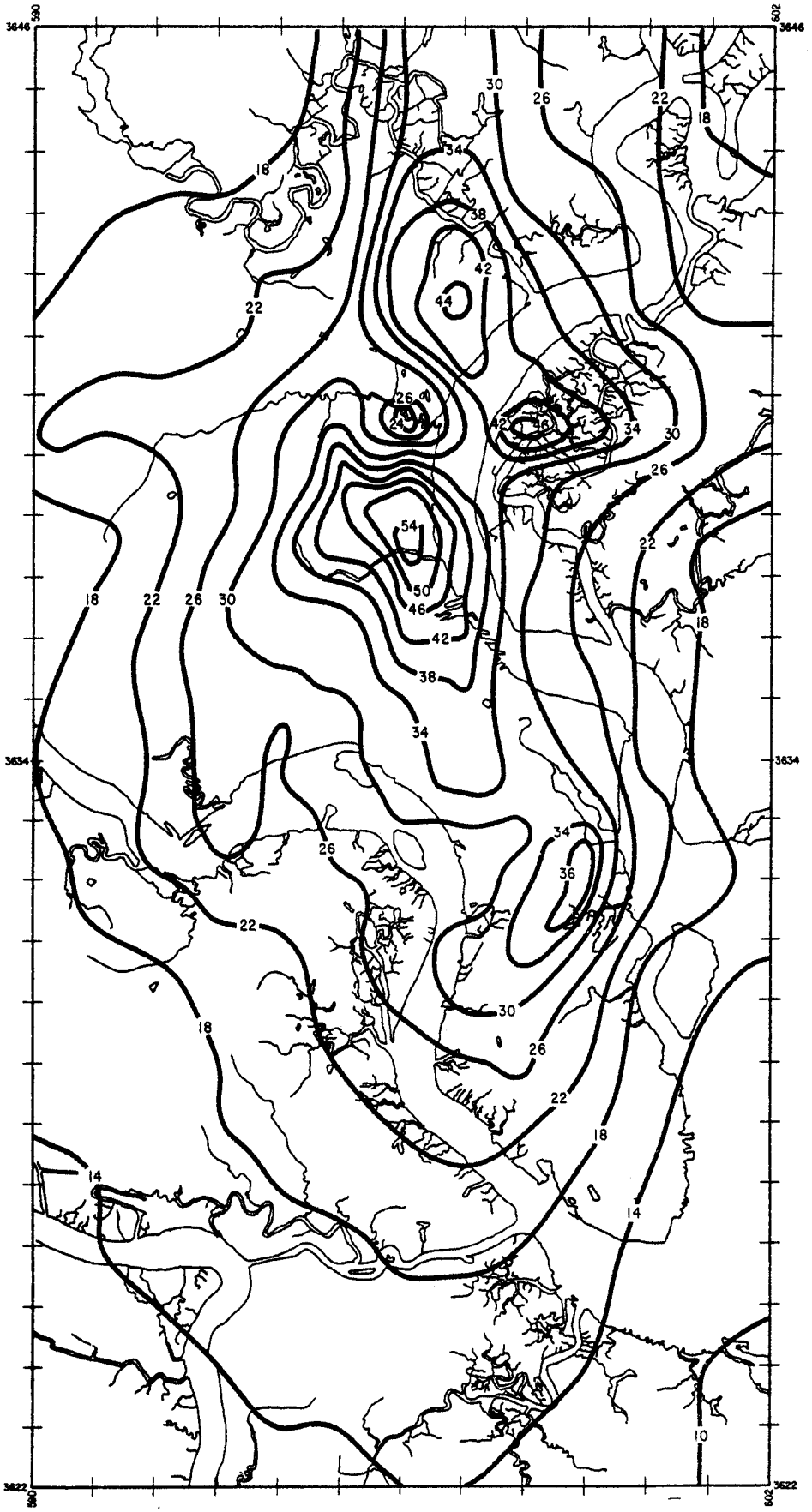



FIGURE 4-13
**ISOPLETH MAP SHOWING SO2 DISTRIBUTION**

GRID AREA IV - CHARLESTON AREA

## PART II

## 1979 Control Strategy Development

As noted in the introduction to this plan, new problems have arisen since the original development of the plan. This part of the Control Strategy section addresses the attainment of photochemical and carbon monoxide standards, as well as three isolated total suspended particulate problems. As with the original plan, monitoring has not revealed any problems in attaining and maintaining nitrogen dioxide standards and, therefore, no plan is required for nitrogen dioxide.

### PARTICULATE CONTROL STRATEGY

In the past, control strategies for total suspended particulate (TSP) matter have primarily focused on point source emissions and to a lesser extent on certain well defined fugitive emissions from industrial processes. It is now realized that reliance on point source controls will not, in many areas, be sufficient to attain and maintain primary or secondary ambient air quality standards. The Clean Air Act Amendments of 1977 require the attainment of primary standards by December 31, 1982, and the attainment of secondary standards as expeditiously as possible. These standards are:

| | Primary | Secondary |
|---|---|---|
| Total Suspended Particulate | | |
| 24 hours | 260 $ug/m^3$* | 150 $ug/m^3$* |
| annual geometric mean | 75 $ug/m^3$ | --- |

(*Not to be exceeded more than once a year)

This past reliance on point source controls to attain standards evolved, in part, because of the relative ease in measuring and capturing or reducing particulate matter from these sources as compared with the less well understood methods of controlling fugitive emissions and fugitive dust sources. As a result, most point sources are presently controlled to at least the level of reasonable available control technology (RACT), and, in many cases to levels far beyond. This leaves the task of identifying and controlling fugitive dust and fugitive emission sources to effect a further reduction in the particulate loading.

Regulations to limit fugitive dust and fugitive emissions have been developed and they are contained in their entirety in Appendix I. It is expected that these regulations, in combination with the offset policy (Appendix B), new source review system (Section 8), and the malfunction regulations (Appendix I) will provide the necessary legal framework and procedural requirements to attain and maintain the particulate standards not only in the nonattainment areas, but in the attainment areas as well.

Demonstration of attainment has relied heavily on the Air Quality Display Model (AQDM). The Air Quality Display Model is a climatological steady state Gaussian plume mathematical model that estimates annual arithmetic average particulate concentrations at ground level. Even though the AQDM has several short-comings it is judged acceptable in predicting point source-receptor relationships. However, its short-comings make it much less acceptable in predicting impacts from fugitive emissions. Several of these short-comings are discussed below.

The AQDM uses a single effective point source approximation for area sources instead of the more detailed numerical integration techniques and AQDM does not have the capability of day/night variation in emission rates. Further, AQDM does not correct the wind speed for variations due to emission heights. The location of the receptor is arbitrary and there are no provisions made for elevation differences between the source and the receptor. There is also no treatment of fumigation or downwash of the pollutant plume and no plume rise is calculated for area sources. A constant, uniform wind is assumed with no provision for either horizontal wind variations or shear in the vertical direction.

Although the short-comings of the AQDM are recognized, especially in respect to predicting area source impacts, the AQDM is used in the demonstrations. The staff is presently evaluating several models that are reported superior to the AQDM in predicting area source impacts, and if these other models do prove to be superior they will be utilized in the future.

GEORGETOWN NON-ATTAINMENT AREA

In 1977 the South Carolina Department of Health and Environmental Control designated certain portions of the City of Georgetown as non-attainment for both primary and secondary particulate standards. Boundaries of the non-attainment area are defined by segments of the city limits, the Sampit River, and traffic arteries* (Figure IV-14). The northern boundary parallels Highmarket Street (U.S. 521), extending from F Street to Broad Street. F Street is essentially the western boundary, while Broad Street is a segment

* Boundary lines which conform to existing street patterns are drawn so that the street(s) will be within the defined area.

of the eastern limit of the non-attainment area. The eastern boundary extends south from Broad Street to the river, follows the meander of the Sampit River around Georgetown Steel, and continues along the southeastern city limit. The southern boundary is defined by the city limits.

Land use within the Georgetown non-attainment area is multiple. Commercial activities and urban housing occupy most of the land area. Approximately 950 people live within the non-attainment area; the projected population for 1980 is about 1,000. The major industrial facilities within the area are Georgetown Steel, Georgetown Ferreduction, and American Cyanimide.

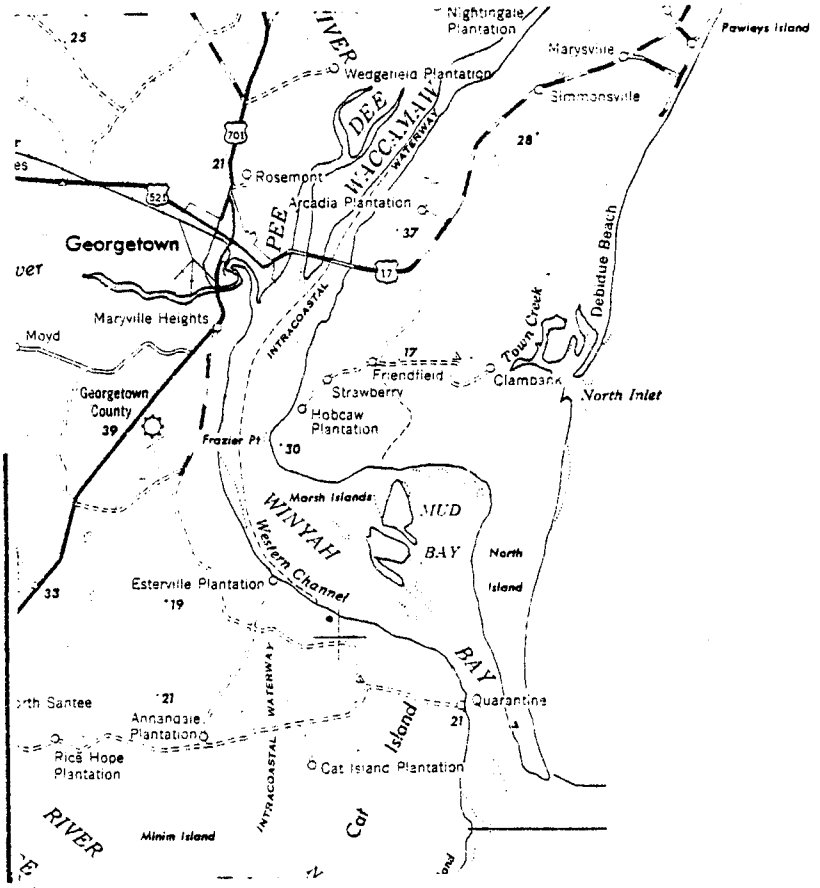
Traffic flow within the area exhibits a marked seasonal variation. As the spring progresses larger numbers of tourists, in cars and recreation vehicles, travel through Georgetown on U.S. 17 and U.S. 521. The eastern segments of Front and Prince Streets form the core of the Central Business District. The museum and other historical sites are located within this section, as well as department stores and office buildings. Most of the commercial activity along Highmarket Street (U.S. 521) and Frazer Street (U.S. 17) is oriented toward the automobile. There are also general commercial businesses as grocery stores and dry cleaning establishments.

The location of the particulate monitoring stations that are located in and about the City of Georgetown are as shown in Figure IV-14. The annual geometric mean and the number of times the secondary standard has been exceeded for the past five calendar year are given in Table IV-9 for each of the monitoring stations.

# GEORGETOWN

FIGURE IV-14

One area has been designated as non-attainment in Georgetown. The boundaries of this area are shown by heavy black lines. Monitoring sites within and near the non-attainment area are depicted by large black circles.



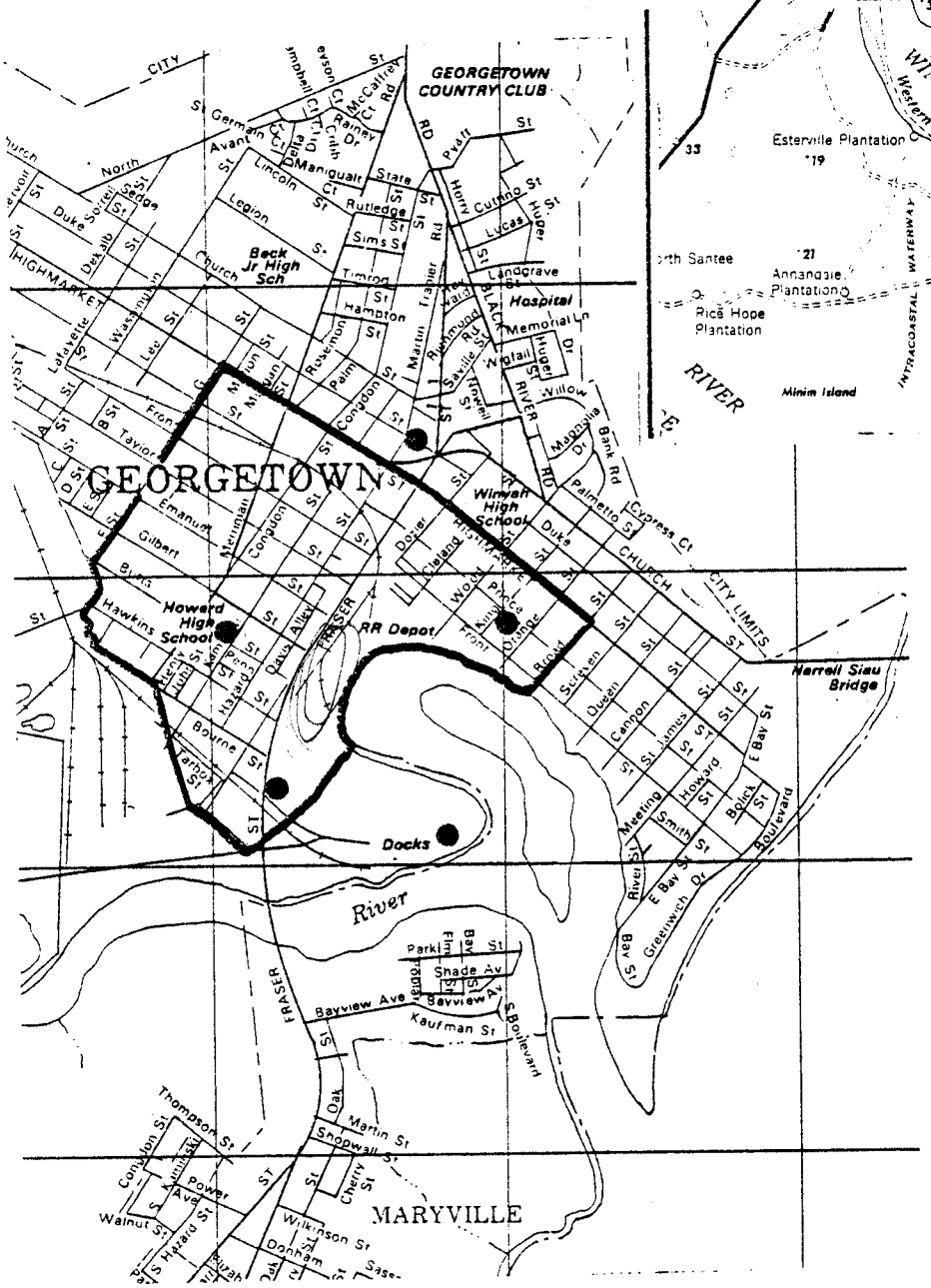



TABLE IV-9

Georgetown Monitoring Stations

| STATION | ANNUAL GEOMETRIC MEAN ($ug/m^3$) | | | | | |
|---|---|---|---|---|---|---|
| | 1973 | 1974 | 1975 | 1976 | 1977 | July 1978 |
| County Health Department | 67 | 72 | 73 | 72(2)* | 71(0) | 67(0) |
| Howard High School | 93 | 80 | 73 | 72(9) | 72(5) | 70(4) |
| Water Tower-CMS | 104 | 76 | 77 | 73(6) | 72(1) | 73(3) |
| Maryville (start-up Feb. 1977) | | | | | 45(0) | 41(2) |
| Georgetown Hospital (start-up Feb. 1978) | | | | | | 47(0) |

* Number of times exceeding secondary standard.

Figures IV-15 to IV-17 graphically show for three of the particulate monitoring stations the twelve month sliding geometric mean for each month beginning with January 1975 and ending with July 1978. The figures show that the annual primary standard has not been exceeded since October, 1977 at any of the monitoring sites.

For each non-attainment area an inventory is required of all sources located within or outside the area that potentially impacts on the non-attainment area. This required inventory (baseyear 1977) is contained in Appendix E and is an updated version of a 1975 particulate inventory conducted by Engineering-Science, Inc. under an Environmental Protection Agency contract.* The 1975 particulate inventory was updated by accounting for all identifiable changes in particulate emissions.

* Georgetown, South Carolina Air Quality Maintenance Planning and Analysis, Engineering-Science, Inc., EPA 904/9-77-030, February 1977.

# GEORGETOWN CMS

## Twelve Month Geometric Mean of Suspended Particulates

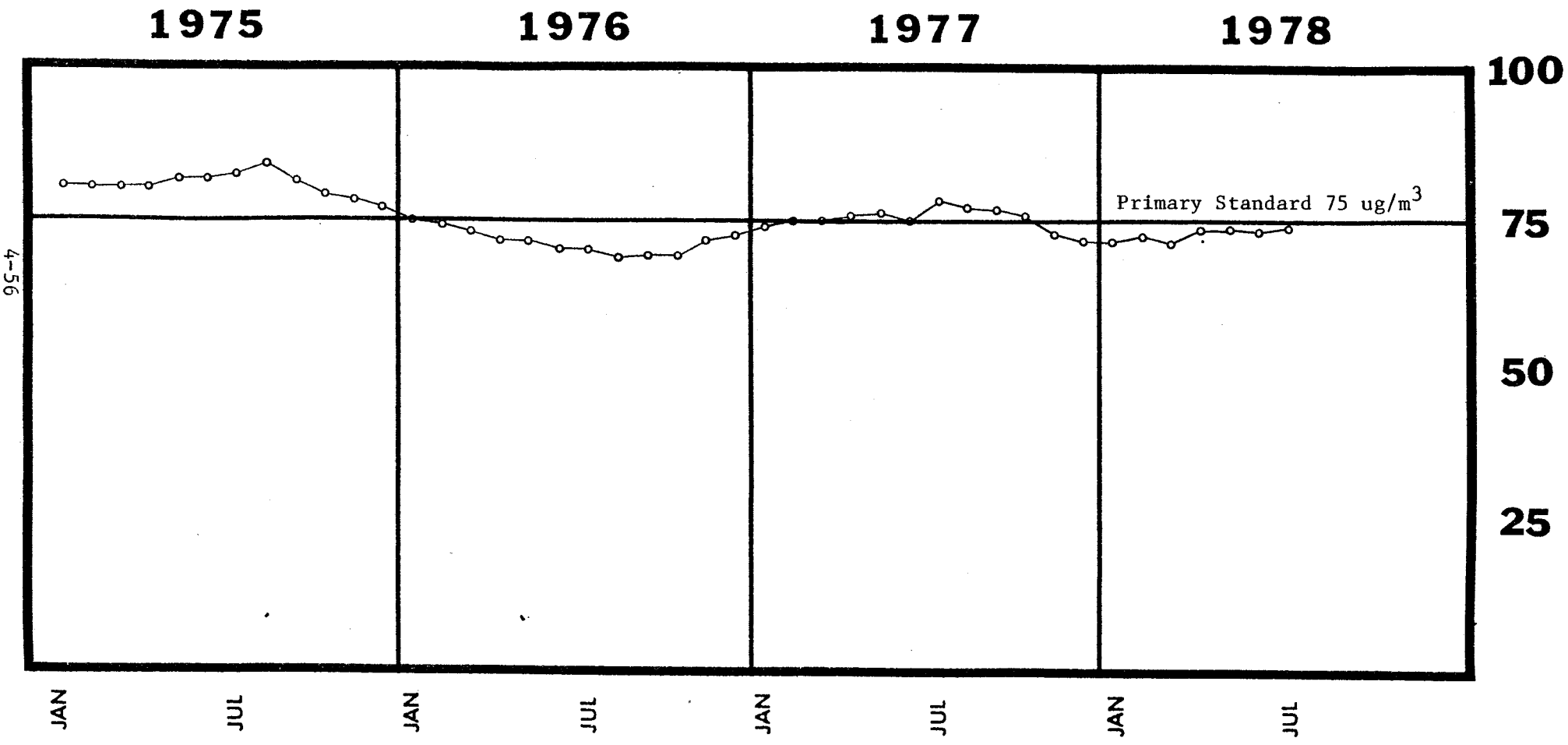



FIGURE IV-15

# GEORGETOWN HEALTH DEPARTMENT

## Twelve Month Geometric Mean of Suspended Particulates

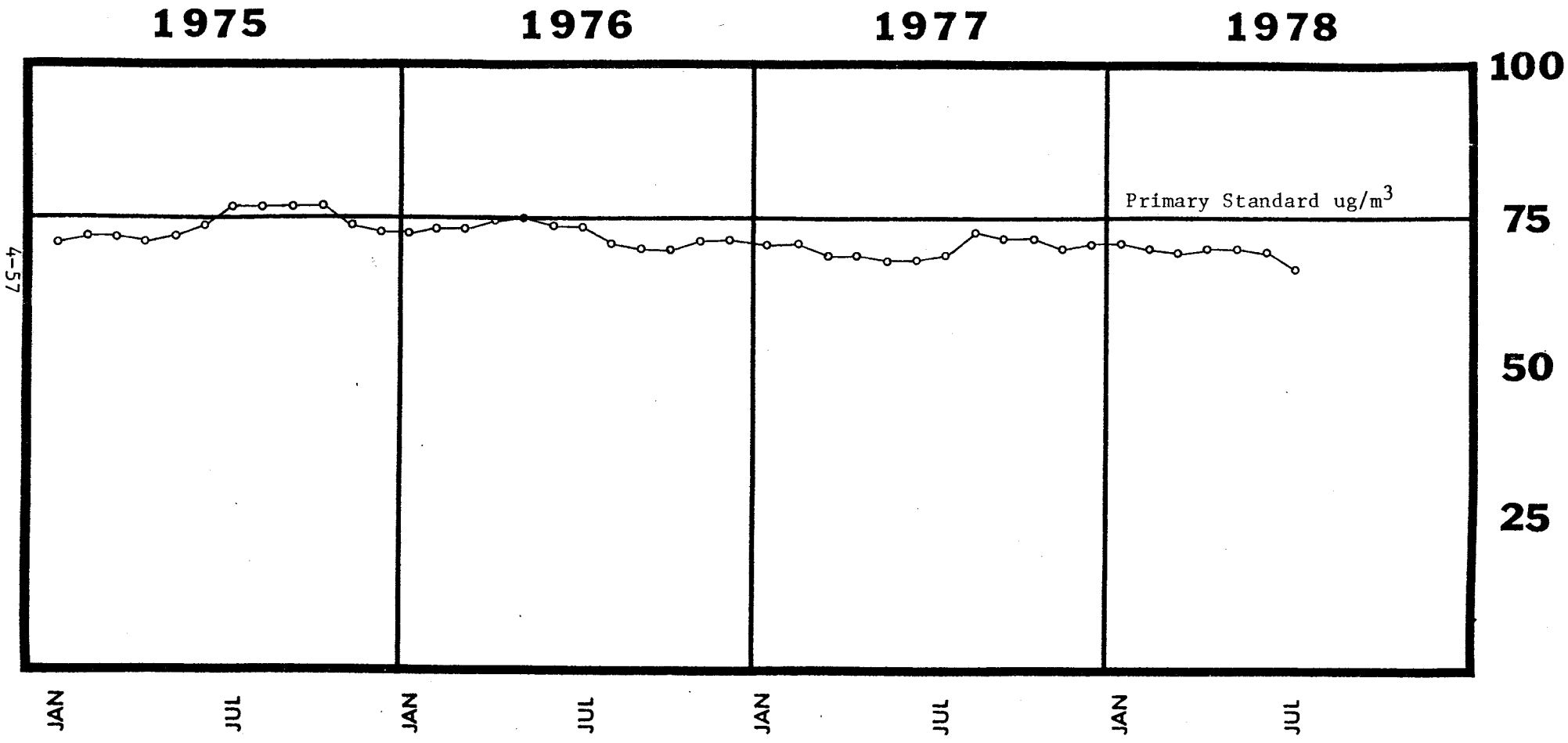



FIGURE IV-16

# GEORGETOWN HOWARD HIGH

## Twelve Month Geometric Mean of Suspended Particulates

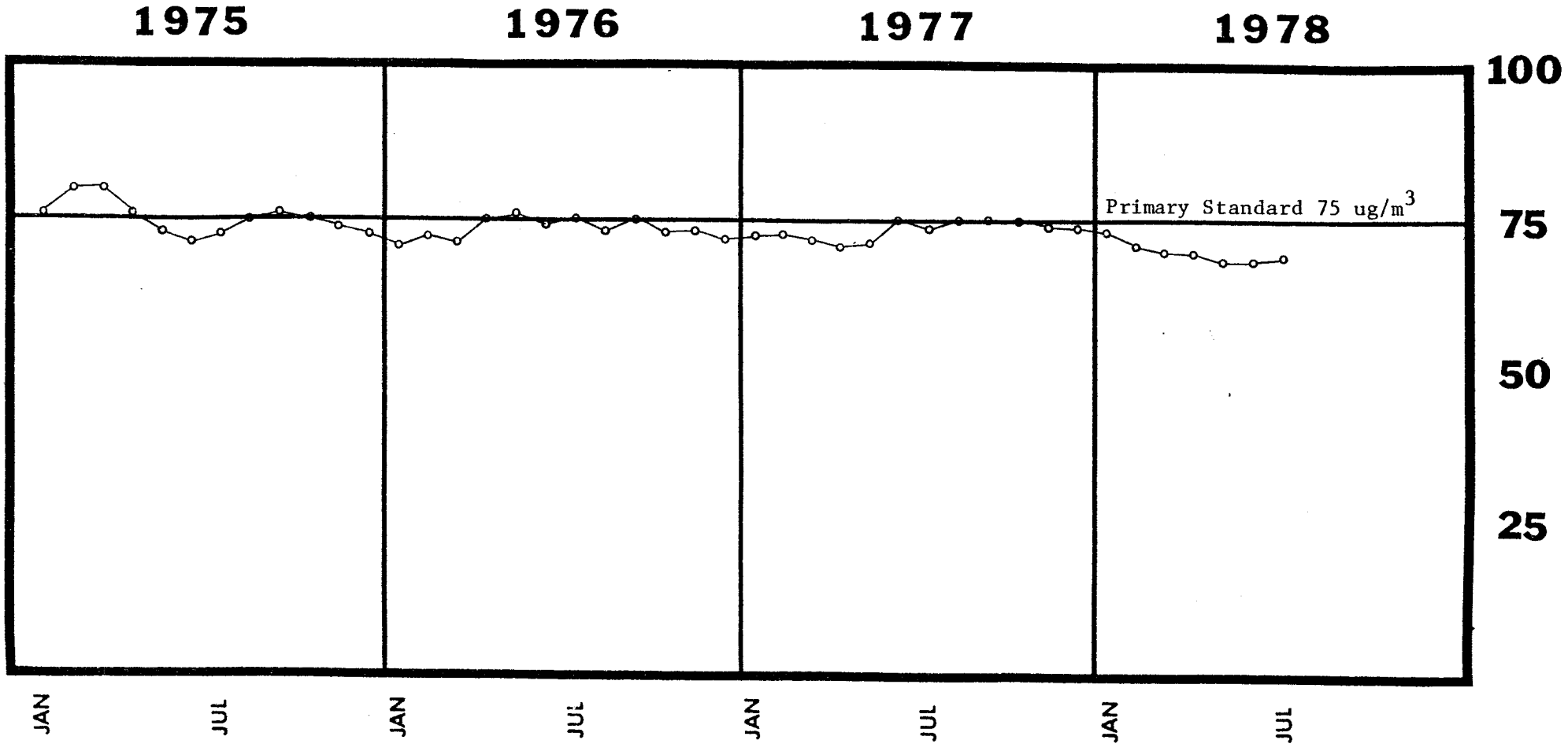



FIGURE IV-17

Table IV-10 lists reductions that have occurred since the 1975 emission inventory. Increases in emissions have generally been a result of population growth in the area and are reflected in the 1977 particulate inventory as increases in fugitive dust (area) sources.

The AQDM was used with the 1977 emission inventory and the results are contained in Appendix E. A comparison of the results using the 1977 emission inventory with the results of the Engineering-Science, Inc. report indicates that the recently noted decreases in the annual geometric mean are results of the reductions noted in Table IV-10.

Even though monitored data and the AQDM show that all areas in Georgetown are now in compliance with the primary standard for suspended particulates, and even though more recent reductions to fugitive emissions will reduce the levels even further, there remain secondary air quality violations in the area. The emission reductions shown in Table IV-10 will be enforceable through operational permit requirements. The additional requirements shall be in effect by July 1, 1979.

In order to reduce the total suspended particulate matter below the secondary standard, the Bureau of Air Quality Control shall, in keeping with its own findings and with those of the Engineering-Science group (Table IV-11), continue to study sources of fugitive process emissions and fugitive dust emissions, and to require, in accordance with the fugitive particulate matter regulation, the application of reasonably available control technology (RACT). While it is believed that all sources of fugitive (process) emissions presently have RACT controls, the Department will continue to access fugitive emission sources and will require RACT controls in the event an uncontrolled fugitive emission source is located.

TABLE IV-10

Recent Fugitive Emission Reductions at Georgetown Industries

| ITEM | EFFECTIVE DATE | EMISSION REDUCTION (TPY) | PERMIT REQUIREMENT Yes/No |
|---|---|---|---|
| **Georgetown Steel** | | | |
| Granulation on baghouse | Mar. 1977 | 2.0 | no |
| Completion of dock road paving | June 1978 | 6.4 | yes |
| Relocation of melt shop louvers | May 1978 | 50.0 | no |
| Lime handling dust control | June 1978 | 51.0 | yes |
| Metal recovery process, site relocation | Mar. 1978 | 1.0 | yes |
| Wetting down slag pile | June 1978 | 1.3 | yes |
| | | 111.7 | |
| **Georgetown Ferreduction** | | | |
| Oxide briquetting | Sept. 1978 | 11.2 | yes |
| Metalized fines briquetting | May 1978 | 9.0 | yes |
| Rail loadout system | June 1978 | 8.5 | yes |
| | | 28.7 | |
| **American Cyanimide** | | | |
| Process change bauxite prod. | May 1976 | 180.0 | yes |
| | | 180.0 | |
| **Other** | | | |
| Sweeping of Frazier St. | July 1978 | 5.0 | yes |
| Completion of 4 lane road | June 1978 | 20.0 | yes |
| | | 25.0 | |

TABLE IV-11

PARTIAL CONCLUSIONS

Georgetown, South Carolina Air Quality Maintenance Planning and Analysis Report

1. The impacted area is limited to a very small part of the County, of approximately 4 $km^2$, centered in downtown Georgetown City.
2. Without more stringent control of emissions, standards will continue to be violated at the same level throughout the decade.
3. Concentrations in the impacted area result about equally from paved and unpaved roads, from the Goergetown Steel complex, and from all other sources.
4. The most probable errors in the emission inventory, if any, are as follows:
   - o Unpaved road emissions are too great.
   - o Point source impact from the steel complex is overestimated.
   - o Fugitive emissions and upset emissions from the steel complex are not included.
5. Further analysis of the air quality data with respect to weather conditions and steel mill operating conditions might provide added insight into the source of emissions.
6. Consideration should be given to control of emissions from unpaved roads in the fringe area of Georgetown City.
7. Measures for increased control of emissions from the steel complex should be investigated.
8. Industrial process fugitive emissions can contribute significantly to TSP levels in downtown Georgetown.

In order to locate sources of fugitive dust the staff will use all available methods of identifying these sources. These methods include micro-inventory, upwind-downwind analysis, wind, pollution and dosage roses, microscopic analyses, and statistical regression analysis. The Department has a wind speed and direction station presently in operation. In addition to the wind station several microscopic analyses have already been performed. The schedule for the tasks outlined above are given in Table IV-12.

TABLE IV-12

Fugitive Dust Assessment Schedule for Georgetown Non-Attainment Area

| Item | Date |
|---|---|
| 1. Begin collection of samples for microscopic analysis | In process |
| 2. Begin wind, pollution and dosage rose analysis | May 1979 |
| 3. Microinventory | May-Sept. 1979 |
| 4. Assessment of microscopic analysis | June 1979 |
| 5. Report on Microinventory analysis | Nov. 1979 |
| 6. Report on wind, pollution and dosage rose analysis | Dec. 1979 |
| 7. Interim report on fugitive dust | Jan. 1980 |
| 8. Propose RACT application and schedules | March 1980 |
| 9. Attainment of secondary particulate standard | Dec. 1984 |

In conclusion, although a portion of Georgetown was declared non-attainment for primary suspended particulate violations, recent reductions in fugitive process emissions have reduced total suspended particulates to below the primary standards. This is borne out by actual monitored data and confirmed

by modeling results. The Bureau will, over the next 18 months, continue to study the fugitive dust problem and through the application of the offset policy, new source review procedures and the fugitive particulate matter regulations will continue to reduce the particulate loading in the Georgetown non-attainment area.

CHARLESTON NON-ATTAINMENT AREAS

Two sections of North Charleston have been declared as non-attainment, (1) the State Ports Authority, and (2) an area around the intersection of Pittsburg and Meeting Streets. These areas are delineated by natural boundaries, as rivers and creeks, and man-made barriers, as streets and highways.*

The northern limit of the State Ports Authority non-attainment area is defined by the boundary of the U.S. Army Dept (Figure IV-18). The west bank of the Cooper River is the eastern boundary, while Filbin Creek is designated as the southern boundary. Virginia Avenue serves as the western edge of this non-attainment area.

Activities within this area are entirely industrial. The State Ports Authority maintains grain elevators and several large multiple purpose warehouses in addition to equipment and storage spaces for the loading and unloading of containerized freight. Immediately adjacent to the Ports Authority is Westvaco, a paper production facility. Due to the nature of these operations, traffic flow is fairly constant year round and most of the vehicles are large trucks hauling various goods and products.

* Boundary lines which conform to existing street patterns are drawn so that the street(s) will be within the defined area. (Note: There is one exception. Interstate Highway 26 is a boundary line but it is not included within the non-attainment area).

# CHARLESTON

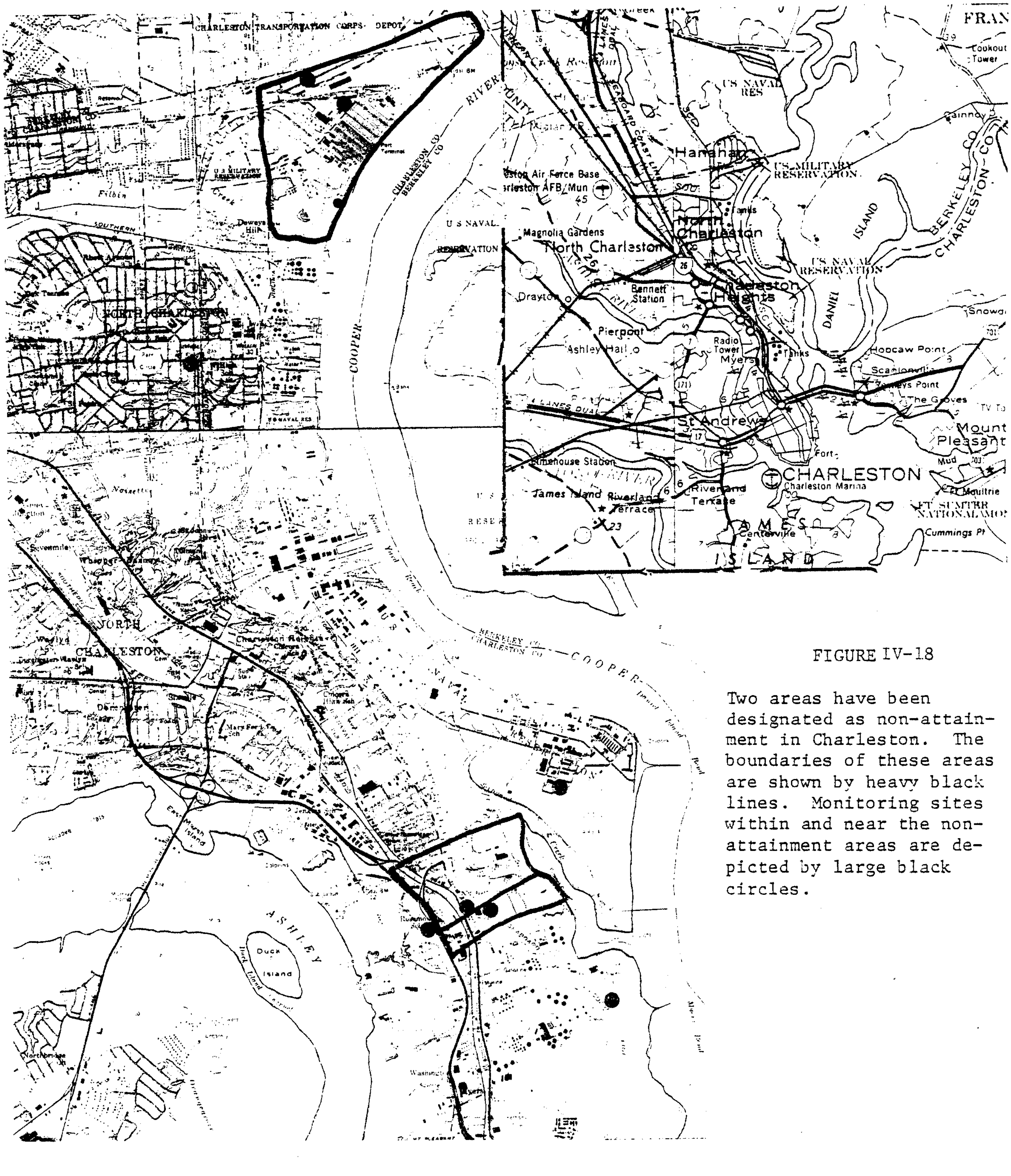



FIGURE IV-18

Two areas have been designated as non-attainment in Charleston. The boundaries of these areas are shown by heavy black lines. Monitoring sites within and near the non-attainment areas are depicted by large black circles.

The Pittsburg-Meeting area is classified non-attainment for both primary and secondary total suspended particulates (TSP). The area violating secondary standards is bounded on the north by a line parallel to Grove Avenue, on the south by Cherry Gove Avenue, and on the west by Interstate Highway 26 (Figure IV-18). The eastern boundary is defined as the west bank of Shipyard Creek. The area classified as non-attainment for both primary and secondary TSP has the same boundaries on the north (Grove Avenue), east (Shipyard Creek), and west (Interstate 26). The southern boundary is Pittsburg Avenue. Vehicle motor traffic within the area is heavy, Interstate 26 being a primary artery for both residents and tourists. Traffic studies along Meeting Street have shown that 15-20 percent of the total number of vehicles travelling this route are eighteen-wheel trucks. Land use is multiple-industrial, general, commercial, and residential.

The EPA, in 1975, commissioned Engineering-Science, Inc. to inventory the sources of particulate matter and to model the source-receptor relationships.* The inventory compiled by Engineering-Science was updated to reflect the changes that have occurred since 1975. This updated inventory (base year 1977) is contained in Appendix E and is the required inventory for both the Charleston non-attainment areas.

Table IV-13 lists emission reductions, for the Charleston area, that have either already occurred or are scheduled to occur in the near future. The Controls/Procedures responsible for the reductions shown in Table IV-13 will be made a condition of the operating permit. This will be completed by July 1, 1979. The 1977 emission inventory reflects the emissions that

* Charleston, South Carolina Air Quality Maintenance Planning and Analysis, Engineering-Science, Inc., EPA 904/9-77-013, June 1977.

TABLE IV-13

Emission Reductions in Charleston Area

| Airco | Effective Date | Emission Reduction | Permit Requirement Yes/No |
|---|---|---|---|
| Tapping (baghouse) | Mar. 1978 | 33 ton/year | yes |
| Crushing (hoods) | Mar. 1978 | 5 ton/year | no |
| Screening (water sprays) | Mar. 1978 | 3 ton/year | no |
| Portable crusher | Oct. 1978 | 5 ton/year est. | yes |
| Roadway maintenance | continuous | 9 ton/year est. | no |
| | | 55 TPY Total | |
| **Westvaco** | | | |
| #6 power boiler conversion | June 1979 | 270 ton/year | Consent Order |
| #6, 7, 8 recovery furnaces | June 1979 | 2290 ton/year | Consent Order |
| #1 & 2 lime kiln | June 1979 | 85 ton/year | Consent Order |
| Road paving | Sept. 1978 | 6 ton/year | no |
| Roadway maintenance | continuous | 2 ton/year est. | no |
| | | 2653 TPY Total | |
| **State Ports Authority** | | | |
| Yard paving | continuous | 12 ton/year est. | no |
| Rail & truck unloading cyclones | Oct. 1976 | 2000 ton/year | yes |
| Roadway maintenance | continuous | 6 ton/year est. | no |
| | | 2018 TPY Total | |
| **Naval Shipyard** | | | |
| Precipitator | July 1, 1980 | 7500 ton/year | yes |
| | | 7500 TPY Total | |
| | | 12,226 TPY grand total | |

have been eliminated but not those that will be eliminated. Also, the mathematical modelling (Appendix E) was based on the 1977 baseline data.

TABLE IV-14

Geometric Means - Charleston Monitoring Sites

| Monitor | Annual Geometric Mean (ug/m$^3$) | | | |
|---|---|---|---|---|
| | 1975 | 1976 | 1977 | July 1978 |
| 1. Charleston CHD | 55 | 51 | 47 | |
| 2. Pittsburg-Meeting | 82 | 80 | 88 | 94 |
| 3. Pittsburg II | | | | 67 |
| 4. State Ports | 72 | 75 | 64 | 63 |
| 5. James Island | 51 | 50 | 53 | 52 |
| 6. Mt. Pleasant | 31 | 36 | 36 | |
| 7. Jenkins St. | 56 | 58 | 61 | 55 |
| 8. Food Stamps | | | 51 | 52 |
| 9. Naval Base (start-up Jan. 1978) | | | | 51 |
| 10. Exxon Dock (start-up Jan. 1978) | | | | 48 |

STATE PORTS AUTHORITY AREA

The Department of Health and Environmental Control declared the State Ports Authority area non-attainment for violation of the secondary suspended particulate air quality standard. The Engineering-Science Charleston report concluded (see Table IV-15) that the Ports Authority station is impacted by localized fugitive dust sources and that the station does not represent the general urban air quality in the area. These conclusions have been confirmed by the staff's air quality modelling efforts.

The reductions listed in Table IV-13 will further reduce the particulate loading in the area. The exact amount of this reduction has not yet been quantified although it is believed to be significant. It is proposed that a microinventory of the area be conducted and upon its completion the staff will model the emissions by utilizing one of the models more compatible with

# NORTH CHARLESTON STATE PORTS

## Twelve Month Geometric Mean of Suspended Particulates

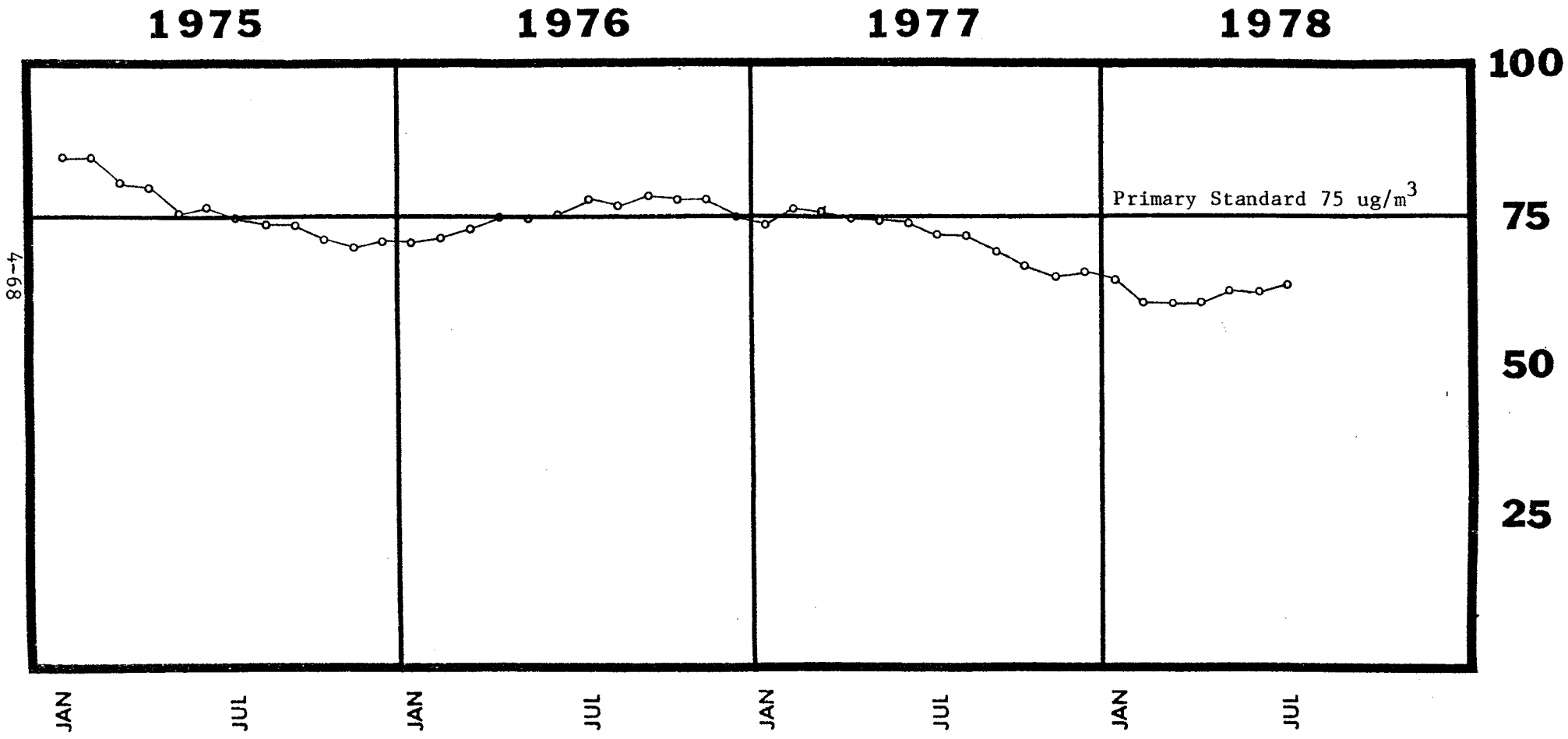



FIGURE IV-19

# PITTSBURG AVE.-MEETING ST.

## Twelve Month Geometric Mean of Suspended Particulates

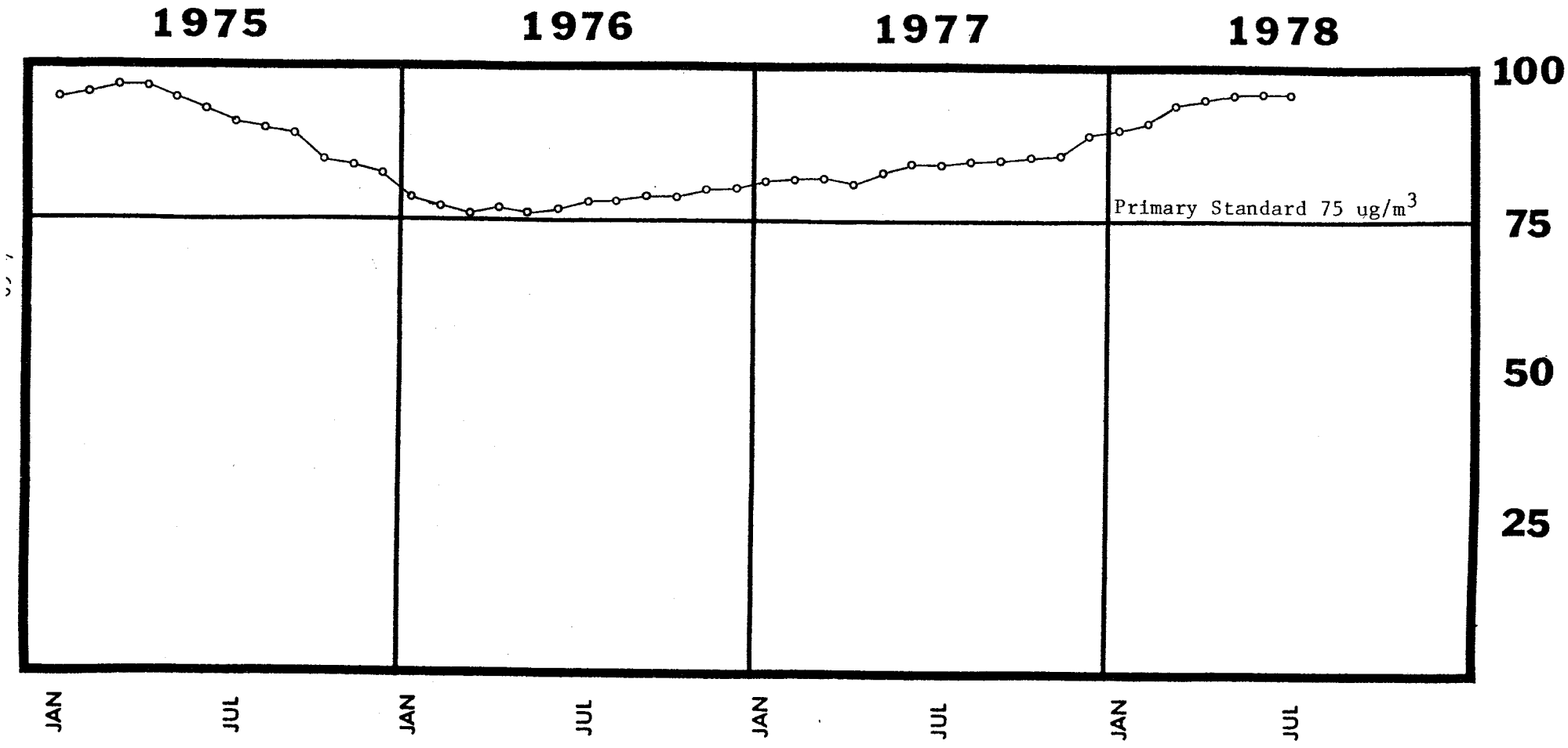



FIGURE IV-20

# PITTSBURG AVE.- #2

## Twelve Month Geometric Mean of Suspended Particulates

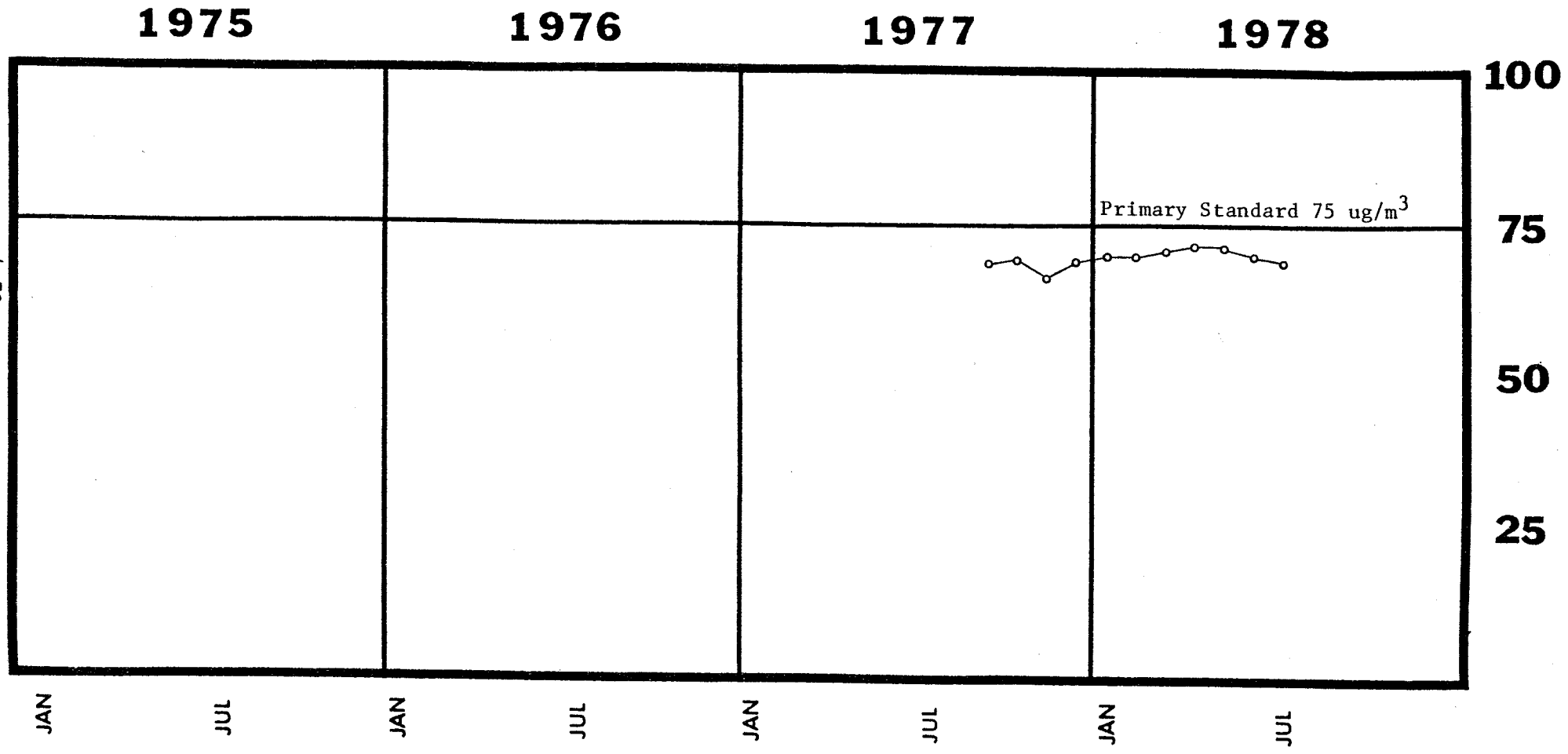



FIGURE IV-21

fugitive dust sources than the AQDM. The date of secondary suspended particulate standard attainment is projected to be December 31, 1982.

PITTSBURG AVENUE - MEETING STREET AREA

As is stated in Table IV-15, the Engineering-Science study concluded that the area around the Pittsburg-Meeting monitoring site is not representative of the general urban air quality in the area but is unduly influenced by localized fugitive dust sources. The Department intends to submit a report to EPA fully describing the monitoring site and requesting that the site be relocated and that the data not be used to determine attainment status. The Department has established a monitor approximately 1200 feet from the Pittsburg-Meeting monitor. This second monitor, designated Pittsburg II, is adequately located to be impacted by all sources which affect the general urban air quality. As an indicator of the localized nature of the particulate loading on the Pittsburg-Meeting monitor the concentration gradient between Pittsburg-Meeting and Pittsburg II is 4.2 $ug/m^3$-100 feet and is 2.9 $ug/m^3$-100 feet between Pittsburg-Meeting and Food Stamps.

While it is believed that emissions from localized fugitive dust are underestimated in the emission inventory and while the Department will more thoroughly investigate and where appropriate take action to reduce emissions of fugitive dust, the impact of fugitive emissions from Airco Alloys cannot be ignored. As is shown in Table IV-13 Airco Alloys have recently made several process changes that have reduced fugitive emissions. It is believed that these changes and Airco Alloys existing controls represent RACT.

TABLE IV-15

CONCLUSIONS OF THE CHARLESTON AIR QUALITY MAINTENANCE AND ANALYSIS REPORT

1. The air quality analysis leaves some doubt as to the source receptor relationship in at least two areas in the AQMA, those in the vicinities of the Meeting Street and Ports Authority monitoring stations. In order to have had agreement between calculated and observed values at those stations, substantial low level sources would have been required near the monitoring stations.*
2. Subjectively, it is believed that the Meeting Street and Ports Authority stations are not representative of the general urban air quality in the area. Each may be impacted by localized fugitive dust sources which have not been adequately inventoried. Such sources have little effect on the air quality in the remainder of the AQMA.
3. However, there is insufficient evidence to define the extent of the impacted areas. A requirement exists to investigate further the air quality and the sources of pollution in those areas.
4. The analysis showed that point sources contributed a maximum of 6 $ug/m^3$ to calculated concentrations. Additional control of all point sources to affect a 50% reduction in emissions would result in a maximum improvement in air quality of 3 $ug/m^3$. A more effective measure might be increased control of fugitive emissions from the point source facilities.
5. Without a major committment of funds there can be little hope of effecting an improvement in air quality by greatly reducing area source emissions since the preponderance of those emissions results from unpaved roads, many of which are in very rural areas of the study area.

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* Elevated sources or more extensive but less intense area sources would affect a much larger area and would not result in the large concentration gradient noted. For instance, the gradient between the Ports Authority and Jenkins Street station was approximately 16 $ug/m^3$-km in FY 75.

In order to continue to reduce fugitive emissions Airco Alloys is, as an operation permit condition, being instructed to submit a plan, in accordance with the schedule listed in Table IV-16, to reduce emissions from the crushing and screening operations and from the material handling involved in the crushing and screening operations. Such reduction will be required as a minimum to be as stringent as RACT.

While the plans for the new crushing and screening operation are being finalized, a portable crusher has been located near the furnace building. Interim control measures as described in Regulation 62.6, Control of Fugitive Particulate Matter, will be instituted. For example, the portable crusher permit will require an enclosure as well as a wet dust suppression system. Airco Alloys has also scheduled a stack emission test simulating upset conditions. This test will be used in conjunction with the malfunction reports to obtain a better estimate of actual emissions. Since Airco Alloys does experience many upset conditions the Department is requiring Airco Alloys to investigate and report to the Department methods to minimize emissions which occur during furnace and equipment malfunctions.

Airco Alloys is also required to investigate and to report to the Department, methods to minimize emissions occurring during the pouring and bed-breaking operations. The report will be due on January 1, 1980 and shall include cost estimates associated with any proposed controls.

It is the intent of the Department to require that the studies into methods of reducing emissions from pouring and bed-breaking and additional controls during upset periods result in controls which will constitute reasonably available control technology (RACT). In the case of the pouring and bed-breaking, as well as operating during upset periods, suitable

schedules will be assessed as soon as it is determined what constitutes RACT.

TABLE IV-16

SCHEDULE FOR REDUCING EMISSIONS FROM THE CRUSHING AND SCREENING OPERATIONS AT AIRCO ALLOYS

Macalloy

| | Not Later Than: |
|---|---|
| Submit Plan | February 28, 1979 |
| Submit Permit Application | August 1, 1979 |
| Let Material Contracts | December 31, 1979 |
| Start Construction | March 1, 1980 |
| Complete Construction | October 31, 1980 |
| Final Compliance | December 31, 1980 |

As stated earlier it is believed that the fugitive dust emissions are greater than indicated in the inventory. The Department will initiate micro-inventory of the non-attainment area to better quantify fugitive dust and process emissions. In addition the Department has purchased two vehicle counters and will use these devices to determine the traffic density in the area and will prepare a report on the effect of the traffic pattern on air quality

The Department will continue the microscopic analysis of samples and will petition EPA to loan the Department a dichotomous sampler to determine the distribution of TSP by size and temporal distribution. This information will be useful in determining source contributions. The tasks outlined here and the scheduled completion dates are given in Table IV-17.

TABLE IV - 17

TASKS AND SCHEDULED COMPLETION DATES FOR THE ASSESSMENT OF FUGITIVE DUST IN THE PITTSBURG-MEETING NON-ATTAINMENT AREA

Collect and Microscopically Analyze Samples

| | |
|---|---|
| Microinventory | April - August 1979 |
| Traffic studies | January - August 1979 |
| Request for dichotomous sampler | January 1979 |
| Collection of dichotomous sampler data | One year period |
| Microinventory report | October 1979 |
| Traffic study report | November 1979 |
| Air Quality Modeling with microinventory data | September - November 1979 |
| Fugitive dust impact report (draft) | February 1980 |
| Fugitive dust impact report (final) | May 1980 |

These data shall be used as the basis of a fugitive dust assessment and impact report. The report shall include recommended controls including associated costs and estimated emission reductions. All transportation related control findings shall be presented to the Metropolitan Planning Organization for their consideration and implementation. The projected attainment date for the primary suspended particulate standard for this area is December 31, 1982. It is projected that the secondary suspended particulate standard will be obtained by December 31, 1984.

## OXIDANT CONTROL STRATEGY

### General

Photochemical oxidants are formed through the reaction of sunlight and nitrogen oxides with volatile organic compounds (VOC). Ozone is the primary constituent of photochemical oxidants and is the only photochemical oxidant that is routinely monitored.

EPA's oxidant control strategy is based on the theory that the oxidant problem is primarily caused by concentrated VOC emissions from large urban areas (More than 200,000 population). This explanation is referred to as the "urban plume" theory. It is derived from the fact that as the wind moves the VOC emissions downwind from the urban area the action of sunlight on the organic compounds changes them into photochemical oxidants. The conclusion of this theory is that by controlling the VOC emissions from the large urban areas to a high degree and by controlling the very large (potential emissions of more than 100 tons per year) facilities in the non-urban areas, the oxidant standard can be attained.

Although this Department recognizes the problem of large concentrated emissions from the urban areas and recognizer that these emissions must be controlled the Department has preliminary data that indicates the problem is more complicated than the simple approach that EPA has put forth. The staff is analyzing the data and will prepare a report in the future.

The strategy calls for reducing the VOC emissions to attain a resultant ozone level which will remain below the standard. Because organic compounds have different reactivity rates the prediction of the necessary VOC emission

reduction is extremely complicated. EPA recognize several mathematical models, each varying in complexity, to predict the needed VOC emission reduction. The necessary data for the more complex models are not available at this time, therefore this strategy will utilize the "simple rollback model" to predict the emission reduction needed. The rollback model or method is a 1:1 ratio model that predicts an unit decrease in oxidant levels for each unit decrease in VOC emissions. In other words a 50 percent reduction in VOC emissions will result in a 50 percent reduction in oxidants.

The rollback model can be modified to account for background oxidant levels and oxidants transported to the urban area from upwind sources. Again this data is not presently available for the two urban non-attainment areas and although EPA provides recommended values for both background and transport it was determined that there would not be any advantage in using these recommended values.

The State was essentially given two oxidant control options. The first was to require controls in only the non-attainment counties. By selecting this option, offsetting reductions would be required by all major new facilities (or modification of major facilities) either locating in or impacting on a non-attainment area. In addition, all new major facilities (or modification of major facilities) proposing to locate in an undesignated area would be required to monitor prior to beginning construction.

The second option was to require controls statewide for all major facilities which would negate the monitoring and offset requirements for major new facilities and modifications of major facilities. This second option was selected for three primary reasons. (1) It is commonly believed that monitoring would show violations of the oxidant standard. (2) A staff

search indicates that there are very few offsets available for new or modified facilities, and (3) there is some indication that EPA will require the state to monitor all undesignated areas in the near future.

The sources of VOC emissions in the oxidant non-attainment areas have veen inventoried and are listed in Appendix E. In addition a list of facilities in the undesignated counties that may have potential VOC emissions of more than 100 TPY has been prepared and is also contained in Appendix E. These facilities will be inventoried by June 30, 1979.

The major sources which we can reasonably control are VOC emissions from vehicles, petroleum and manufactoring industries. This strategy will address all of the above sources. The strategies to limit VOC emissions are therefore based on : the Federally administered program to limit emissions from vehicles; the State VOC regulations (Appendix I) for stationary sources; the new source review procedures (Chapter 8) which requires the application of the lowest achievable emission rate (LAER) for a new or modified major (greater than 100 tons per year potential emissions) facility; and transportation control measures which reduce total miles travelled, and/or other means. In addition, if attainment in the urban areas is not possible by December 31, 1982 an emission inspection and maintenance program for automobiles must be initiated.

The South Carolina Volatile Organic Compound Regulations presently apply to source categories for which EPA has published Control Technique Guidelines (CTG's).Exceptions to this are coating of new vehicles and petroleum refineries, as South Carolina does not have any existing sources in either

category. In all, EPA intends to publish CTG's for the source categories shown in Table IV-18. The state will have until December of the year following the publication of a CTG to adopt regulations for that source category. As with any new regulation the Department is required to have a public hearing before adoption.

RICHLAND-LEXINGTON COUNTIES NON-ATTAINMENT AREA

In the case of oxidants EPA has specified the minimum area for non-attainment status as the county. As the Columbia urban area covers portions of Lexington and Richland counties, both counties were declared non-attainment. In addition, since the Columbia urban area exceeds 200,000 population, the two-county area has been declared a major urban area and as such it is required to exhibit more stringent control on stationary sources of VOC and to consider transportation control measures.

The design value for oxidant reduction has been specified by EPA to be the highest of the second high values for the period 1975-1977. This level is 305 $ug/m^3$ for the Richland-Lexington area. Using this value and the oxidant standard of 160 $ug/m^3$ the amount of reduction* needed is:

$$\frac{305\ ug/m^3 - 160\ ug/m^3}{305\ ug/m^3} = .475$$

or a 47.5 percent reduction in VOC emissions.

* Workshop on Requirements for Non-attainment Area Plans, EPA, OAQPS No. 12-103, revised April 1978.

TABLE IV-18

STATIONARY SOURCES OF VOLATILE ORGANIC COMPOUNDS

AND SCHEDULE FOR APPLICABLE CONTROL TECHNIQUES GUIDELINES

Contained in Proposed Regulations

| SOURCE CATEGORY |
|---|
| Large Appliance Manufacture |
| Magnet Wire Insulation |
| Gasoline Bulk Plants |
| Metal Furniture Manufacture |
| Petroleum Liquid Storage, Fixed Roof Tanks |
| Degreasing |
| Bulk Gasoline Terminals |
| Petroleum Refinery Vacuum Systems, Wastewater Separators and Process Unit Turnarounds |
| Cutback Asphalt Paving |
| Surface Coating of Automobiles, Cans, Metal Coils, Paper, and Fabric Products |
| Service Stations, Stage 1 |

State Regulations Required by December 1979

| SOURCE CATEGORY | FINAL REPORT DATE |
|---|---|
| Petroleum Refinery Fugitive Emissions (leaks) | Published |
| Surface Coating of Miscellaneous Metal Parts and Products | Published |
| Vegetable Oil Processing | Published |
| Factory Surface Coating of Flatwood Paneling | Published |
| Pharmaceutical Manufacture | December 1978 |
| Rubber Products Manufacture | December 1978 |
| Graphic Arts (printing) | December 1978 |

TABLE IV-18 (cont'd)

| SOURCE CATEGORY | FINAL REPORT DATE |
|---|---|
| Service Stations, Stage II | December 1978 |
| Petroleum Liquid Storage, Floating Roof Tanks | December 1978 |
| Organic Chemical Manufacture | December 1978 |
| Dry Cleaning | December 1978 |
| Architectural and Miscellaneous Coatings | December 1978 |
| Proposed CTG's | |
| Ship and Barge Transport of Gasoline and Crude Oil | June 1979 |
| Wood Furniture Manufacture | June 1979 |
| Organic Chemical Manufacture | |
| Waste Disposal | June 1979 |
| Storage and Handling | June 1979 |
| Natural Gas and Crude Oil Production | Screening studies underway |
| Natural Gas and Natural Gasoline Plants | Screening studies being initiated |
| Adhesives | Not yet scheduled |
| Other Industrial Surface Coatings | Not yet scheduled |
| Auto Refinishing | Not yet scheduled |
| Other Solvent Usage | Source strengths of major categories being confirmed before initiating CTG analysis. |

Table IV-19 indicates the VOC emissions by source category for the 1977 baseline year and for the years 1982 and 1987. The projected emissions for stationary sources include estimated reductions for the 10 sources for which there are proposed regulations and for the sources for which there are published CTG's. The total VOC emissions from all sources for the 1977 base year is 32,501 tons per year (TPY). The projected emissions for 1982, which includes reductions from new automobile emission standards (without I/M program), and RACT controls to applicable stationary sources are 22,378 TPY. This represents a VOC emission reduction of $\left(\frac{32,501 - 22,378}{32,501} = .31\right)$ or 31 percent. EPA estimates the maximum reduction that could be expected from transportation control measures (TCM) is in the order of 5 percent and for stationary controls the maximum expected reduction is 10 percent. Therefore, even if the maximum expected reductions by 1982 could be achieved, the reductions required to meet the oxidant standard cannot be accomplished by 1982.

The Central Midlands Regional Planning Council (CMRPC) has been assigned, by the Governor of the State, the responsibility for analyzing an implementing the TCM's. The CMRPC has implemented several programs which will reduce VOC emissions from vehicles, however, they have not completed the necessary analysis quantifying those reductions. Additional information can be found in Appendix J.

Since it will not be possible to achieve the necessary VOC emission reductions through the application of RACT, new automotive performance standards and transportation control measures, the DHEC requests that a time extension beyond 1982 be granted. In order to qualify for such time extension, an inspection and maintenance (I/M) program for automotive

TABLE IV-19

| MAJOR SOURCE CATEGORY | Richland-Lexington 1977 Emissions | % | 1982 Emissions | % | 1987 Emissions | % |
|---|---|---|---|---|---|---|
| Mobile Sources | | | | | | |
| Without I/M Program | 16,337 | 50.3 | 10,110 | 45.2 | 5812 | 33.0 |
| With I/M Program[1] | | | 9,538 | 43.7 | 4463 | 27.5 |
| Petroleum Industry | | | | | | |
| Bulk Plants[2] | 250 | | 12 | | 12 | |
| Service Station Loading (Stage I) and Unloading (Stage II) | 249 | | 24 | | 24 | |
| Bulk Terminals[2] | 0 | | 0 | | 0 | |
| Subtotal | 499 | 1.5 | 36 | .2 | 36 | .2 |
| Industrial/Commercial | | | | | | |
| Manufacturing | 89 | | 89 | | 83 | |
| Surface Coating | 8490 | | 5179 | | 4421 | |
| Degreasing | 694 | | 396 | | 396 | |
| Dry Cleaning | 465 | | 465 | | 381 | |
| Graphic Arts | 375 | | 375 | | 138 | |
| Subtotal | 10,113 | 31.1 | 6504 | 29.8 | 5419 | 33.3 |
| Asphalt Paving | 209 | .6 | 0 | 0 | 0 | 0 |
| Area Sources | 5343 | 16.4 | 5728 | 26.3 | 6338 | 39.0 |
| Total Without I/M Program | 32,501 | | 22,378 | | 17,605 | |
| Total With I/M Program | | | 21,806 | | 16,256 | |

1 Program assumed to have a stringency of 30% and mechanics training.

2 Estimated from available data - detailed 1977 inventory not yet completed.

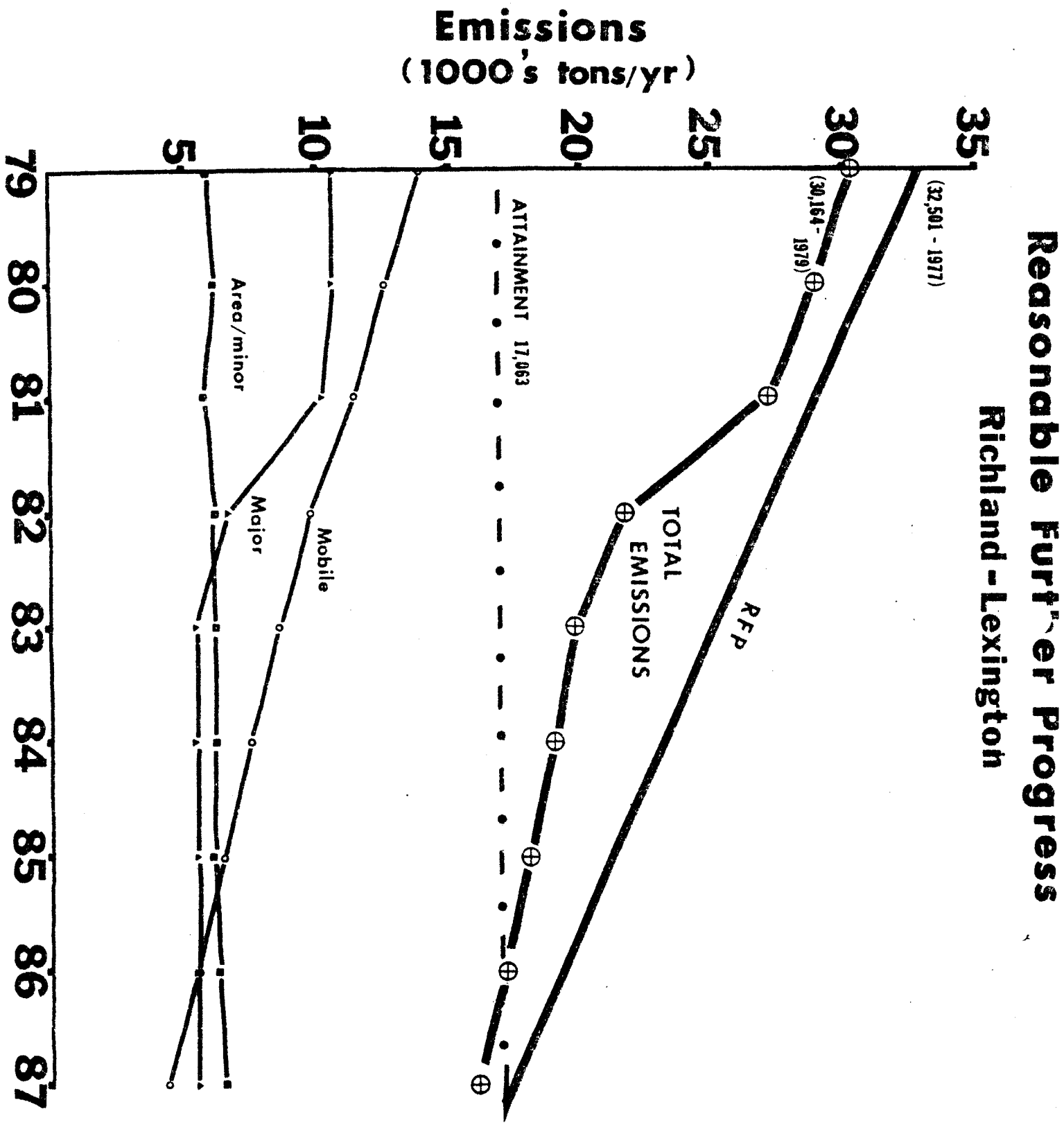
emissions is required. The I/M program will be supervised by the S. C. Department of Highways and Public Transportation as directed by Governor Edwards in a letter to John C. White, Regional Administrator, EPA dated March 30, 1978 (See Appendix I). The Department of Highways and Public Transportation is preparing for this contingency and the projected schedule for implementation of that program can be found in Appendix J.

The projected VOC emissions for 1987, assuming an I/M program having a stringency of 30 percent and mechanics training, are 16,256 which represents a 50 percent reduction. The 30 percent stringency factor and the resultant decreases in mobile emissions is based on national figures and are used here for purposes of illustration. The actual stringency factor will be based on the data received during a voluntary I/M program (in the event such a program is inititated). The stringency factor will be set to insure the required 25 percent decrease in mobile emissions beyond the emissions that would have occurred without such a program.

The projected total emission reduction for 1987 is approximately 800 TPY greater that the required reduction of 15,438 TPY. It is planned to allocate this 800 TPY as a growth allowance for the area, and, in general, to require emission offsets only after this amount is allocated.

Figure IV-22 is the "Reasonable Further Progress" (RFP) chart for the Richland-Lexington oxidant non-attainment area. This RFP chart illustrates the RFP line as well as the increase and/or decrease in VOC emissions by major source categories and total emissions for the period 1979-1987. The exception to the statement that emission offsets are not required until the growth allocation is consumed can be illustrated by the RFP chart. In

FIGURE IV-22


Reasonable Furt"er Progress
Richland-Lexington
Emissions
(1000's tons/yr)
35
30
25
20
15
10
5
79
80
81
82
83
84
85
86
87
(32,501 - 1977)
(30,164 - 1979)
RFP
TOTAL EMISSIONS
ATTAINMENT 17,063
Mobile
Major
Area/minor

the event a new or modified facility or source would increase emissions above the RFP line, emissions greater than those allowed by RFP would have to be "offset". It is apparent from the RFP chart that this would be unlikely to occur except in the first two years.

The Department is required to submit to the EPA, annual reports describing reasonable further progress. This report will contain the emissions reductions for the year, emissions growth for that period and any projected emission increases.

CHARLESTON-BERKELEY COUNTIES NON-ATTAINMENT AREA

The Charleston-Berkeley counties were originally declared to be non-attainment for oxidants based only on the population of the area. However, in June 1978 an ozone monitor was located in the area and violations of the standard have occurred.

Since the Charleston urban area exceeds a population of 200,000 and extends into Berkeley County, both counties were designated a major urban non-attainment area.

As the area did not have an ozone monitor for the period 1975-1977, EPA has directed the State to use the second high ozone value for which monitoring data is available as the design value. In the case of the Charleston-Berkeley area this second high value is 255 $ug/m^3$. Therefore, the emission reduction necessary is:

$$\frac{255\ ug/m^3 - 160\ ug/m^3}{255\ ug/m^3} = .373$$

or 37.3 percent.

Table IV-20 shows baseline year emissions of 25,144 TPY and 1982 year emissions of 17,431 TPY. Therefore, the projected VOC emission reduction between 1977 and 1982 is 30.7 percent. The additional reductions that could occur from the transportation control measures can be expected to add only a few percentage points to the figure above. Therefore, an I/M program will be necessary in the Charleston-Berkeley area in order to obtain the necessary time extension beyond 1982. The I/M program will be supervised by the S. C. Department of Highways and Public Transportation (DHPT). The projected schedule for implementation of the I/M program is contained in Appendix J.

Using the projected 1987 emission level (with I/M program) a minimum reduction of 44.2 percent can be expected. This is only 1744 TPY above the amount required and will be used for growth. The emission reductions that will occur due to TCM's which have been implemented or will be implemented will provide for a further growth factor.

The Berkeley-Charleston-Dorchester Regional Planning Council (BCDRPC) has been assigned the task of analyzing, planning and implementing the TCM's for the non-attainment area. Several improvements have been implemented since the 1977 base year inventory. It is estimated that a 5 percent reduction in VOC emissions can be expected from TCM's. This reduction should provide additional growth for the area before requiring emission offsets from new industry. Information on TCM's for this area can be found in Appendix J.

TABLE IV-20

Charleston-Berkeley

| MAJOR SOURCE CATEGORY | 1977 Emissions | % | 1982 Emissions | % | 1987 Emissions | % |
|---|---|---|---|---|---|---|
| Mobile Sources | | | | | | |
| Without I/M Program | 11,626 | 46.2 | 6862 | 38.5 | 3839 | 25.7 |
| With I/M Program[1] | | | 6462 | 37.1 | 2913 | 20.8 |
| Petroleum Industry | | | | | | |
| Bulk Plants[2] | 204 | | 11 | | 11 | |
| Service Station Loading (Stage I) and Unloading (Stage II) | 451 | | 49 | | 49 | |
| Bulk Terminals[2] | 1384 | | 915 | | 915 | |
| Subtotal | 2039 | 8.1 | 975 | 5.6 | 975 | 7.0 |
| Industrial/Commercial | | | | | | |
| Manufacturing | 611 | | 611 | | 566 | |
| Surface Coating | 765 | | 630 | | 430 | |
| Degreasing | 697 | | 526 | | 526 | |
| Dry Cleaning | 329 | | 329 | | 237 | |
| Graphic Arts | 97 | | 97 | | 23 | |
| Subtotal | 2499 | 9.9 | 2193 | 12.6 | 1782 | 12.7 |
| Asphalt Paving | 250 | 1.0 | 0 | 0 | 0 | 0 |
| Area Sources | 8730 | 34.7 | 7801 | 44.8 | 8351 | 59.6 |
| Total Without I/M Program | 25,144 | | 17,831 | | 14,947 | |
| Total With I/M Program | | | 17,431 | | 14,021 | |

1 Program assumed to have a stringency of 30% and mechanics training.

2 Estimated from available data - detailed 1977 inventory not yet completed.

The RFP Chart for the Charleston-Berkeley non-attainment area is contained in Figure IV-23. It is unlikely that the RFP line would be exceeded by any potential new or modified facility and/or source for the period 1979-1987. However, if this should occur such a source and/or facility would be required to obtain emission offsets for any emissions above the RFP line. Annual reports to EPA will track decreases and increases in VOC emissions.

YORK COUNTY NON-ATTAINMENT AREA

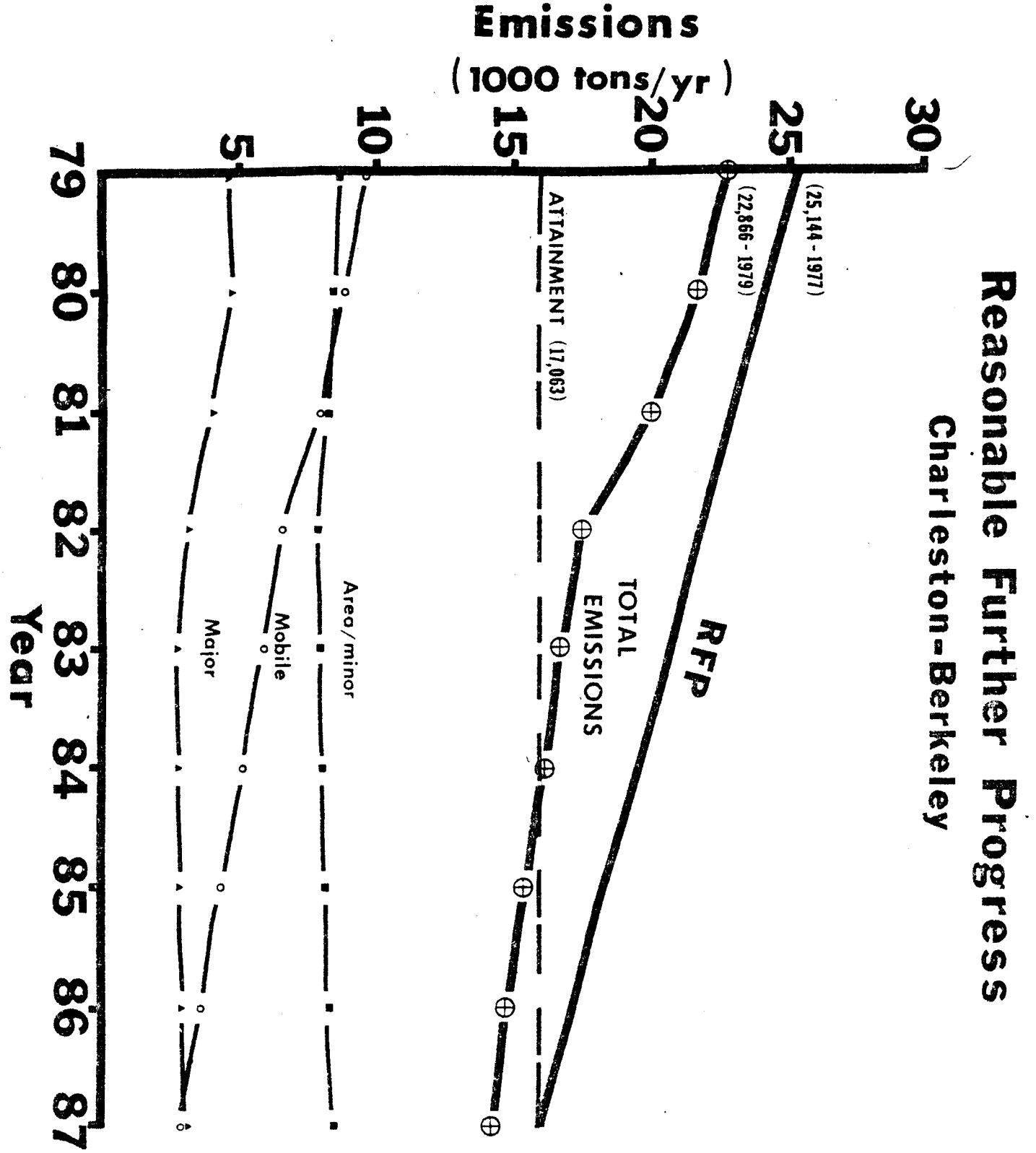
The Environmental Protection Agency has specified that non-urban oxidant non-attainment areas have only to control major stationary sources and to have a current (1977) emission inventory. The VOC source regulations (Appendix I) and the emission inventory (Appendix E) satisfy the two requirements.

In addition, as for all non-attainment areas, major new or modified sources must have Lowest Achievable Emission Reductions (LAER) but do not have to obtain emission offsets.

UNDESIGNATED COUNTIES

In the undesignated counties of the state major (potential VOC emissions greater than 100 TPY) stationary sources will have to comply with the VOC regulations, and major new or modified sources will have to meet the LAER requirements. However, new or modified sources will not have to monitor or obtain emission offsets. The emissions inventory has not yet been completed for the undesignated counties, but a list of sources that may have the potential to emit 100 TPY has been compiled and is contained in Appendix E. These sources shall be inventoried by June 30, 1979 and will be required to comply with applicable VOC regulations if they have the potential to emit 100 TPY of VOC.

FIGURE IV-23


Reasonable Further Progress
Charleston-Berkeley
Emissions
(1000 tons/yr)
30
25
20
15
10
5
(25,144 - 1977)
(22,866 - 1979)
ATTAINMENT (17,063)
RFP
TOTAL
EMISSIONS
Area/minor
Mobile
Major
79
80
81
82
83
84
85
86
87
Year

## CARBON MONOXIDE CONTROL STRATEGY

There are two areas of the state that have been declared non-attainment for carbon monoxide (CO). These areas are the corporate city limits of Columbia and Rock Hill. A search of the two areas has not identified any stationary sources of CO, therefore, it is assumed that mobile sources are the predominant contributors. The contribution from area sources has not yet been calculated but is expected to be minor.

The primary standards for CO are:

| | |
|---|---|
| 8 hour | 10,000 $ug/m^3$ |
| 1 hour | 25,000 $ug/m^3$ |

not to be exceeded more than once per year.

Table IV-21 lists, for Columbia and Rock Hill, the CO design level based on 1977 monitoring data. Table IV-21 also lists, for the urban portions of Richland and York Counties, the 1977 CO emissions from mobile sources and the projected emissions for 1982 and 1987. The emissions were derived from the EPA Mobile I model. Further data can be found in Appendix E.

TABLE IV-21

Carbon Monoxide Levels in Non-attainment Areas

| | 1977 Design Level $ug/m^3$ | % Exceeding Standard | CO Emissions (TPY) 1977 | 1982 | 1987 |
|---|---|---|---|---|---|
| Columbia * | 12.1 | 17 | 56,129 | 35,489 | 18,071 |
| Rock Hill ** | 15.0 | 50 | 9,586 | 9,178 | 6,853 |

* With I/M Program - program assumed to have a stringency of 30% and mechanics training.

** Without I/M

Ideally the CO non-attainment should be modelled using the APRAC-II model. However, the model was not available at the time of writing, therefore, the rollback method is used for purposes of illustration. In the case of both Rock Hill and Columbia only the 8 hour standard has been exceeded.

As is noted from Table IV-21, Columbia has a CO design level of 12.1 $ug/m^3$ which is 17 percent above the primary standard. Because the Richland-Lexington area will require an I/M program for VOC control, the projected CO emissions are based upon the I/M schedule. The figures in Table IV-21 indicate that Columbia can expect a 37 percent decrease in CO by 1983 and a 63 percent decrease by the end of 1987. Although it is obvious that Columbia should not have a problem in attaining the CO standard by 1983, the Department will model the area by using the APRAC-II model. This modeling effort should be completed in time to include the results in the 1980 annual report to EPA.

Rock Hill has a design level of 15 $ug/m^3$ which is 50 percent above the 8 hour primary standard. Using linear rollback and the projected emissions for 1982 and 1987 it is apparent that the percent reductions (4 and 29) are significantly less than the 50 percent reduction necessary. As stated, the rollback model does not give true projections and should not be used other than as a preliminary assessment tool.

The Department will collect the necessary data for the APRAC-II model and prepare and submit to EPA by July 1,1979, the data for the APRAC model. The Department shall include the results of the modeling effort in the 1980 annual report to EPA. The report will discuss a schedule of the necessary actions indicated by the modeling efforts.

Although it is believed that the problem is not as serious as indicated by the rollback model, it is conceivable that measures such as transportation control or I/M program could ultimately be needed. For example, the projected 1982 emissions with an I/M program are 4487 TPY which translate into a 53 percent decrease using the rollback method.

## AIR QUALITY SURVEILLANCE

An air quality surveillance network has been designed and is established within the State of South Carolina to provide information to be used as a basis for the following actions:

1. To judge compliance with and/or progress being made toward meeting ambient air quality standards.
2. To activate control procedures in the event of an air pollution episode.
3. To observe pollution trends in both urban and rural portions of the State. Information on rural areas is needed to evaluate whether air quality in relatively clean portions of the State is significantly deteriorating and to gain knowledge about background levels.
4. To provide data for development and evaluation of abatement strategies and for the development and validation of diffusion models.
5. To provide data for pre-monitoring requirements of PSD where feasible under Part C of the Clean Air Act.

### BASIS FOR NETWORK DESIGN

The numbers and types of samplers are based on the following considerations:

1. Priority classification of the region (see appendix Air Quality Control Region).
2. Industrial and population density
3. Recommendations of the Environmental Protection Agency (as required by Federal Regulation).

After considering such practical aspects as the availability of adequate housing, power supply and security, the location of sampling sites was based on the following considerations:

1. Location in areas of estimated maximum pollutant concentration.

2. Location in rural areas for background determinations.

3. Location in areas with most potential for an Air Pollution Episode.

All sampling stations are located approximately ten to fifty feet above ground level to eliminate entrainment of street particulates, as well as direct influence of automobile exhaust emissions. Locations have also been selected so that the immediate area is free of local emissions.

The locations of sampling sites, as well as sampler types are listed in Table 5-1. Primary sites, those located in areas of estimated maximum pollutant concentrations, are indicated by an asterisk in Table 5-1. Additional sites will be established, or existing sites will be relocated, as changes in population and industrial densities dictate.

TYPES AND METHODS OF SAMPLING

The types of instrumentation used as well as the frequency of sampling and analysis are those recommended by the Environmental Protection Agency in the Federal Register, Volume 36, Number 84, April 30, 1971. The following general types of monitoring instruments are used:

1. Continuous Monitoring Instruments - These are instruments designed to sample the ambient air continuously and measure a specified pollutant. The pollutant is automatically analyzed and the results are recorded on strip charts. These instruments monitor sulfur dioxide, ozone, carbon monoxide, nitrogen dioxide, and non-reactive hydrocarbons.

2. Manual Sampling Devices - These are devices that sample the ambient air into a collection device for a preselected time period of from one hour up to a month. At the end of the sampling period, the sample must be manually removed and sent to a laboratory for analysis. The results of the analysis represent an average concentration of the pollutant over the sampling period. These devices include, but are not

limited to, high volume air samplers for suspended particulates and gas bubblers for sulfur dioxide and nitrogen dioxide.

3. Semi-continuous Monitoring Instruments - These types of instruments combine the features of the above two types. That is, for pre-selected time periods a sample of air is collected. The instrument automatically proceeds in a continuous cycle performing the sampling. Then analysis is performed in the Laboratory. At the present time, the only instrument of this type being used in South Carolina is the double-tape sampler for fluoride monitoring.

METHODS OF DATA HANDLING AND ANALYSIS

Analysis methods are summarized in Table 5-2. Laboratory instrumentation used in support of field operations includes:

1. Perkin Elmer Model 303 Atomic Absorption Spectrophotometer - for trace analysis of metals in suspended particulates.
2. Water Extraction Units - for sulfate, nitrate and chloride determinations in suspended particulates.
3. Spectrophotometer - for determination of sulfur dioxide and other air contaminants.
4. Perkin Elmer Model 881 Gas Chromatograph and Model 421 Infrared Spectrophotometer - for separation and identification of organic material and gaseous pollutants.
5. Technicon Autoanalyzer AAII - for automated analysis of bubbler samples for sulfur dioxide and nitrogen dioxide. Also used in automated analysis for sulfates, nitrates and chlorides in suspended particulates.

The mention of a manufacturer's name in the text and tables of this section serves only as an identifier and does not constitute an endorsement by the South Carolina Department of Health and Environmental Control.

The Analytical and Data Services Division utilizes an IBM System 7 computer to handle manual gas sampling data. Other data are handled in the following manner:

1. Manual Sampling - Field data are compiled on special SAROAD (Storage and Retrieval of Aerometric Data) compatible forms which identify sampling site, pollutant collection method, date and time, sampling period and initial and final airflow. This method applies to high volume air samplers and gas bubblers.
2. Continuous Monitoring - The strip charts obtained from continuous monitoring equipment are read and averaged manually for one hour averages and recorded on SAROAD forms for keypunching. Examples of the SAROAD forms are contained in the appendix to this plan.
3. Data Reporting - The data from the above mentioned sampling and monitoring equipment are keypunched and shipped quarterly to the National Aerometric Data Bank. Additonally, a data report is published annually in the "Air Pollution Measurements of the South Carolina Air Sampling Network"; data are also available, upon request for any specific location of interest.

MOBILE LABORATORY

In addition to the air quality surveillance network, the Air Quality Control Laboratory also operates a mobile laboratory van. The mobile laboratory is used for special studies, random sampling and air pollution episode sampling. In addition to wind measuring and recording capability, the mobile laboratory can be equipped for particulate sampling, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone and non-methane hydrocarbons.

## AIR POLLUTION EPISODE

The sampling sites listed in Table 5-1 which are identified as primary sites have the continuous monitoring capability essential during an Air Pollution Episode. The Air Pollution Episode Manual contains details and plans for air quality monitoring during an episode.

## METEOROLOGICAL EQUIPMENT

In addition to its air quality monitoring and sampling equipment, the Air Quality Control Laboratory also maintains equipment for continuous measurement of wind direction and velocity. This equipment is useful in the development of diffusion models, determining optimum sampler locations and for other special studies. The laboratory currently possesses two MRI, two Westinghouse and six EcoWind wind recorders. Five of these recorders are at permanently established sites. Several of the units are moved and erected as current requirements dictate.

## QUALITY ASSURANCE

The agency has a rigid quality assurance program which includes quality control checks throughout the analysis and data reduction system to assure that the measurements are made under acceptable conditions.

Continuous analyzers must be calibrated during installation and recalibrated whenever anyone of the following conditions occur:

1. Control limit is exceeded for the span check.
2. After repair of a malfunctioning analyzer.
3. After replacement of major components.
4. Failure of an independent audit. Each continuous analyzer will be independently audited once every tow weeks as a minimum.

High-volume air samplers are calibrated every three months with at least one independent audit while in service. Collocated samplers are utilized to asses: data for precision.

Precision and accuracy data will be reported quarterly for each parameter monitored.

TABLE 5-1 AIR QUALIT SURVEILLANCE NETWORK

| | City | Location | UTM Coordinates (Km) | Site Type | High Volume Sampler | Bubbler $SO_2$ | Bubbler $NO_2$ | Continuous $SO_2$ | Continuous $NO_2$ | Continuous CO | Continuous $O_3$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | AQCR# 53 Augusta - Aiken Interstate | | | | | | | | | | |
| | North Augusta | Police Dept. | N 3705.7 E 410.1 | 13 | X | | | | | | |
| (X) | Beech Island | | | | X | X | X | X | | | |
| (X) | Holly Hill | | | | X | | | | | | |
| | Aiken | Eustis Park School | N 3714.2 E 432.1 | 13 | X | | | | | | |
| | Orangeburg | Co. Health Dept. | N 3704.6 E 507.6 | 13 | X | | | | | | |
| | AQCR# 198 Camden - Sumter Intrastate | | | | | | | | | | |
| | Sumter | Co. Health Dept. | N 3753.8 E 561.6 | 13 | X | | | | | | |
| | Sumter | Water Plt. #2 | N 3753.5 E 561.8 | 21 | X | X | X | | | | |
| | Camden | Co. Health Dept. | N 3793.2 E 571.2 | 13 | X | X | X | | | | |
| | Bishopville | Agricultural Bldg. | N 3786.2 E 569.3 | 13 | X | | | | | | |
| | AQCR# 199 Charleston Intrastate | | | | | | | | | | |
| (X) | Grover | | | | X | X | X | | | | |
| | Mt. Pleasant | Fire Station | N 3628.0 E 605.4 | 22 | X | | | | | | |
| * | N. Charleston | Meeting @ Pittsburg | N 3633.0 E 598.0 | 21 | X | | | X | X | | |
| | Goose Creek | Westview Elem. School | N 3651.9 E 589.0 | 13 | X | X | X | | | | |
| | N. Charleston | Army Reserve | N 3641.6 E 596.7 | 21 | X | | | X | | | |
| | N. Charleston | Navy Base | N 3634.2 E 599.0 | 22 | X | | | | | | |
| | N. Charleston | Exxon Dock | N 3632.2 E 599.4 | 21 | X | | | | | | |
| | Charleston | Mt. Pleasant St. | | | X | X | X | | | | |
| | N. Charleston | Tri-County TEC | N 3643.3 E 596.0 | 21 | X | | | | | | |
| | Charleston | Co. Hospital | N 3627.4 E 598.2 | 13 | X | | | | | | |
| | James Island | Fire Station | N 3623.0 E 600.0 | 22 | X | | | | | | |
| | N. Charleston | State Ports | N 3640.4 E 596.6 | 21 | X | | | | | | |
| | N. Charleston | Jenkins St. F. S. | N 3638.5 E 595.6 | 13 | X | | | | X | | |
| | Bushy Park | Red Bank Landing | N 3647.7 E 599.2 | | X | X | X | | | | |
| (X) | Harleyville | | | | X | | | | | | |
| (X) | Charleston | | | | | | | | | X | |
| | Bushy Park | Pump Station | N 3650.2 E 599.2 | 34 | | | | | | | X |

* - Maximum pollution concentration

TABLE 5-1 AIR QUALITY SURVEILLANCE NETWORK (Continued)

| | City | Location | UTM Coordinates (Km) | Site Type | High Volume Sampler | Bubbler $SO_2$ | Bubbler $NO_2$ | Continuous $SO_2$ | Continuous $NO_2$ | Continuous CO | Continuous $O_3$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | AQCR# 200 Columbia Intrastate | | | | | | | | | | |
| | Columbia | Owens Field | N 3759.5 3 499.8 | 23 | X | | | | | | |
| * | Columbia | DHEC | N 3770.5 E 496.1 | 23 | X | | | | X | X | |
| | Pontiac | Sesquicentennial St.Pk. | N 3783.7 E 514.1 | 32 | X | | | | | | |
| | Columbia | Water Plant | N 3762.5 E 495.2 | 23 | X | X | X | | | | |
| | W. Columbia | Co. Health Dept. | N 3759.4 E 493.0 | 13 | X | | | | | | |
| (X) | Irmo | | | | X | X | X | | | | |
| (X) | Wateree | | | | X | X | X | | | | |
| | Columbia | Co. Health Dept. | N 3766.0 E 497.8 | 23 | X | | | | | | |
| (X) | Columbia | | | | | | | | | X | |
| | State Park | State Park Complex | N 3772.0 E 502.9 | 31 | | | | | | | X |
| | AQCR# 201 Florence Intrastate | | | | | | | | | | |
| | Florence | Co. Health Dept. | N 3784.7 E 615.3 | 13 | X | X | X | | | | |
| | Darlington | Co. Health Dept. | N 3796.2 E 604.4 | 13 | X | | | | | | |
| | Dillon | City/Co. Office Bldg. | N 3809.5 E 649.2 | 13 | X | | | | | | |
| | AQCR# 203 Greenwood Intrastate | | | | | | | | | | |
| | Greenwood | Co. Health Dept. | N 3774.1 E 392.5 | 23 | X | X | X | | | | |
| | Laurens | Co. Health Dept. | N 3817.8 E 406.6 | 21 | X | | | | | | |
| | AQCR# 202 Greenville Spartanburt Intrastate | | | | | | | | | | |
| | Anderson | Dept. Social Services | N 3819.0 E 348.3 | 13 | X | X | X | | | | |
| | Clemson | Agri. Eng. Bldg. | N 3838.4 E 331.9 | 22 | X | X | X | | | | |
| | Gaffney | Co. Health Dept. | N 3881.1 E 440.9 | 13 | X | | | | | | |
| | Greenville | City Water Works | N 3857.1 E 370.8 | 11 | X | X | X | | | | |
| | Gantt | Fire Dept. #1 | N 3849.3 E 372.3 | 22 | X | | | | | | |
| | Greenville | District Office | N 3858.1 E 372.4 | 13 | | | | X | X | | |
| * | Greenville | Curb Market | N 3856.5 E 372.5 | 13 | X | X | X | | | | |
| | Greenville | Parker W & S | N 3859.3 E 370.3 | 21 | X | | | | | | |
| | Tigerville | Farmoda Farms | N 3880.1 E 375.9 | 32 | X | | | | | | |
| | Greer | Utility Bldg. | N 3866.8 E 387.7 | 13 | X | X | X | | | | |
| | Spartanburg | City Hall | N 3867.6 E 413.8 | 13 | X | X | X | | | | |
| | Spartanburg | NGA | N 3863.1 E 410.0 | 22 | X | | | | | | |
| (X) | Spartanburg | | | | X | X | X | | | | |

TABLE 5-1 AIR QUALITY SURVEILLANCE NETWORK (Continued)

| City | Location | UTM Coordinates (Km) | Site Type | High Volume Sampler | Bubbler $SO_2$ | Bubbler $NO_2$ | Continuous $SO_2$ | Continuous $NO_2$ | Continuous CO | Continuous $O_3$ |
|---|---|---|---|---|---|---|---|---|---|---|
| AQCR# 204 Georgetown AQCR | | | | | | | | | | |
| Georgetown | Co. Health Dept. | N 3694.0 E 659.1 | 11 | X | X | X | | | | |
| Georgetown | Howard High School | N 3693.3 E 658.4 | 11 | X | | | | | | |
| Georgetown | CMS | N 3592.8 E 658.6 | 11 | X | | | X | | | |
| Georgetown | Maryville Substation | N 3691.0 E 658.3 | 22 | X | | | | | | |
| Georgetown | Co. Hospital | N 3694.7 E 659.5 | 22 | X | | | | | | |
| Conway | PCA Bldg. | N 3745.3 E 680.8 | 13 | X | X | X | | | | |
| Myrtle Beach | Co. Health Dept. | N 3731.2 E 697.1 | 23 | X | | | | | | |
| AQCR# 167 Metropolitan Charlotte Interstate | | | | | | | | | | |
| Rock Hill | Water Plant | N 3868.8 E 500.0 | 23 | X | | | X | | X | X |
| Fort Mill | Fort Mill School | N 3872.8 E 503.9 | 21 | X | X | X | | | | |
| Van Wyck | Van Wyck | N 3859.3 E 512.4 | 34 | X | X | X | | | | |
| Clover | Clover High School | N 3883.8 E 483.1 | 31 | X | | | | | | |
| Lancaster | Police Dept. | N 3845.2 E 520.5 | 23 | X | X | X | | | | |
| AQCR# 058 Savannah Beaufort Interstate | | | | | | | | | | |
| Hardeeville | Looney Lukes | N 3552.6 E 492.9 | 35 | X | X | X | | | | |
| Beaufort | Co. Health Dept. | N 3553.9 E 528.3 | 13 | X | X | X | | | | |
| Hilton Head | Harbor Town | N 3554.9 E 517.5 | 22 | X | X | X | | | | |

(X) Location not yet selected, but scheduled for operation by 12/31/78
* Primary Episode Stations

TABLE 5-1 AIR QUALITY SURVEILLANCE NETWORK (Continued)

SITE TYPE CODING KEY

| CODE | CATEGORY AND SUBCATEGORY SAMPLING SITE DESCRIPTION |
|---|---|
| 11 | Center City - Industrial |
| 12 | Center City - Residential |
| 13 | Center City - Commercial |
| 14 | Center City - Mobile |
| 21 | Suburban - Industrial |
| 22 | Suburban - Residential |
| 23 | Suburban - Commercial |
| 24 | Suburban - Mobile |
| 31 | Rural - Near Urban |
| 32 | Rural - Agricultural |
| 33 | Rural - Commercial |
| 34 | Rural - Industrial |
| 35 | Rural - None of the above |
| 40 | Remote |

TABLE 5-2 TYPES AND METHODS OF SAMPLING, ANALYSIS AND CALIBRATION

| POLLUTANT | SAMPLING INSTRUMENT | ANALYSIS METHOD | SAMPLING INTERVAL | SAMPLING FREQUENCY | CALIBRATION METHOD | FREQUENCY OF CALIBRATION |
|---|---|---|---|---|---|---|
| Suspended Particulates | High Volume Sampler (General Metals) | Gravimetric determination of total suspended particulates and chemical analysis for specific pollutants | 24-Hour | Every 6th day | Calibration orifice meter | Every 500 hours |
| Gaseous Fluorides | Double Tape Sampler | Potentiometry (Fluoride Ion Electrode) | 12 hour | Continuous | Sampler-Wet test meter<br>Analysis-Static | Monthly<br>Every Batch |
| Sulfur Dioxide | 24-Hour bubbler | Modified pararosaniline method Technicon II | 24-Hour | Every 6th day | Static | Every Batch |
| | Monitor Labs 8450E | Flame Photometric Detection | Continuous | Continuous | Permeation tube<br>Zero and air-flow check | Bi-weekly<br>Daily |
| | Lear-Seigler SM1000 | Second derivative spectrometer | Continuous | Continuous | Permeation tube<br>Zero and air-flow check | Bi-weekly<br>Daily |
| | Beckman 953 | Fluorescence | Continuous | Continuous | Permeation tube<br>Zero and air-flow check | Bi-weekly<br>Daily |

TABLE 5-2 (continued)

| POLLUTANT | SAMPLING INSTRUMENT | ANALYSIS METHOD | SAMPLING INTERVAL | SAMPLING FREQUENCY | CALIBRATION METHOD | FREQUENCY OF CALIBRATION |
|---|---|---|---|---|---|---|
| Nitrogen Dioxide | 24-Hour bubbler | Colorimetric Sodium Arsenite | 24-Hour | Every 6th day | Static | Every Batch |
| | Monitor Labs 8440E | Gas Phase Chemiluminescent | Continuous | Continuous | Permeation Tube | Bi-weekly |
| | Bendix 8101C | | | | Zero & Air Flow Check | Daily |
| Carbon Monoxide | Bendix Model 8501 | Nondispersive IR | Continuous | Continuous | Calibrated gases (CO, in $N_2$) | Monthly |
| | | | | | Zero, span, flow | Daily |
| Photochemical Oxidants | Bendix Model 8002 | Gas Phase Chemiluminescent | Continuous | Continuous | Ozone Generator | Bi-weekly |
| | Monitor Labs 8410E | | | | Zero, span, flow | Daily |
| Hydrocarbons (nonmethane) | Bendix 8201 | Flame ionization | Continuous | Continuous | Calibrated gases ($CH_4$ in $N_2$ | Bi-weekly |
| | | | | | Zero, span, flow | Daily |

# AIR POLLUTION EPISODE PLAN

## PURPOSE

Air Pollution Episodes occur during periods of relatively stagnant air. Chief factors in air stagnation situations are the absence of winds that disperse pollutants horizontally and a stable atmospheric layer (inversion) which tends to inhibit vertical mixing through relatively deep layers. As these stagnant meteorological conditions persist, air pollutant concentrations increase. The effects of increasing pollutant concentrations vary from reduced visibility and increased discomfort associated with respiratory ailments to damage to vegetation and increased human mortality. It is the purpose of this Air Pollution Episode Plan to establish procedures which will prevent serious degradation of air quality during these meteorological conditions.

The objective of this plan is temporarily to control pollutant sources within specified areas of the State of South Carolina during periods when atmospheric dilution is not adequate to prevent high ground level concentrations of pollutants. Effective control cannot be attained without the cooperation of industry and the general public.

## EPISODE CRITERIA

1. FORECAST - This level will normally be activated when an Air Stagnation Advisory (ASA) is issued for any part of South Carolina by the Columbia Forecast Office of the National Weather Service. If continuous air monitoring equipment indicates an upward trend in pollutant concentrations, the S.C. Department of Health and Environmental Control may request that the National Weather Service issue an ASA, even

though meteorological factors do not appear critical. In the absence of an ASA, the Commissioner of Health and Environmental Control may, at his discretion, declare this level when it is the best interest of public health and welfare.

2. WATCH - This level will be activated when continuous air quality monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 400 ug/$m^3$ (0.15 p.p.m.), 24-hour average.

   Particulate - 3.0 COHs or 375 ug/$m^3$, 24-hour average.

   $SO_2$ and particulate combined - product of $SO_2$ p.p.m., 24-hour average and COHs equal to 0.15 or product of $SO_2$ ug/$m^3$, 24-hour average, and particulate ug/$m^3$, 24-hour average equal to 49 x $10^3$.

   $O_3$ (Oxidant) - 200 ug/$m^3$ (0.1 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only).

   and meteorological condition are such that the pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

3. ALERT - This level indicates that air quality is continuing to deteriorate and that additional control actions are necessary. An alert will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 800 ug/$m^3$ (0.3 p.p.m.), 24-hour average.

   Particulate - 4.0 COHs or 500 ug/$m^3$, 24-hour average.

$SO_2$ and particulate combined - product of $SO_2$ p.p.m., 24-hour average and COHs equal to 0.7 or product of $SO_2$ ug/$m^3$, 24-hour average and particulate ug/$m^3$, 24-hour average equal to 229 X $10^3$.

$O_3$ (Oxidant) - 800 ug/$m^3$ (0.4 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only).

and meteorological conditions are such that pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

4. EMERGENCY - The primary objective of this plan is to prevent this level from ever being reached; however, should this level be reached the most stringent control actions are necessary. An emergency will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

$SO_2$ - 1600 ug/$m^3$ (0.6 p.p.m.), 24-hour average.

Particulate - 6 COHs or 750 ug/$m^3$, 24-hour average.

$SO_2$ and particulate combined - product of $SO_2$ p.p.m., 24-hour average and COHs equal to 1.3 or product of $SO_2$ ug/$m^3$, 24-hour average and particulate ug/$m^3$, 24-hour average equal to 425 X $10^3$.

$O_3$ (Oxidant) - 1000 ug/$m^3$ (0.5 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only).

and meteorological conditions are such that this condition can be expected to continue for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

5. TERMINATION - Once declared, any level reached by application of these criteria will remain in effect until the criteria for that level are no longer met. At such time, the next lower level will be assumed.

The appropriate episode stage will be declared on a regional basis, as dictated by air quality monitoring. Adverse air quality need not be region-wide to trigger control actions; the appropriate episode stage will be declared for an entire Air Quality Control Region when any monitoring site within the region records ambient air quality in excess of that designated in the criteria.

COMMUNICATIONS AND OPERATIONS

Communications and operating procedures are described in the Bureau of Air Quality Control Air Pollution Episode Manual.

Air Stagnation Advisories will be released to the news media by the National Weather Service Weatherwire. All other news releases will be prepared and disseminated by the Department of Health and Environmental Control Public Information Office.

EMISSION REDUCTION PLAN

The objective of this portion of the total episode plan is the temporary reduction of emissions during episodes through the application of preplanned abatement strategy. South Carolina Air Pollution Control Regulation No. 2.3 specifies emission reduction requirements.

An objective and quantitative evaluation has been made of all sources to determine the sources requiring control. Selection criteria was not limited to total pollutants emitted but also takes into consideration technical feasibility and economic reasonableness of emergency control, and minimal disruption of community activities.

During an episode if it is determined that any single source, or only a

limited number of sources are responsible for the deteoriation of air quality, then emission reduction requirements may be applied solely to the responsible source or sources.

Operators of sources 100 tons or more are required to submit written plans for meeting the required reductions. These plans identify the air pollutant source, the approximate amount of reduction of pollutants and a brief description of the manner in which the reduction will be achieved during each level. Plans submitted by sources are reviewed and approved by the Department of Health and Environmental Control. Unacceptable plans are returned to the source for necessary revisions.

INTERGOVERNMENTAL COOPERATION

Formal arrangements have been made with the States of Georgia and North Carolina concerning the exchange of information from interstate regions during an episode.

METEOROLOGICAL MONITORING - The Columbia Forecast Office of the National Weather Service has been designated an Air Stagnation Advisory Office (ASAO) for the State of South Carolina. Upon receipt of an Air Stagnation Advisory and until the cancellation of such an advisory, or the termination of any Air Pollution Episode, close liaison will be maintained between the ASAO and the Bureau of Air Quality Control meteorologist. As a minimum, an updated forecast will be obtained every twelve hours.

ACCIDENTS

Although not normally part of an Air Pollution Episode, hazardous air pollutant levels as the result of an accident cannot be completely ignored.

Toxic materials may be released to the atmosphere as the result of a plant site accident or an accidental discharge during shipment of such materials. Such accidents are normally handled by plant safety personnel, local fire or law enforcement personnel, or in some cases, Civil Defense units.

However, anytime public health and safety are involved the Bureau of Air Quality Control will render air quality monitoring service within its capabilities during these short term emergencies.

TRAFFIC HAZARDS

On rare occasions air contaminants may reduce visibility over a relatively small area. Should the concentration of particulate matter, dust, fumes, gas, mist, smoke or vapor, or any combination thereof, produced by a process other than natural, reach such a level around a point or area source as to cause imminent endangerment on a public highway, the Department of Health and Environmental Control may declare an Emergency.

During such an Emergency the Department of Health and Environmental Control will take such action as deemed necessary to abate the source, or sources, of the air contaminants. The aid of local law enforcement officials will be requested.

## SOURCE EVALUATION

The Department of Health and Environmental Control's Bureau of Air Quality Control has trained stack sampling teams. The function of these teams is to determine the air pollutants from any process in the State, either by actual measurement or by observing and evaluating of required compliance tests performed by source or consultant personnel. Control and supervision of these teams is the responsibility of the Facilities Evaluation Division. Technical expertise is supplied by the permanent individuals on each team, i.e., an engineer to head the team and environmental technician(s). Environmental technicians from each district will be available for added manpower.

There are several steps in determining the gaseous or particulate emissions from sources, as follows: (1) preliminary evaluation, (2) data and sample collection, (3) sample analysis, (4) calculation of total emissions and process weight rate, (5) reporting the preliminary results, and (6) compiling the final report. The same precautions are necessary whether performed by this agency or by sources or contractors.

An important element of success for the testing program is the preliminary evaluation. Included in this step are: (a) determination of sampling location, (b) estimation of gas characteristics, (c) formulation of methods for determining process weight rate, (d) awareness of possible problem areas, and (e) scheduling of the test.

Upon arrival at the test site, the sampling equipment is unpacked and prepared for use if Bureau of Air Quality Control is to perform the tests. Such matters as calibration and checks to assure reliability will have been performed prior to arrival. It may be necessary to make changes or modifications

in sampling methods and equipment as a result of the preliminary survey. Provisions are made to insure that the proper process data is recorded in order to determine the process weight rate and that the process is functioning properly during the testing cycle.

After any unforeseen malfunctions are eliminated from the sample train, measurements of velocity head, temperature, static pressure, gas composition, and cross-sectional area are made. Accurate measurements of stack conditions at the point of sampling are essential in computing both concentrations and emission rates of gaseous and particulate materials.

A representative portion of stack gas is sampled by adjusting the sampling rate according to stack gas and test equipment parameters. The volume of the stack gas sample is metered, and the collected pollutant sample is enclosed and transported to the laboratory for analysis. The process weight rate is calculated from obtained data.

Following sample collection and analysis, calculations of the concentrations and emission rates for particulates and gaseous materials are made.

The preliminary results (emission rates and source compliance status) are reported to appropriate personnel. Then everything is rechecked for possible errors, and a complete report is written.

All procedures are done with care under engineering supervision within the guidelines established by the State. These guidelines are published under the title "Procedures and Minimum Requirements for Source Tests of Particulate Emissions" in Appendix B. Tests for pollutants other than particulates shall follow the same guidelines except that the method shall be changed to that of the EPA reference method for that pollutant. For example, tests for fluorides would be according to Method 13A or 13B instead of Method 5.

Compliance status of the source is determined by comparison of emission rates and source process weight rates during tests to the appropriate Regulation and Standard.

A. Periodic Testing

Scheduled tests for particulates and sulfur dioxide will be required of the sources listed herein every two years, or as required by permit conditions. Legal authority exists (Pollution Control Act as amended in 1973-Section 9, paragraph 22) to require the source operator to conduct the test, under the supervision of qualified Bureau of Air Quality Control staff personnel. It is present agency policy that Bureau of Air Quality Control staff members will perform the tests only to gain legal evidence of non compliance when pursuasive methods fail, to maintain staff skills by performing a limited number of tests, or because of unusual circumstances. All other times the source will be required to perform the tests, or contract for it.

1. Oil-fired boilers greater than 250 X $10^6$ BTU/hr. rated input,
2. Coal-fired boilers greater than 50 X $10^6$ BTU/hr. rated input,
3. Woodwaste (or combination woodwaste) boilers greater than 20 X $10^6$ BTU/hr. actual input,
4. Recovery furnaces and lime kilns of pulp and paper mills (smelt tank vents every four years),
5. Rotary kilns, clinker coolers, and rotary dryers of Portland Cement plants,
6. Sulfuric acid plants,
7. Metallurgical furnaces greater than 10 tons/hr. normal output,
8. Asphalt plants,
9. Fertilizer plants,
10. Any other source which is deemed necessary.

Test requirements other than the above will normally be stipulated as a permit condition.

B. Opacity Monitoring Requirements

The owner or operator of any fossil fuel-fired steam generator of more than 250 million BTU per hour heat input capacity except as exempted under applicable state air quality regulations, shall install, calibrate, operate, and maintain continuous monitoring system(s) for the measurement of opacity. The continuous opacity monitoring system(s) shall conform with the performance specifications set forth in 40 CFR, Part 60, Appendix B, Performance Specification I. Any owner or operator who has purchased opacity monitoring system(s) prior to September 11, 1974, shall be exempt from meeting such test procedures until December 14, 1981.

Woodwaste boilers will be required to install, calibrate, operate and maintain continuous monitoring system(s) for the measurement of opacity, if they meet one or more of the below criteria:

1. Any new boilers of 10,000 lb steam/hr rated input. A boiler will be considered <u>new</u> if never placed in operation before July 1, 1979.
2. All woodwaste boilers of 60,000 lb steam/hr rated input.
3. Any woodwaste boilers, regardless of size, that has been operating, as determined by this agency, an excessive amount of time in non-compliance with applicable state air pollution control regulations and standards.

If a boiler is fired on more than one fuel (e.g., woodwaste and fuel-oil), the total capacity will determine the applicability of above requirements.

The monitoring systems must be approved by this agency prior to installation.

# NEW SOURCE REVIEW AND SOURCE PERMIT SYSTEM

## I. GENERAL

Ample authority to deny permits to construct new, increased or altered facilities or sources exists in the South Carolina Pollution Control Act (Chapter 1, Title 48, 1976 S.C. Code of Laws) and the Department of Health and Environmental Control's Air Pollution Control Regulations (Regulation 62.1, Section II) upon failure to satisfy anyone of the criteria established for the category of source under consideration; or any of the general provisions of the above referenced Act.

A significant exception to this may be encountered when federally promulgated standards or statutes require adherence to criteria more strict than state authorized ones. The statutory authority under the South Carolina's Pollution Control Act is probably adequate but needs further study. In these exceptional cases, namely, the enforcement of Standards of Performance for New Stationary Sources, (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAPS), and the program for the Prevention of Significant Deterioration (PSD), delegation of EPA's authority to administer these programs was sought by the South Carolina Department of Health and Environmental Control (SCDHEC), and was granted. That this is an acceptable procedure on the part of South Carolina has been verified in a memo from a South Carolina Assistant Attorney General, dated September 18, 1975. A letter requesting an extension of this delegated authority to administer the revised PSD regulations published on June 19, 1978, was sent on August 24, 1978, and can be found in the appendix. This delegated authority will continue to be the basis for controlling new sources subject to federal standards for the immediate future.

## II. APPLICABILITY

The New Source Review procedures shall apply to:

A. All sources specified in South Carolina Air Pollution Control Regulations and Standards.

B. Sources subject to the PSD requirements as contained in the Clean Air Act as amended in 1977, and 40 CFR 52.21, published in the Federal Register on June 19, 1978 and including future changes in PSD requirements as promulgated in the Federal Register.

C. Standard of Performance of New Stationary Sources as delegated by EPA. Requests for delegation of authority will be made from time to time as additional source categories become subject to NSPS.

D. National Emission Standards for Hazardous Air Pollutants as above. As additional sources categories become subject to NESHAPS, from time to time, additional delegated authority will be requested.

## III. CRITERIA

A. General. The Department of Health and Environmental Control shall examine each proposed major new source and proposed major modification to determine if such a source will meet all applicable emission requirements in the South Carolina Implementation Plan or programs for which federal authority has been delegated, including any applicable new source performance standard in 40 CFR Part 60 or any national emission standard for hazardous air pollutants in 40 CFR Part 61. If the Department determines that the proposed major new source cannot meet the applicable emission requirements the permit to construct will be denied.

In addition, for each proposed major new source with allowable emissions exceeding 50 tons per year, 1,000 pounds per day, or 100 pounds per hour, whichever is most restrictive the Department shall determine if the source will cause or contribute to a violation of a NAAQS.[1] A proposed source which would not exceed any of the above emission levels may be approved without further analysis, provided such a source meets all other requirements. Additional analysis may be required to determine if the source impacts a Class I area, an area of PSD increment violation, or a non-attainment area. For "stable" air pollutants (i.e., $SO_2$, particulate matter and CO), the determination of whether a source will cause of contribute to a violation of a NAAQS generally should be made on a case-by-case basis as of the proposed new source's start-up date using the source's allowable emissions in an atmospheric stimulation model (unless a source will clearly impact on a receptor which exceeds a NAAQS). For source of nitrogen oxides, the initial determination of whether a source would cause or contribute to a violation of the NAAQS for $NO_2$ should be made using an atmospheric simulation model assuming all the nitric oxide emitted is oxidized to $NO_2$ by the time the plume reaches ground level. The initial concentration estimates may be adjusted if adequate data are available to account for the expected oxidation rate.

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[1] Required only for those pollutants for which the increased allowable emissions exceeds 50 tons per year, 1000 pounds per day, or 100 pounds per hour. The preceding hourly and daily rates shall apply only with respect to a pollutant for which a national ambient air quality standard, for a period less than 24 hours or for a 24 hour period, as appropriate, has been established.

Submitted 12/78

B. Prevention of Significant Deterioration - Sources subject to review or prevent significant deterioration (PSD) shall be subject to the identical requirements and procedures as contained in Title 40, Part 52 of the Code of Federal Regulations at Section 52.21, published in the Federal Register on June 19, 1978. One exception concerns the definitions of "source" and "facility", which, for the purpose of this New Source Review Policy, shall be interchanged.[2]

C. Non-Attainment Areas - Sources applying for a permit to locate in areas which have been designated non-attainment by the Department, or EPA as published in the Federal Register, for one or more pollutants for which there is a national standard shall be subject to the emission offset policy of the South Carolina Implementation Plan. Sources impacting a non-attainment area will also be subject to this policy.

new paragraph

In non-attainment areas for photochemical oxidants and carbon monoxide scheduled for attainment after December 31, 1982, prior to the issuance of any permit for construction or modification of a major emitting facility of VOC and carbon monoxide an analysis of alternate sites, sizes, production processes, and environmental control techniques for such proposed source which demonstrates that benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification.

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[2]This is due to a conflicting definition of "source" in South Carolina Statutes.

## IV. PROCEDURE

The discussion below describes, in general, the mechanics of handling permit applications. Where requirements for federally mandated procedures are in addition to these steps, these additional requirements will be handled as prescribed in the PSD or Emission Offset Policies, published elsewhere in the SIP.

The South Carolina Pollution Control Act of 1970, as amended (Title 40, Chapter 1, 1976 S.C. Code of Laws) provides for issuance of permits to construct and operate new and altered sources, as well as permits to operate existing sources, if all of the provisions of the Pollution Control Act are met. It further provides for amending or revoking such permits if, for any reasons, the owner or operator fails to comply with any provisions of the permit or if any standards are contravened.

Pursuant to the authority granted in the Pollution Control Act, regulations governing the procedure for obtaining permits were adopted by the Department. These regulations provide that any person who intends to discharge any air contaminant to the atmosphere from any source where such person is not now discharging such material or any person intending to build, alter or add to any source, or device for the control of air contaminant discharges, shall first apply to the Department of Health and Environmental Control for a permit to construct, alter or add to the source or device and to discharge therefrom. No permit shall be required for the construction and operation of:

1. Boilers and space heating systems of less than 1,500,000 BTU/hr, rated capacity.
2. Motor vehicles.
3. Comfort air conditioning or ventilation systems.

4. Laboratory hoods.

5. Emergency power generators, less than 150 KW rated capacity.

6. Sources emitting essentially all steam, air, nitrogen, oxygen, carbon dioxide, or any physical combination of these, except where such sources are found to be in violation of the visible emission standards.

In the case of portable or semi-portable equipment, construction and operation permits are required. Prior to relocating any permitted portable or semi-portable equipment, the Department shall be notified of the new location on forms provided.

Existing sources are defined to be sources which were in existence prior to February 11, 1971. Existing source permitting requirements are detailed in the regulations which are available from the Department.

One construction permit is issued for the construction of the facility and one construction permit is issued for each source at this facility. An operation permit is issued for each construction permit issued, if eligible. Operation permits are issued for a specified time period determined by the Department and are applicable for this period until the source is modified, put out of service, or the permit is revoked. Included in each operation permit is a malfunction reporting requirement.

CONSTRUCTION PERMIT PROCEDURE

1. Source completes appropriate permit application forms and forwards to the Department. Permit application forms are available from district and central offices.

2. Permit application forms are received by the Bureau of Air Quality Control and routed to Facilities Evaluation Division.

3. A preliminary review is made for completeness of all required information on the permit application. If all information has been supplied, an acknowledgement letter will be sent to the source. If additional information is necessary, a letter will be sent requesting desired information. The permit applications will be returned with the letter to the source.

4. After a complete permit application has been received, a detailed review will be completed. The emission rates, allowable emissions, gas flow rates, fuel consumption, and other factors or data will be checked for accuracy. At this time, dispersion calculations will be performed, as necessary.

5. The location is evaluted for proximity to sensitive areas and for general pollution parameters by district field personnel. This information is forwarded to the permit section to be considered in overall review of atmospheric impact.

6. Recommendations of the permit section are made and the file is sent to the Facilities Evaluation Division Director for approval and signing.

OPERATION PERMIT REVIEW PROCEDURE

1. The owner or operator of a new or modified source notifies the Bureau of Air Quality Control in writing no later than 15 days prior to initial startup of the new, increased, or altered source.

2. Permit section engineer checks files for completeness of information and reviews it before determining final compliance procedures, such procedures consisting of inspection and/or source tests, and notifies source in writing of compliance procedures.

3. Permit section engineer completes review of required procedures and makes determination of compliance.

To facilitate this procedure, application forms have been designed for:

1. Incinerators
2. Fuel Burning Operations
3. Industrial Processes, and
4. Asphalt Plants

The permitting system is partially adapted for computer processing for review and engineering analysis. This system is designed to be compatible with the emission inventory program in order that the inventory system will be kept current.

In the event that the permit is denied a hearing may be held to allow parties to introduce new testimony which might alter the decision.

The permit system described above provides the means to disapprove construction of any new source that will violate applicable rules and regulations or interfere with attainment and maintenance of ambient air quality standards. No approval to construct nor permit to operate will be granted to a new source that does not meet applicable standards or provisions of the Pollution Control Act, as well as Parts C and D of the Clean Air Act as amended.

Appendix A contains examples of permit forms.

# SOURCE SURVEILLANCE

## GENERAL

a. The responsibility for source surveillance, after issuance of any required permit, throughout the state is the primary function of 12 established district offices. The district offices have a complement of one to six people depending upon the complexity of the problem in the district. Any increase in personnel will be dependent upon future needs as well as resources available.

b. Stationary sources are the prime concern of the State's source surveillance efforts. Increased surveillance efforts are directed to "major point sources". A major point source being defined as any emission point emitting or capable of emitting 100 tons per year of either particulate or sulfur dioxide pollutants. It is anticipated that greater emphasis will be placed upon "point sources" (those emitting less than the criteria set forth for a major point source) in the future as resources permit.

## GENERAL INSPECTION PROCEDURES

a. Inspection will determine the apparent degree of air pollution emissions by:

   1. Contacting a responsible official for a comprehensive tour of the plant.
   2. Looking for visible emissions.
   3. Detecting odors.
   4. Handling of solid waste.
   5. Listing sources of air pollution.
   6. Determining that all air pollution sources are operating within design specifications and all air pollution control devices are in

good repair, properly maintained and operated, and are performing their functions.

7. Requesting that the Facilities Evaluation Division conduct source sampling, if indicated.

b. During the inspection, a review of emission inventory data will be made to update and/or determine the correctness and completeness of the data on file with the agency.

c. All major point sources are thoroughly inspected at least once per year in order to determine their compliance with State regulations and standards. Results of these inspections are forwarded to the U.S.E.P.A.

d. Written reports of observed violations are forwarded to the owner/operator of the source and appropriate action is taken.

e. All inspections are performed in accordance with detailed inspection procedures maintained on file at each district office.

VISIBLE EMISSION CONTROL

a. All appropriate district personnel who can qualify will be certified to determine Ringelmann readings and opacity. A smoke generator is available for training and re-certification purposes. Re-certification is required at least every six months.

b. Visible emissions evaluations of sources and subsequent reporting of the results is a continuing responsibility.

INVESTIGATION OF COMPLAINTS

a. All complaints are investigated in a timely manner.

b. Both parties will be interviewed by the investigator in an effort to determine the validity and extent of the complaint. If, in the opinion of the investigator, an air pollution problem exists, he shall so advise the owner/operator orally and in writing of this opinion. Thereafter

the legal procedure prescribed by the State Pollution Control Act is followed.

c. Complaints are considered a very important aspect of the air pollution control program.

ROUTINE INSPECTION

a. The majority of routine inspection efforts are directed toward enforcement of the open burning regulation. Most cases involve control of the open burning of land clearing and construction debris.

b. The inspection of small incinerators is included in the category of routine inspections to be performed. This is a visual inspection to see that all parts and auxillary equipment are in good operating condition, operators are qualified to use the equipment and visible emission requirements are met.

c. All appropriate existing sources are inspected to determine if any modifications have been made and/or that the equipment is operating properly prior to being issued a permit to operate.

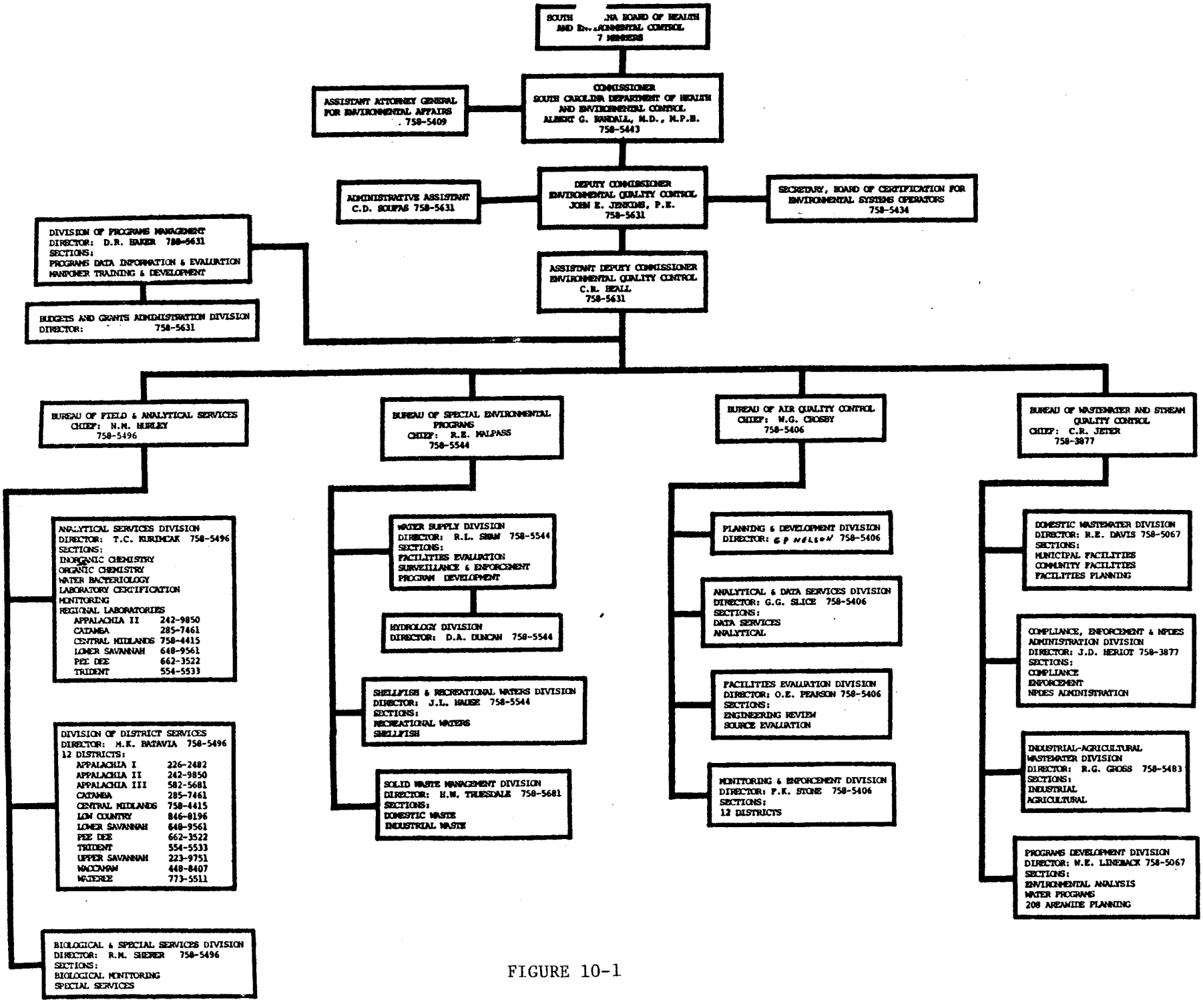
d. All new installations and construction are routinely inspected prior to construction and at start-up to determine accuracy of permit applications and compliance with permit stipulations.

# RESOURCES

Table 10-1 and 10-2 depict the budgeted man-years and funds for FY 1979, as well as projections for FY 1980 through FY 1983. At the present time, no significant change is anticipated beyond FY 1983. The man-year totals in this table reflect only those personnel that devote 100% of their efforts to the air quality program. In addition to these personnel, the Bureau of Air Quality Control has the part-time assistance of: the district directors assigned to the twelve Environmental Quality Control Districts; the Department of Health and Environmental Control (DHEC) legal staff; the DHEC Office of Communications; the Environmental Quality Control (EQC) Office of Manpower Planning, Development and Training; and DHEC Data Systems Management.

Figure 10-1 depicts the entire Environmental Quality Control structure within the Department of Health and Environmental Control, and Figure 10-2 is a further expansion to depict the twelve district offices. The district boundaries coincide with the Air Quality Control Regions with two exceptions. The Greenville-Spartanburg Intrastate AQCR is divided into three districts; Appalachia I, Appalachia II and Appalachia III. Appalachia III also includes Union County, a county which is part of the Metropolitan Charlotte Interstate AQCR. The districts are depicted in Figure 3-1.

Resources for any Transportation Control Plan and for any Motor Vehicle Inspection and Maintenance Program will be provided by the appropriate Metropolitan Planning Organization and the South Carolina Department of Highways and Public Transportation, respectively.


SOUTH CAROLINA BOARD OF HEALTH AND ENVIRONMENTAL CONTROL
7 MEMBERS
COMMISSIONER
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
ALBERT G. RANDALL, M.D., M.P.H.
758-5443
ASSISTANT ATTORNEY GENERAL FOR ENVIRONMENTAL AFFAIRS
758-5409
DEPUTY COMMISSIONER
ENVIRONMENTAL QUALITY CONTROL
JOHN E. JENKINS, P.E.
758-5631
ADMINISTRATIVE ASSISTANT
C.D. SOUPAS 758-5631
SECRETARY, BOARD OF CERTIFICATION FOR ENVIRONMENTAL SYSTEMS OPERATORS
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DIVISION OF PROGRAMS MANAGEMENT
DIRECTOR: D.R. BAKER 758-5631
SECTIONS:
PROGRAMS DATA INFORMATION & EVALUATION
MANPOWER TRAINING & DEVELOPMENT
BUDGETS AND GRANTS ADMINISTRATION DIVISION
DIRECTOR: 758-5631
BUREAU OF FIELD & ANALYTICAL SERVICES
CHIEF: N.M. HURLEY
758-5496
ANALYTICAL SERVICES DIVISION
DIRECTOR: T.C. KURIMCAK 758-5496
SECTIONS:
INORGANIC CHEMISTRY
ORGANIC CHEMISTRY
WATER BACTERIOLOGY
LABORATORY CERTIFICATION
MONITORING
REGIONAL LABORATORIES
APPALACHIA II 242-9850
CATAWBA 285-7461
CENTRAL MIDLANDS 758-4415
LOWER SAVANNAH 648-9561
PEE DEE 662-3522
TRIDENT 554-5533
DIVISION OF DISTRICT SERVICES
DIRECTOR: M.K. BATAVIA 758-5496
12 DISTRICTS:
APPALACHIA I 226-2482
APPALACHIA II 242-9850
APPALACHIA III 582-5681
CATAWBA 285-7461
CENTRAL MIDLANDS 758-4415
LOW COUNTRY 846-8196
LOWER SAVANNAH 648-9561
PEE DEE 662-3522
TRIDENT 554-5533
UPPER SAVANNAH 223-9751
WACCAMAW 448-8407
WATEREE 773-5511
BIOLOGICAL & SPECIAL SERVICES DIVISION
DIRECTOR: R.M. SHERER 758-5496
SECTIONS:
BIOLOGICAL MONITORING
SPECIAL SERVICES
BUREAU OF SPECIAL ENVIRONMENTAL PROGRAMS
CHIEF: R.E. MALPASS
758-5544
WATER SUPPLY DIVISION
DIRECTOR: R.L. SHAW 758-5544
SECTIONS:
FACILITIES EVALUATION
SURVEILLANCE & ENFORCEMENT
PROGRAM DEVELOPMENT
HYDROLOGY DIVISION
DIRECTOR: D.A. DUNCAN 758-5544
SHELLFISH & RECREATIONAL WATERS DIVISION
DIRECTOR: J.L. HAUSE 758-5544
SECTIONS:
RECREATIONAL WATERS
SHELLFISH
SOLID WASTE MANAGEMENT DIVISION
DIRECTOR: H.W. TRUESDALE 758-5681
SECTIONS:
DOMESTIC WASTE
INDUSTRIAL WASTE
BUREAU OF AIR QUALITY CONTROL
CHIEF: W.G. CROSBY
758-5406
PLANNING & DEVELOPMENT DIVISION
DIRECTOR: G.P. NELSON 758-5406
ANALYTICAL & DATA SERVICES DIVISION
DIRECTOR: G.G. SLICE 758-5406
SECTIONS:
DATA SERVICES
ANALYTICAL
FACILITIES EVALUATION DIVISION
DIRECTOR: O.E. PEARSON 758-5406
SECTIONS:
ENGINEERING REVIEW
SOURCE EVALUATION
MONITORING & ENFORCEMENT DIVISION
DIRECTOR: F.K. STONE 758-5406
SECTIONS:
12 DISTRICTS
BUREAU OF WASTEWATER AND STREAM QUALITY CONTROL
CHIEF: C.R. JETER
758-3877
DOMESTIC WASTEWATER DIVISION
DIRECTOR: R.E. DAVIS 758-5067
SECTIONS:
MUNICIPAL FACILITIES
COMMUNITY FACILITIES
FACILITIES PLANNING
COMPLIANCE, ENFORCEMENT & NPDES ADMINISTRATION DIVISION
DIRECTOR: J.D. HERIOT 758-3877
SECTIONS:
COMPLIANCE
ENFORCEMENT
NPDES ADMINISTRATION
INDUSTRIAL-AGRICULTURAL WASTEWATER DIVISION
DIRECTOR: R.G. GROSS 758-5483
SECTIONS:
INDUSTRIAL
AGRICULTURAL
PROGRAMS DEVELOPMENT DIVISION
DIRECTOR: W.E. LINEBACK 758-5067
SECTIONS:
ENVIRONMENTAL ANALYSIS
WATER PROGRAMS
208 AREAWIDE PLANNING

FIGURE 10-1

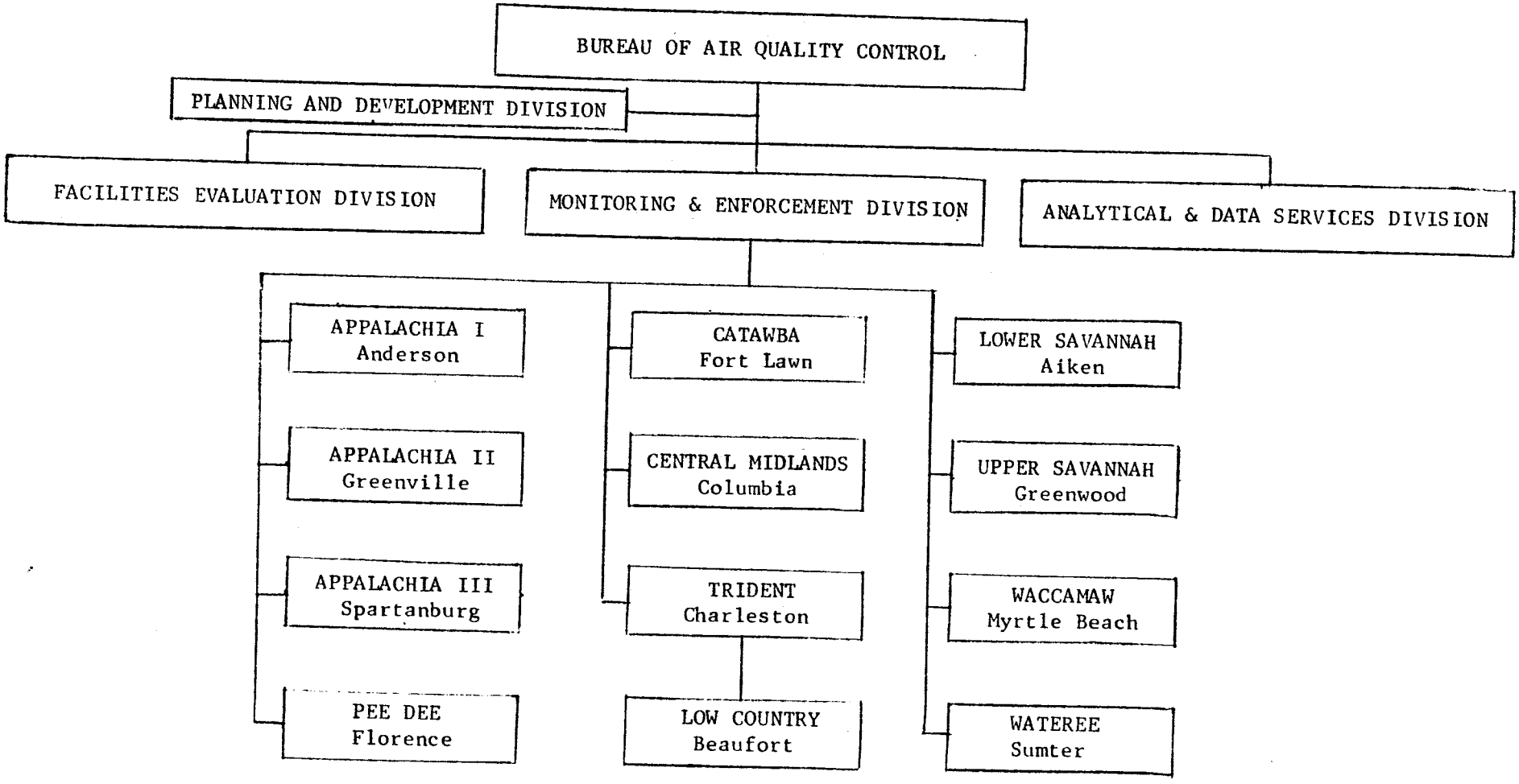
BUREAU OF AIR QUALITY CONTROL
PLANNING AND DEVELOPMENT DIVISION
FACILITIES EVALUATION DIVISION
MONITORING & ENFORCEMENT DIVISION
ANALYTICAL & DATA SERVICES DIVISION
APPALACHIA I Anderson
APPALACHIA II Greenville
APPALACHIA III Spartanburg
PEE DEE Florence
CATAWBA Fort Lawn
CENTRAL MIDLANDS Columbia
TRIDENT Charleston
LOW COUNTRY Beaufort
LOWER SAVANNAH Aiken
UPPER SAVANNAH Greenwood
WACCAMAW Myrtle Beach
WATEREE Sumter

Figure 10-2

TABLE 10-1 - RESOURCES

Man-year estimates by function for the State of South Carolina

| Function | FY 1979 | FY 1980 | FY 1981 | FY 1982 | FY 1983 |
|---|---|---|---|---|---|
| Enforcement & field services (Subtotal) | 23 | 24 | 24 | 25 | 25 |
| Inspections | 10 | 11 | 11 | 12 | 12 |
| Complaints & field patrol | 7 | 6 | 6 | 6 | 6 |
| Reports | 2 | 2 | 2 | 2 | 2 |
| Emissions inventory | 3.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| Industry self-monitoring | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Engineering services (Subtotal) | 16 | 18 | 18 | 18 | 18 |
| Permit system | 5 | 5 | 5 | 5 | 5 |
| Emission estimates & source modelling | 2 | 2 | 2 | 2 | 2 |
| Source testing | 5 | 5 | 5 | 5 | 5 |
| Reports, new legislation, etc. | 2 | 2 | 2 | 2 | 2 |
| NESHAPS, NSPS, AND PSD | 2 | 4 | 4 | 4 | |
| Technical services (Subtotal) | 23 | 24 | 27 | 28 | 29 |
| Operation of monitoring network | 7 | 7 | 8 | 8 | 8 |
| Special studies | 1 | 1 | 1 | 1 | 1 |
| Instrument calibration & maintenance | 7 | 8 | 8 | 8 | 8 |
| Laboratory operations | 4 | 4 | 6 | 6 | 6 |
| Data processing | 2 | 2 | 2 | 2 | 2 |
| Quality assurance | 2 | 2 | 2 | 3 | 4 |
| Management services (Subtotal) | 13 | 13 | 14 | 14 | 14 |
| Policy, P/R, strategies, etc. | 6 | 6 | 7 | 7 | 7 |
| Staff training | 1 | 1 | 1 | 1 | 1 |
| Administrative & clerical support | 6 | 6 | 6 | 6 | 6 |
| TOTALS | 75 | 79 | 83 | 85 | 86 |

TABLE 10-2 - RESOURCES

Fund estimates by function for the State of South Carolina

| FUNCTION | FY 1979 | FY 1980 | FY 1981 | FY 1982 | FY 1983 |
|---|---|---|---|---|---|
| Enforcement & field services ---------- | 459 | 487 | 511 | 534 | 556 |
| Engineering services----- | 311 | 374 | 387 | 397 | 403 |
| Technical services------ | 518 | 512 | 574 | 622 | 662 |
| Management services----- | 252 | 252 | 289 | 289 | 297 |
| TOTAL FUNDS ---------- | 1540 | 1625 | 1761 | 1842 | 1918 |

Note: Funds in 1,000 of dollars, based on 1978 dollars with no allowance for inflation.

# APPENDICES

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ATTACH ADDITIONAL SHEETS IF NEEDED TO PROVIDE COMPLETE INFORMATION

PERMIT APPLICATION FOR ASPHALT PLANT

Permit No._____

1. Permit to be issued to:_____
2. Mailing Address:_____
3. Facility Location:_____County:_____
4. Person to contact:_____Phone no:_____
5. Permit required for:
   ____Construction ____Operation of existing source
   ____Alteration (construction begun on or before February 11, 1971)
6. Plant Data
   A. Superintendent's Name_____Plant Location_____
   _____
   B. Manufacturer's name and model number:_____
   C. ___Batch: ___Continuous: ___Drum
   D. Dryer Capacity_____tons/hr
   E. Burner
      1. Manufacturer's name and nodel number_____
      2. Rated BTU/hr_____
      3. Type of Primary Fuel_____
         A. _____BTU/_____(BTU/1,000cf or gal.)
         B. _____% sulfer by weight. C. _____% Ash by weight
      4. Fuel consumption_____(gal. or cf per hour)
7. Description of emsision control equipment
   A. ___Wet Scrubber: Manufacturer's name and model number_____
   B. ___Bag House: (1) Manufacturer's name and moder number_____
      (2) Number and type of bags_____
8. Stack Data: Height from ground (ft)_____Velocity (ft/sec)_____
   Inside diameter (ft)_____Temperature (F)_____
9. Particulate emission data
   A. ___Wet Scrubber_____lbs/hr.
   B. ___Bag House_____lbs/hr.
10. Normal Operation Schedule: hr/day_____day/week_____week/year_____
    Seasonal Variation: Jan.-Mar.____% Apr.-June____% July-Sept.____% Oct.-Dec.____%
11. How will waste material from process and control equipment be disposed of?_____
    _____
12. Include the following information:
    A. Plot plan (show distance to nearest residence, business, etc.)
    B. Flow diagram of process to be permitted (indicate and identify emission points)
    C. Supply all technical data available from vendor (make, model, design criteria)

I certify that, to the best of my knowledge and belief that no undesirable levels will be created and no applicable standards or regulations will be contravened or violated. I understand that any statements and descriptions which are found to be incorrect may be the cause for immediate revocation of any permit pursuant to this application.

_____
Signature of responsible person or company offical and title

_____
Date

White/Air Quality Central Office Yellow/DHEC District Office Pink/Applicant 7/77

ATTACH ADDITIONAL SHEETS IF NEEDED TO PROVIDE COMPLETE INFORMATION

# INCINERATOR PERMIT APPLICATION

Permit No._____

1. Permit to be issued to:_____
2. Mailing Address:_____
3. Facility Location:_____ County:_____
4. Person to contact:_____ Phone no:_____
5. Permit required for:
   ____Construction ____Operation of existing source
   ____Alteration (construction begun on or before February 11, 1971)
6. Manufacturer:_____ Model:_____
7. Rated Capacity:_____lbs/hr, burning type_____waste; amount burned daily:_____
   Type of waste to be incinerated:_____
8. Auxillary Fuel: Gas_____, Oil_____, Other (specify)_____
9. Controls: Automatic_____, Manual_____
10. Auxillary Burners: Primary Chamber_____, Secondary Chamber_____,
    Stack_____, Specify Burner Capacity_____
11. Air Pollution Controls: Afterburners_____, Scrubber_____, Multichamber_____,
    Other (specify)_____
12. Manufacturers Certification of Emissions under normal operating conditions:
    _____lbs/million BTU input exclusive of auxillary
13. Establishment Type: Hospital____, Restaurant____, Store____, Industry____,
    Warehouse____, Apartment____, Public Institution____,
    Other (specify)_____
. Area Type: Industrial____, Commercial____, Residential____, Rural____
15. Estimated Date for Starting Construction_____
16. Normal Operating Schedule: hr/day_____, days/week_____, weeks/year_____
17. Include the following information:
    A. Plot plan (show distance to nearest residence, business, etc.).
    B. Current particulate emission test report applicable to this unit.
    C. Supply all technical data available from vendor (make, model, design criteria)

I certify that, to the best of my knowledge and belief that no undesirable levels will be created and no applicable standards or regulations will be contravened or violated. I understand that any statements and description which are found to be incorrect may be the cause for immediate revocation of any permit pursuant to this application.

_____
Signature of responsible person or company offical and title

_____
Date

White/Air Quality Central Office Yellow/DHEC District Office Pink/Applicant 7/77

ATTACH ADDITIONAL SHEETS IF NEEDED TO PROVIDE COMPLETE INFORMATION

# FUEL BURNING PERMIT APPLICATION

Permit No._____

1. Permit to be issued to:_____
2. Mailing Address:_____
3. Facility Location:_____ County:_____
4. Person to contact:_____ Phone no:_____
5. Permit required for:
   ____Construction ____Operation of existing source
   ____Alteration (construction begun on or before February 11, 1971)
6. Construction start date:_____ Completion date:_____
7. Type of Fuel Burning Operation:_____
   Make:_____ Model:_____ I.D. no. (e.g., Unit #4)_____
   Rated Input_____BTU/hr, Rated Output_____BTU/hr _____lbs steam/hr @_____F
8. A. Fuel Data: if multiple fuels are used, indicate primary (P), Secondary (S).
   PLEASE indicate all units (e.g. lbs/hr):

| Fuel | Heat Content | % Sulfur by weight | % Ash by weight | Consumption rated | Consumption actual |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

   B. Burner Data: (solid fuels only)
   Pulverized_____, Traveling Grate_____, Spreader Stoker_____, Hand Fired_____,
   Underfeed Stoker_____, Flyash Re-inject_____, Other (specify)_____
9. Air Pollution Control Device Description:_____
   _____ I.D. no.(e.g., Unit #4)_____
10. Stack Data: Height from ground (ft)_____ Velocity (ft/sec)_____
    Inside diameter (ft)_____ Temperature (F)_____
11. Emission Data: (pounds/hr)

| | uncontrolled | controlled | | uncontrolled | controlled |
|---|---|---|---|---|---|
| Particulate ------- | | | NOx | | |
| Hydrocarbons (specify) | | | CO | | |
| | | | SO2 | | |
| Other (specify) | | | H2SO4 | | |
| | | | | | |

12. Normal Operation Schedule: hr/day_____day/week_____week/year_____
    Seasonal Variation: Jan.-Mar.____% Apr.-June____% July-Sept.____% Oct.-Dec.____%
13. How will waste material from process and control equipment be disposed of?_____
    _____
14. Include the following information:
    A. Plot plan (show distance to nearest residence, business, etc.)
    B. Flow diagram of process to be permitted (indicate and identify emission points)
    C. Supply all technical data available from vendor (make, model, design criteria)

I certify that, to the best of my knowledge and belief that no undesirable levels will be created and no applicable standards or regulations will be contravened or violated. I understand that any statements and descriptions which are found to be incorrect may be the cause for immediate revocation of any permit pursuant to this application.

_____
Signature of responsible person or company offical and title

_____
Date

White/Air Quality Central Office Yellow/DHEC District Office Pink/Applicant 7/77

ATTACH ADDITIONAL SHEETS IF NEEDED TO PROVIDE COMPLETE INFORMATION

# PROCESS PERMIT APPLICATION

Permit No._____

1. Permit to be issued to:_____
2. Mailing Address:_____
3. Facility Location:_____ County:_____
4. Person to contact:_____ Phone no:_____
5. Permit required for:
   ____Construction ____Operation of existing source
   ____Alteration (construction begun on or before February 11, 1971)
6. Construction start date:_____ Completion date:_____
7. A. Major raw materials: Type:_____ Quantity used:_____
   _____ (lbs/hr) _____
   _____ _____
   B. Product:_____ Rate of production:_____
8. Process Description:_____
   _____ I.D. no.(e.g., Unit #4)_____
9. Air Pollution Control Device Description:_____
   _____ I.D. no.(e.g., Unit #4)_____
10. Stack Data: Height from ground (ft)_____ Velocity (ft/sec)_____
    Inside diameter (ft)_____ Temperature (F)_____
11. Emission Data: (pounds/hr)

| | uncontrolled | controlled | | uncontrolled | controlled |
|---|---|---|---|---|---|
| Particulate ------- | _____ | _____ | NOx | _____ | _____ |
| Hydrocarbons (specify) | | | CO | _____ | _____ |
| _____ | _____ | _____ | SO2 | _____ | _____ |
| Other (specify) | | | H2SO4 | _____ | _____ |
| _____ | _____ | _____ | | | |

12. Normal Operation Schedule: hr/day_____ day/week_____ week/year_____
    Seasonal Variation: Jan.-Mar.____% Apr.-June____% July-Sept.____% Oct.-Dec.____%
13. How will waste material from process and control equipment be disposed of?_____
    _____
14. Include the following information:
    A. Plot plan (show distance to nearest residence, business, etc.)
    B. Flow diagram of process to be permitted (indicate and identify emission points)
    C. Supply all technical data available from vendor (make, model, design criteria)

I certify that, to the best of my knowledge and belief that no undesirable levels will be created and no applicable standards or regulations will be contravened or violated. I understand that any statements and descriptions which are found to be incorrect may be the cause for immediate revocation of any permit pursuant to this application.

_____ _____
Signature of responsible person or company offical and title

_____
Date

White/Air Quality Central Office Yellow/DHEC District Office Pink/Applicant 7/77

# APPENDIX B

Policies and Procedures

## Appendix B - ITEM 1

Offset Policy

# EMISSION OFFSET POLICY

## I. Initial Screening Analyses and Determination of Applicable Requirements

A. Applicability

For each non-attainment area designated by the Department or the U.S. Environmental Protection Agency, as published in the Federal Register, this policy will apply to sources anywhere in the State that will cause or contribute to any violation of the National Ambient Air Quality Standard (NAAQS) within the non-attainment area. Such facilities will be allowed to construct only in accordance with this policy.

B. Definitions - For purposes of this policy:

1. Source[1] means any and all points of origin of air contaminants whether publicly or privately owned. For the purpose of this regulation, source is further defined as any article, machine, process equipment or other contrivance from which air pollutants emanate or are emitted, either directly or indirectly.

2. Facility[1] means any structure, building, equipment installation or operation (or combination thereof) which is located on one or more contiguous or adjacent properties and which is owned or operated by the same person (or by persons under common control).

3. "Potential" to emit means the maximum capacity to emit a pollutant absent air pollution control equipment. "Air pollution control equipment" includes control equipment which is not, aside from air pollution control laws and regulations, vital to production of the normal product of the facility or to its normal operation. Annual potential shall be based on the maximum annual rated capacity of the facility, unless the facility is subject to enforceable permit conditions which limit the operating rate or hours of operation, or both. Enforceable permit conditions on the

---

[1]South Carolina law defines "source" as any and all points of origin of air contaminants and conflicts, therefore, with EPA's use of the word "source". Consequently, the definitions of "source" and"facility"are reversed from EPA's frequently used definitions of these terms.

type or amount of materials combusted or processed will be used in determining the potential emission rate of a facility.

4. "Major facility" means any facility for which the potential emission rate is equal to or greater than 100 tons per year of any of the following pollutants: particulate matter, sulfur oxides, nitrogen oxides, volatile organic compounds, or carbon monoxide.

5. "Major modification" means any physical change in the method of operation of, or addition to a stationary facility which increases the potential emission rate of any air pollutant specified in B.4 above, including any not previously emitted and taking into account all accumulated increases in potential emissions occurring at the facility after the date of applicability of any state or federal regulation pertaining to emission offsets or since the time of the last construction approval issued for the facility pursuant to this policy, whichever time is more recent, regardless of any emission reductions achieved elsewhere in the facility, by 100 tons per year or more.

(i) A physical change shall not include routine maintenance, repair, and replacement.

(ii) A change in the method of operation, unless limited by previous permit conditions, shall not include:

a. an increase in the production rate, if such increase does not exceed the operating design capacity of the facility;

b. an increase in the hours of operation;

c. use of an alternative fuel or raw material, if on December 21, 1976, the facility was capable of accommodating such fuel or material; or

d. use of an alternative fuel or raw material by reason of an order in effect under Sections 2(a) and (b) of the Energy Supply and Environmental Coordination Act of 1974 (or any superseding legislation), or by reason of a natural gas curtailment plan in effect pursuant to the Federal Power Act;

e. use of an alternative fuel by reason of an order or rule under Section 125 of the Act;

f. change in ownership of a facility.

6. "Allowable emissions" means the emission rate calculated using the maximum rated capacity of the source at a facility (unless the source is subject to enforceable permit conditions which limit operating rate, or hours of operation, or both) and the most stringent of the following:

(i) applicable new source performance standards set forth in 40 CFR Part 60;

(ii) South Carolina Implementation Plan;

(iii) the emission rate specified as an enforceable permit condition.

7. "Lowest achievable emission rate" means, for any facility, that rate of emissions based on the following, whichever is more stringent:

(i) the most stringent emission limitation which is contained in the implementation plan of any state for such class or category of facility, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or

(ii) the most stringent emission limitation which has been achieved in practice or can reasonably be expected to occur in practice by such class or category of facility taking into consideration the pollutant which must be controlled.

This term, applied to a modification, means the lowest achievable emission rate for the new or modified sources within the facility. In no event shall the application of this term permit a proposed new or modified facility to emit any pollutant in excess of the amount allowable under applicable new source standards of performance.

8. "Reconstruction" will be presumed to have taken place where the fixed capital cost of the new components exceed 50 percent of the fixed capital cost of a comparable entirely new facility or source. A reconstructed facility will be treated as a new facility for purposes of this policy, except that use of an alternative fuel or raw material by reason of an order in effect under Sections 2(a) and (b) of the Energy Supply and Environmental Coordination Act of 1974 (or any superseding legislation), by reason of a natural gas curtailment plan in effect pursuant to the Federal Power Act, or by reason of an order or rule under Section 125 of the Clean Air Act, shall not be considered reconstruction. In determining LAER for a reconstructed facility, the provisions of 40 CFR 60.15 (f) (4) shall be taken into account in assessing whether a new source performance standard is applicable to such facility.

9. "Fixed capital cost" means the capital needed to provide all the depreciable components.

10. "New source performance standards" (NSPS) means Federal Standards of Performance for New Stationary Sources under Title 40 Code of Federal Regulations, Part 60.

C. Review of specified sources[2] for air quality impact.[3]

Where a facility is constructed or modified in phases which individually do not emit more than 50 tons per year, 1000 pounds per day or 100 pounds per hour, and the phases have not been offset in accordance with this policy, the allowable emissions from all such phases granted a permit to construct after July 1, 1979 shall be added together and this policy may be applicable when a proposed phase would cause the sum of the allowable emissions which have not been offset to equal or exceed 50 tons per year, 1000 pounds per day, or 100 pounds per hour. If the total modification would cause or contribute to a violation of the NAAQS, all of the provisions of this policy are then applicable to each phase. If any of the phases have not previously been subject to Condition 1 of Section II A (requiring the facility to meet the lowest achievable emission rate), such determination must consider the stage of construction of such phase and the ability of the facility to install additional control equipment.

The determination as to whether a facility would cause or contribute to a violation of a NAAQS will be made as of the new facility's start-up date. Therefore, if an area designated as non-attainment by the Department or EPA, as published in the Federal Register, is projected to be an attainment area as part of an approved SIP control strategy by the new facility start-up date, offsets will not be required.

---

[2]Hereafter the term "facility" will be used to denote both any facility and any modification.

[3]Required only for those pollutants for which the increased allowable emissions exceeds 50 tons per year, 1000 pounds per day, or 100 pounds per hour and has potential to emit 100 tons per year, although the Department may address other pollutants if deemed appropriate. The preceding hourly and daily rates shall apply only with respect to a pollutant for which a national ambient air quality standard, for a period less than 24 hours or for a 24 hour period, as appropriate, has been established.

For photochemical oxidants, sources of volatile organic compounds (VOC) locating anywhere in the state shall be subject to the provisions of Section II of this Ruling only to the extent required by Subsection A, Condition 1, in accordance with the stipulations contained in Criteria for Approval of 1979 SIP Revisions, FR21673, May 19, 1978. At such time as the room for growth provided in the statewide approved plan is exhausted, the other provisions of Section II will also apply.

D. Facilities in attainment or undesignated areas.

For areas designated as attaining the NAAQS or which cannot be classified as to their attainment status, facilities locating in such areas which would exceed the significance levels shown below, at any locality that does not meet NAAQS are subject to this policy. However, such a facility may be exempt from Condition 3 of Section II A of this policy.

Significance Levels

| Pollutant | Annual | 24-Hour | 8-Hour | 3-Hour | 1-Hour |
|---|---|---|---|---|---|
| $SO_2$ | 1 $ug/m^3$ | 5 $ug/m^3$ | | 25 $ug/m^3$ | |
| TSP | 1 $ug/m^3$ | 5 $ug/m^3$ | | | |
| $NO_2$ | 1 $ug/m^3$ | | | | |
| CO | | | .5 $ug/m^3$ | | 2 $mg/m^3$ |

II. Facilities That Would Contribute to Concentrations Which Exceed a NAAQS

A. Conditions for approval.

If the Department finds that the emissions[4] from a proposed facility would contribute to concentrations which exceed a NAAQS as of the facility's proposed start-up date, approval will be granted only if the following conditions are met:

[4]Where a new facility will result in specific and well defined secondary emissions which can be accurately quantified, the Department will consider such secondary emissions in determining whether the facility would cause or contribute to a violation of the NAAQS. The indirect impact of motor vehicles and aircraft traffic will not be considered under this policy.

Condition 1. The new facility is required to meet an emission limitation[5] which specifies the lowest achievable emission rate for such facility.

Condition 2. The applicant must certify that all existing major facilities owned or operated by the applicant (or any entity controlling, controlled by, or under common control with the applicant) in the State are in compliance with all applicable emission limitations and standards (or are in compliance with an expeditious schedule which is Federally enforceable or contained in a court decree).

Condition 3. Emission reductions ("offsets") from existing facilities[6] in the area of the proposed facility (whether or not under the same ownership) are required such that there will be reasonable progress toward attainment of the applicable NAAQS.[3] Only intrapollutant emission offsets will be acceptable (e.g., hydrocarbon increases may not be offset against $SO_2$ reductions).

Condition 4. The emission offsets will provide a positive net air quality benefit in the affected non-attainment area.[3] This requirement applies only to sulfur dioxide, particulate matter and carbon monoxide; for volatile organic matter and oxides of nitrogen, fulfillment of Condition 3 will be considered adequate to meet this condition.

---

[5] If the Department determines that technological or economic limitations on the application of measurement methodology to a particular class of facilities would make the imposition of an enforceable numerical emission standard infeasible, the Department may instead prescribe a design, operational or equipment standard. In such cases, the Department will make its best estimate as to the emission rate that will be achieved and specify that rate in the required submission to EPA. Any permits issued without an enforceable numerical emission standard shall contain enforceable conditions which assure that the design characteristics or equipment will be properly maintained (or that the operational conditions will be properly performed) so as to continuously achieve the assumed degree of control.

[6] Subject to the provisions of Part II C.

B. Exemptions from certain conditions.

Temporary emission facilities, such as pilot plants, sources which will operate for a period not to exceed one year at a location, and emissions resulting from the construction phase of a new facility, are exempt from Condition 3 under Part II A.

C. Baseline for determining credit for emission and air quality offsets.

The baseline for determining credit for emission and air quality offsets will be the SIP emission limitations in effect at the time the application to construct or modify a source is filed. Credit for emission offset purposes will be allowable for existing control that goes beyond that required by the SIP. Emission offsets generally will be made on a pounds per hour basis when all sources at the facilities involved in the emission offset calculations are operating at their maximum expected or allowed production rate. The Department will specify other averaging periods (e.g., tons per year) in addition to the pounds per hour basis if necessary to carry out the intent of this policy. When offsets are calculated on a tons per year basis, the baseline emissions for existing facilities providing the offsets will be calculated using the actual annual operating hours for the previous one or two year period (or other appropriate period if warranted by cyclical business conditions). Where the SIP requires certain hardware controls in lieu of an emission limitation (e.g., floating roofs for petroleum storage), baseline allowable emissions will be based on actual operating conditions for the previous one or two year period (i.e., actual throughput and vapor pressures) in conjunction with the required hardware controls.

1. No meaningful or applicable SIP requirement.

Where the South Carolina Implementation Plan does not contain an emission limitation for a source or facility category, the emission offset baseline involving such facilities shall be the actual emissions determined by test methods, air

sampling, emission estimates[7] or other methods acceptable to the department and in accordance with operating conditions discussed in the preceeding paragraph.

Where the SIP emission limit allows greater emissions than the potential rate of the source or facility (e.g., the single particulate emission limit for all fuels), emission offset credit will be allowed only for control below the potential emission rate.

2. Combustion of fuels.

Generally, the emissions for determining emission offset credit involving an existing fuel combustion source will be the allowable emissions under the SIP for the type of fuel being burned at the time the new source application is filed (i.e., if the existing source has switched to a different type of fuel at some earlier date, any resulting emission reduction either actual or allowable shall not be used for emission offset credit). If the existing facility commits to switch to a cleaner fuel at some future date, emission offset credit based on the allowable emissions for the fuels involved is not acceptable unless the permit is conditioned to require the use of a specified alternative control measure which would achieve the same degree of emission reduction should the facility switch back to a dirtier fuel at some later date.

The facility must demonstrate to the Department that an adequate long term supply of the new fuel is available before emission offset credit is allowed for fuel switches.

3. Operating hours and source shutdown.

A facility will be credited with emission reductions achieved by shutting down an existing facility or permanently curtailing production or operating hours below baseline levels, provided that the work force to be affected has been notified of the proposed shutdown or curtailment. Emission offsets that involved reducing operating

[7]Emission estimates will be based on EPA publication "AP-42, Compilation of Air Pollution Emission Factors", or other valid and accepted methods of estimating emissions.

hours or production or facility shutdowns shall be enforced by modifying operating permits accordingly.[8]

4. No credit for hydrocarbon substitution.

No emission offset credit (when required) will be allowed for replacing one volatile organic compound with another of lesser reactivity, except for those compounds listed in Table 1 of EPA's "Recommended Policy on Control of Volatile Organic Compounds" (42 FR35314, July 8, 1977), and as subsequently revised.

5. "Banking"of emission offset credit.

For offsets approved after August 7, 1978 the Department will allow offsets which exceed the reasonable further progress requirement to be "banked" for use in the future, but will continue to exercise control of how and when such banked emission are used. The Department will not approve the construction of a facility using banked emissions if the new facility would interfere with "reasonable further progress" toward attainment. To preserve the banked emission reductions, the Department will identify the banked reductions on an attachment to the permit.

D. Location of offsetting emissions.

At such time that emission offsets involving volatile organic compounds (VOC) are required, the offsets may be obtained from facilities or sources located anywhere in the broad vicinity of the proposed new facility. Generally, offsets will be acceptable if obtained from within the same AQCR as the new facility or from other areas which may be contributing to the oxidant problem at the proposed new facility location. Offsets for $NO_x$ sources may be obtained within the broad area of non-attainment.[9] For $SO_2$, particulate and carbon monoxide, the Department may consider

[8]Facility shutdowns and curtailments in production or operating hours occurring prior to the date the new facility application is filed generally may not be used for emission offset credit. However, where an applicant can establish that it shut down or curtailed production after August 7, 1977, and the proposed new facility is a replacement for the shutdown or curtailment, credit for such shutdowns or curtailment may be applied to offset emissions from the new facility.

[9]This is because area-wide oxidant and $NO_2$ levels are generally not as dependent on specific hydrocarbon or $NO_x$ source location as they are on overall area emissions.

atmospheric simulation modeling to ensure that the emission offsets provide a positive net air quality benefit. In most cases it will be assumed that if the emission offsets are obtained from an existing facility on the same premises or in the immediate vicinity of the new facility, and the pollutants disperse from substantially the same effective stack height, the air quality test under Condition 4 of Part II A above will be met.

When stack emissions are offset against a ground level source at the same site, modeling will be required. The Department may perform this analysis or may at its option, require the applicant to submit appropriate modeling results.

E. Reasonable progress toward attainment.

In order to insure that reasonable progress toward attainment will be made, an emission offset ratio of at least 1.10 to 1.00 will be required for facilities subject to this policy.

## III. ADMINISTRATIVE PROCEDURES

The necessary emission offsets may be proposed either by the owner of the proposed facility or by the local community or the State. The emission reduction committed to shall be enforceable by the Department by the use of appropriate operating permit conditions and must be accomplished by the new facility's start-up date. If emission reductions are to be obtained in a neighboring state, the emission reductions committed to must be legally binding and enforceable by the new facility, which will be permitted to operate only as long as the emission reduction is in effect. Where the new source is a replacement for a source that is being shut down in order to provide the necessary offsets, the Department will allow up to 180 days for shakedown of the new source before the existing source is required to cease operation, provided that there is no net increase in emissions resulting from the new source start-up.

A. Facility initiated emission offsets.

A facility may propose emission offsets which involve: (1) reductions from facilities controlled by the facility owner (internal emission offsets); and/or (2) reductions from neighboring facilities (external emission offsets). The facility does not have to investigate all possible emission offsets. As long as the emission offsets obtained represent reasonable progress toward attainment, they will be acceptable. The Department will verify that the emission offsets will be as effective as proposed by the facility. An internal emission offset will be considered enforceable if it is made a SIP requirement by inclusion as a condition of the new source permit, and the new source enters a legally binding contract or agreement with the owner(s) or operator(s) of the source(s) of offsetting emissions. In such cases the responsibility for enforcing the contract or agreement lies with the new source. Failure to exact fulfillment of the contract or agreement will result in withdrawal of the operation permit.

The new source will be deemed to be in violation of a SIP requirement and subject to enforcement action if the emission offset is not obtained and continued in effect.

B. State or community initiated emission offsets.

The State or community which desires that a facility locate in its area may commit to reducing emissions from existing facilities (including mobile sources) to sufficiently outweigh the impact of the new facility and thus open the way for the new facility. As with facility initiated emission offsets, the commitment must be at least 1.10 to 1.00. This commitment shall be a permit condition or a consent order, both of which are enforceable under the SIP.

## Appendix B - ITEM 2

Volatile Organic Compounds Test Procedure

# METHODOLOGY FOR USE WITH

# STANDARD NO. 5 ON VOLATILE ORGANIC COMPOUNDS

# (VOC)

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METHODOLOGY FOR USE WITH
STANDARD NO. 5 ON VOLATILE ORGANIC COMPOUNDS

As stated under Part F of Standard 5 the owner or operator of any volatile organic compound source shall, at his own expense, conduct such test as required by the Department in order to demonstrate complete compliance, further, the test methods and procedures shall be those either specified by the Department in the following sections or such alternative methods approved by the Department. All tests shall be made by, or under the direction of a person qualified by training and/or experience in the field of Air Pollution testing.

The owner or operator must satisfy all sections of Part F before compliance testing will be allowed, or the results accepted.

Section I Determination of Volatile Content of Surface Coatings.

A. This method applies, in accordance with Part F of Standard No. 5, to paint, varnish, lacquer, and surface coatings which are air-dried or force-dried.

B. This method does not apply to any coating system requiring a special curing process such as:

1. exposure to temperatures in excess of 110°C (230°F) to promote thermal cross-linking; or,

2. exposure to ultraviolet light to promote cross-linking.

C. For the purposes of this method, the applicable surface coatings are divided into three classes. They are:

1. Class I: General Solvent-Type Paints. This class includes white linseed oil outside paint, white soya and phthalic alkyd enamel, white linseed o-phthalic alkyd enamel, red lead primer, zinc chromate primer, flat white inside enamel, white epoxy enamel, white vinyl toluene modified alkyd, white amino modified baking enamel, and other solvent-type paints not included in Class II.

2. Class II: Varnishes and Lacquers. This class includes clear and pigmented lacquers and varnishes.

3. Class III: Water Thinned Paints. This class includes emulsion or latex paints and colored enamels.

D. For the purposes of this method, a representative sample of the surface coating shall be obtained at the point of delivery to the coater or any other point in the process that the Department approves.

E. The volatile organic content of the sample shall be determined as follows:

1. Assign the coating to one of the three classes in paragraph (c) of this section. Assign any coating not clearly belongs to Class II or III to Clas I.

2. Determine the density $D_m$ (in grams/cubic centimeter) of the paint, varnish, lacquer, or related product according to the procedure outlined in ASTM D 1475-60, Standard Method of Test for Density of Paint, Varnish, Lacquer, and Related Products found in Appendix A of this manual. Then, depending on the class of the coating, using one of the following specified procedures to determine the volatile content:

   I. Class I. Use the procedure in ASTM D 2369-73, Standard Method of Test for Volatile Content of Paints as found in Appendix B of this manual.

      a. Record the following information:

         $W_1$ = Weight of dish and sample, grams

         $W_2$ = Weight of dish and sample after heating, grams

         S = Sample weight, grams

      b. Compute the volatile matter content C (in grams/liter of paint) as follows:

$$C_v = \frac{(W_1 - W_2)\ (D_m)\ (10^3)}{S}$$

      c. To convert grams/liters to pounds/gallon, multiply $C_v$ by $8.3455 \times 10^{-3}$.

   II. Class II. Use the procedure in ASTM D 1644-59 Method A, Standard Methods of Test for Nonvolatile Content of Varnishes as found in Appendix C of this manual.

      a. Record the following information:

         A = Weight of dish, grams

         B = Weight of sample used, grams

         C = Weight of dish and contents after heating, grams

b. Compute the volatile matter convert $C_v$ (in grams/liter) as follows:

$$C_v = \frac{(A + B - C)\ (D_m)\ (10^3)}{B}$$

c. To convert grams/liter to pounds/gallon, multiply $C_v$ by $8{,}3455 \times 10^{-3}$.

III. Class III. Use the procedure in ASTM D 2369-73, Standard Method of Test for Volatile Content of Paints as found in Appendix B of this manual.

a. Record the same information as specified in paragraph (e) (2) (i) of this section.

b. Determine the water content in P (in percent water) of the paint according to the procedure outlined in Federal Standard 141a, Method 4082.1, Water in Paint and Varnishes (Karl Fischer Titration Method) as found in Appendix D of this manual.

c. Compute the nonaqueous volatile matter content $C_v$ (in grams/liter) as follows:

$$C_v = \frac{(W_1 - W_2 - 0.01\ PS)(D_m)\ (10^3)}{S}$$

d. To convert grams/liters to pounds/gallon, multiply $C_v$ by $8.3455 \times 10^{-3}$.

## Section II Determination of Volatile Organic Compound Emission Control System Efficiency.

A. The provisions of this section are generally applicable, in accordance with Part F, to any test method employed to determine the collection or control efficiency of any device or system designed, installed, and operated for the purpose of reducing volatile organic compound emissions.

B. The following procedures shall be included in any efficiency determination:

1. The volatile organic compound containing material shall be sampled and analyzed in a manner approved by the Department such that the quantity of emissions that could result from the use of the material can be quantified.

2. The efficiency of any capture system used to transport the volatile organic compound emissions from their point of origination to the control equipment shall be computed using accepted engineering practice and in a manner approved by the Department.

3. Samples of the volatile organic compound containing gas stream shall be taken simultaneously at the inlet and outlet of the emissions control device in a manner approved by the Department.

4. The total combustible carbon content of the samples shall be determined by a method approved by the Department.

5. The efficiency of the control device shall be expressed as the fraction of total combustible carbon content reduction achieved.

6. The volatile organic compound mass emmission rate shall be the sum of emissions from the control device, emissions not collected by the capture system and capture system losses.

Section III Determination of Solvent Metal Cleaning Organic Compound Emissions.

A. This method is applicable to determining volatile organic compound emissions from solvent metal cleaning equipment.

B. The purpose of this method is to quantify, by material balance, the amount of solvent input into a degreaser over a sufficiently long period of time so that an average emission rate can be computed.

C. The following procedure shall be followed to perform a material balance test:

1. Clean the degreaser sump before testing.

2. Record the amount of solvent added to the tank with a flow meter.

3. Record the weight and type of work load degreased each day.

4. At the end of the test run, pump out the used solvent and measure the amount with a flow meter. Also, estimate the volume of metal chips and other material remaining in the emptied sump, if significant.

5. Bottle a sample of the used solvent and analyze it to find the percent that is oil and other contaminants. The oil and solvent proportions can be estimated by weighing samples of used solvent before and after boiling off the solvent. The volume of solvent displaced by this oil along with the volume of make-up solvent added during operations is equal to the solvent emission.

## Section IV Test Procedure for Determination of VOC Emissions From Bulk Gasoline Terminals.

A. Principle. VOC mass emissions are determined directly using flow meters and hydrocarbon analyzers. The volume of liquid gasoline dispensed is determined by a computation based on the metered quantity of gasoline at the loading rack. Test results are expressed in milligrams of hydrocarbons emitted per liter of gasoline transferred.

B. Summary of the Method. This method describes the test conditions and test procedures to be followed in determining the emissions from systems installed to control volatile organic compound vapors resulting from tank truck and trailer loading operations at bulk terminals. Under this procedure, direct measurements are made to compute the hydrocarbon mass exhausted from the vapor control system. All possible sources of leaks are qualitatively checked to insure that no uncontrolled vapors are emitted to the atmosphere. The results are expressed in terms of mass hydrocarbons emitted per unit volume of gasoline transferred. Emissions are determined on a total hydrocarbon basis. If methane is present in the vapors returned from the tank trucks or trailers, provisions are included for conversion to a total nonmethane hydrocarbon basis.

C. Applicability. This method is applicable to determining VOC emission rates at tank truck and trailer gasoline loading terminals employing vapor collection systems and either continuous or intermittent vapor control systems. This method is applicable to motor tank truck and trailer loading only as per Part E of Standard No. 5.

D. Apparatus. The components essential to the evaluation of emissions from gasoline loading terminals are:

1. portable combustible gas detector equipped to read 0 to 100 percent of the lower explosive limit,

2. flexible thermocouple with recorder,

3. gas volume meter, sized for the expected exhaust flow rate and range,

4. total hydrocarbon analyzer with recorder (flame ionization detector or nondispersive infrared equipped to read 0 to 10 percent by volume hydrocarbon as propane for vapor control systems which recover the vapor as liquid; or 0 to 10,000 ppmv hydrocarbons as propane for incineration vapor control systems),

5. barometer to measure atmospheric pressure,

6. gas chromatography/flame ionization detector with a column to separate $C_1$ - $C_7$ alkanes; used if methane is present in recovered vapors or if incineration is the vapor control technique.

E. Test requirements.

1. No less than three 2-hour test repetitions will be performed, or if a batch operation a minimum of three cycles.

2. During the test period, all loading racks shall be open for each product line which is controlled by the system under test. Simultaneous use of more than one loading rack shall occur to the extent that such use would normally occur.

3. Simultaneous use of more than one dispenser on each loading rack shall occur to the entent that such use would normally occur.

4. Dispensing rates shall be set at the maximum rate at which the equipment is designed to be operated. Automatic product dispensers are to be used according to normal operating practices.

5. Applicable operating parameters of the vapor control system shall be monitored to demonstrate that the control unit is operating at design levels. For intermittent vapor control systems employing a vapor holder, each test repetition shall include at least one fully automatic operation cycle of the vapor holder and control device. Tank trucks and trailers shall be essentially leak free as determined by the Department.

F. Basic Measurements Required. The basic measurements essential to the evaluation of emissions from gasoline loading terminals are:

1. the amount of gasoline dispensed from gasoline dispensers,

2. leak check of all fittings and vents,

3. the following items for the processing unit exhaust;

   I. temperature

   II. pressure,

   III. volume of vapors,

   IV. hydrocarbon concentration of vapors,

   V. gas chromatograph analysis of vapors if methane is present in recovered vapors.

G. Test Procedure.

1. Calibrate and span all instruments as outlined under paragraph (j) under this section.

2. Install an appropriately sized gas meter on the exhaust vent of the vapor control system. For those vapor control systems where size restrictions preclude the use of a volume meter; or when incineration is used for vapor control, a gas flow rate meter (orifice, pitot tube, annubar, etc.) is necessary. At the meter inlet, install a thermocouple with recorder. Install a tap at the volume meter outlet. Attach a sample line for a total hydrocarbon analyzer (0 to 10 percent as propane) to this tap. If the meter pressure is different than barometric pressure, install a second tap at the meter outlet and attach an appropriate manometer for pressure measurement. If methane analysis is required, install a third tap for connection to a constant volume sample/pump evacuated bag assembly as described in Method 3, Federal Register, and found in Appendix E of this manual.

3. Measurements and data required for evaluating emissions from the system;

   I. at the beginning and end of each test repetition, record the volume readings on each product dispenser on each loading rack served by the system under test,

   II. at the beginning of each test repetition record the ambient temperature and the barometric pressure,

   III. for intermittent vapor control systems employing a vapor holder, the unit shall be manually started and allowed to process vapors in the holder until the lower automatic cut-off is reached. This cycle should be performed immediately prior to the beginning of the test repetition for readings required under paragraph (g)(3)(i) of this section are taken. No loading shall be in progress during this manual cycle.

   IV. for each cycle of the vapor control system during each test repetition, record the start and stop time, the initial and final gas meter readings, the average vapor temperature, pressure and hydrocarbon concentration. If a flow rate meter is used, record flow meter readouts continuously during the cycle. If required, extract a sample continuously during each cycle for chromatographic analysis for specific hydrocarbons.

   V. for each tank truck or trailer loading during the test period, check all fittings and seals on the tanker compartments with the combustible gas detector. Record the maximum combustible gas reading for any incidents of leakage of hydrocarbon vapors. Explore the entire periphery of the potential leak sourch with the sample hose inlet 1 cm (0.4 inches) away from the interface.

   VI. during each test period, monitor all possible sources of leaks in the vapor collection and control systems with the combustible gas indicator. Record the location and combustible gas reading for any incidents of leakage.

VII. for intermittent vapor control systems, the control unit shall be manually started and allowed to process vapors in the holder until the lower automatic shut-off is reached at the end of each test repetition. Record the data required under paragraph (g) (3) (iv) of this section for this manual cycle.

H. Calculations.

1. Terminology:

$T_a$ = Ambient temperature ($^oC$)

$P_b$ = Barometric pressure (mm Hg)

$L_t$ = Total volume of liquid dispensed from all controlled racks during the test period (liters)

$V_e$ = Volume of air-hydrocarbon mixture exhausted from the processing unit ($M^3$)

$V_{es}$ = Normalized volume of air-hydrocarbon mixture exhausted, $NM^3$ @ $20^oC$, 760 mmHg

$C_e$ = Volume fraction of hydrocarbons in exhausted mixture (volume % as $C_3H_{10}$/100, corrected for methane content if required)

$T_e$ = Temperature at processing unit exhaust ($^oC$)

$P_e$ = Pressure at processing unit exhaust (mm Hg abs)

$(M/L)_e$ = Mass of hydrocarbons exhausted from the processing unit per volume of liquid loaded, (mg/l).

2. Calculate the following results for each period of the vapor control system:

I. Volume of air-hydrocarbon mixture exhausted from vapor control system.

$V_e = V_{ef} - V_{ei}$, or ($M^3$)

$V_e$ = totalized volume from flow rate and time records.

II. Normalized volume of exhausted misture:

$$V_{es} = \frac{(0.3585\ ^{o}K/mmHg)\ VePe}{(T_e + 273.2)} \quad NM^3 \text{ @ } 20^{o}C,\ 760 \text{ mmHg}$$

III. Mass of hydrocarbons exhausted from the vapor control system:

$$M_e = (1.833 \times 10^6 \frac{mgC_3H_8)}{NM^3C_3H_8} \times V_{es}C_e \text{ (mg)}$$

3. Calculate the average mass of hydrocarbons emitted per volume of gasoline loaded:

$$(M/L)_e = \frac{M_e}{L_t} \quad \text{(mg/liter)}$$

J. Calibrations.

1. Flow meters shall be calibrated using standard methods and procedures which have been approved by the Department.

2. Temperature recording instruments shall be calibrated prior to a test period and following the test period using an ice bath ($0^{o}C$) and a known reference temperature source of about $35^{o}C$. Daily during the test period, use an accurate reference to measure the ambient temperature and compare the ambient temperature reading of all other instruments to this value.

3. Manufacturer's instructions concerning warm-up and adjustments shall be followed for total hydrocarbon analysers. Prior to and immediately after the emission test, perform a comprehensive laboratory calibration on each analyzer used. Calibration gases should be propane in nitrogen prepared gravimetrically with mass quantities of approximately 100 percent propane. A calibration curve shall be provided using a minimum of five prepared standards in the range of concentrations expected during testing;

   I. For each repetition, zero with zero gas (3 ppm C) and span with 70 percent propane for instruments used in the vapor lines and with 10 percent propane for instruments used at the vapor control system exhaust.

   II. The zero and span procedure shall be performed at least once prior to the first test measurement, once during the middle of the run, and once following the final test measurement for each run.

   III. Conditions in calibration gas cylinders must be kept such that condensation of propane does not occur. A safety factor of 2 for pressure and temperature is recommended.

Appendix A

Standard Method of Test for

# DENSITY OF PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS

## SCOPE

1. This method describes a procedure for the measurement of density of paints, varnishes, lacquers, and components thereof, other than pigments, when in fluid form. It is particularly applicable where the fluid has too high a viscosity or where a component is too volatile for a specific gravity balance determination.

   Note 1.--The method provides for the maximum accuracy required for hiding power determinations. It is equally well suited for work in which less accuracy is required, by ignoring the directions for recalibration and consideration of temperature differentials, by using the container as a "weight-per-gallon" cup.

## DEFINITION

2. Density.--The mass (weight in vacuo) of a unit volume of the liquid at any given temperature. In this method, it is expressed as the weight in grams per cubic centimeter, or as the weight, in pounds avoirdupois, of one U. S. gallon measure of the liquid at the specified temperature; in the absence of other temperature specification, 25 C is assumed.

## OUTLINE OF METHOD

3. The accurately known absolute density of distilled water at various temperatures, available in published tables, is used to calibrate the volume of a container. The weight of the paint liquid contents of the same container at a standard temperature (25 C) or at an agreed-upon temperature, is then determined, and density of the contents calculated in terms of grams per cubic centimeter, or pounds per gallon at the specified temperature.

## APPARATUS

4. a. Pycnometer, any type, or weight-per-gallon cup, having a capacity of from 20 to 100 cu cm may be used, provided that it may be filled readily with a viscous liquid, adjusted to exact volume, and covered to exclude loss of volatile matter.

   b. Thermometers, graduated in 0.1 C, such as are supplied with glass pycnometers.

c. Constant-Temperature Bath, held at 25± 0.1 C is desireable.

d. Laboratory Analytical Balance (Note 2).

Note 2.--The usual weight-per-gallon cup and similar specialized pycnometers may have filled weights which exceed the capacity of the usual laboratory analytical balance. In such cases, use of a hanging pan, triple-beam balance, with scales graduated to 0.01 g has been found to provide results the mean of which was consistent with the over-all precision and accuracy of the method.

e. Desiccator and Desiccated Balance, or a room of reasonably constant temperature and humidity are desireable

CALIBRATION OF PYCNOMETER OR CUP

5. Determine the volume of the container at the special temperature by employing the following steps:

a. Clean and dry the container and bring it to constant weight. Chromic acid cleaner and nonresidual solvents may be used with glass containers, and solvents with metal containers. For maximum accuracy, rinsing, drying, and weighing must be continued until the difference between two successive weights does not exceed 0.001 per cent of the weight of the container. Fingerprints on the container will change the weight and must be avoided. Record the weight, M, in grams.

b. Fill the container with freshly boiled distilled water at a temperature somewhat below that specified. Cap the container, leaving the overflow orifice open. Immediately remove excess overflowed water or water held in depressions by washing with acetone or alcohol and dabbing dry with absorbent material. Avoid air bubbles occluded within the container.

c. Bring the container and contents to specified temperature. Use the constant-temperature bath or room if necessary. This may be expected to cause further slight flow of water from the overflow orifice due to the expansion of the water with the rise of the temperature.

d. Remove the excess overflow by wiping carefully with absorbent material, avoiding wicking of water out of orifice, and immediately cap the overflow tube where such has been provided. Dry the outside of the container, if necessary, by wiping with absorbent material. Do not remove overflow which occurs subsequent to the first wiping after attainment of the desired temperature (Note 3). Immediately weigh the filled container to the nearest 0.001 per cent of its weight (Note 4). Record this weight, N, in grams.

Note 3.--Handling the container with bare hands will increase the temperature and cause more overflow from the overflow orifice, and will also leave fingerprints; hence, handling only with tongs and with hands protected by clean, dry, absorbent material is recommended.

Note 4.--Immediate and rapid weighing of the filled container is recommended here to minimize loss of weight due to evaporation of the water through orifices, and from overflow subsequent to the first wiping after attainment of temperature where this overflow is not retained within a capped enclosure

e. Calculate the container volume as follows:

$$V = \frac{N - M}{q}$$

where:

V = volume of container in cubic centimeters

N = weight of container and water (Paragraph (d) ),

M = weight of dry container (Paragraph (a) ), and

q = absolute density of water in grams per cubic cemtimeter at specified temperature (see Table 1).

f. Obtain the mean of at least three determinations of v to provide the value of V required in Section 6 (b).

PROCEDURE

6. a. Repeat the steps in Part 5, substituting the sample for the distilled water and a suitable nonresidual solvent for the acetone or alcohol (see Section 5 (b) and Note 5). Record the weight of the filled container, w, in grams.

Note 5.--Trapping of paint liquids in ground glass or metal joints is likely to result in high values of density which appear to increase with the viscosity and density of the material; such errors should be minimized by firm seating of the joints.

b. Calculate the density in grams per cubic centimeter as follows:

$$Dm = \frac{W - w}{V}$$

where:

Dm = density in grams per cubic centimeter.

c. Calculate the density in pounds per gallon as follows:

$$D = \frac{(W - w)\ K}{V}$$

where:

D = density in pounds per gallon,

K = 8.3455 (Note 6), and

V = volume of container in cubic centimeters (See Section 5 (f) ).

Note 6.--The factor K, 8.3455, is calculated from volume-weight relationship as follows

$$8.345452 = \frac{(2.54)^{3^a} \times (231.00)^b}{(453.59243)^c}$$

---

a-$2.54^3$ is the conversion factor for centimeters to inches.

b-231.00 is the conversion factor for cubic inches to gallons.

c-453.59243 is the conversion factor for grams to pounds.

REPORT

7. In reporting the density, state the test temperature to the nearest 0.1 C, the units, and the value calculated to the fourth place to the right of the decimal point (for example, D = x.xxxx lb per gal at 25 C); state the mean, the range, and the number of replicate determinations.

PRECISION

8. Using the procedure for maximum accuracy, a single determination by one person in one laboratory should not differ from the mean of determinations by that person by more than ±0.008 lb per gal (3-sigma limits) and should not differ from the mean of all determinations by different persons in the same and different laboratories by more than ±0.015 lb per gal (3-sigma limits).

Appendix A

Standard Method of Test for

DENSITY OF PAINT, VARNISH, LACQUER,
AND RELATED PRODUCTS

Table 1

Absolute Density of Water, G per CC.

| Deg C | Density |
|---|---|
| 15 | 0.999099 |
| 16 | 0.998943 |
| 17 | 0.998744 |
| 18 | 0.998595 |
| 19 | 0.998405 |
| 20 | 0.998203 |
| 21 | 0.997992 |
| 22 | 0.997770 |
| 23 | 0.997538 |
| 24 | 0.997296 |
| 25 | 0.997044 |
| 26 | 0.996783 |
| 27 | 0.996512 |
| 28 | 0.996232 |
| 29 | 0.995944 |
| 30 | 0.995656 |

Appendix B

Standard Method of Test for

VOLATILE CONTENT OF PAINTS

1. SCOPE

1.1 This method covers the determination of the volatile content of solvent-type paints.

Note 1.--This method has been proven to be applicable to the following types of paint and is considered to be applicable to most solvent type paints: white linseed oil outside house paint, white soya and phthalic alkyd enamel, white linseed o-phthalic alkyd enamel, red lead primer, zinc chromate primer, flat white inside enamel, white epoxy enamel, white vinyl toluene modified alkyd and white amino modified baking enamel.

2. REAGENT

2.1 Toluene, reagent grade, purified.

3. APPARATUS

3.1 Oven--A forced-draft oven capable of maintaining 110± 1 C, or an infrared oven constructed as described in Note 2 and Fig. 1. The infrared oven shall be regulated by a powerstat.

Note 2.--The infrared oven recommended for use may be simply constructed in accordance with Fig. 1.

3.2 Syringe, 5-ml.

3.3 Aluminum Foil Dish, 58 mm in diameter by 18 mm high, with a flat bottom. The bottom of the dish must not have a trough in which excess material might collect

4. PROCEDURE

4.1 Mix samples until homogeneous, preferably on a mechanical shaker. If air bubbles become entrapped in the sample, it should be stirred by hand.

4.2 Using a 5-ml syringe, weight accurately (to the third decimal place) by difference from 0.4 to 0.6 g of the sample into a tared aluminum foil dish (58 mm in diameter by 18 mm high) into which has previously been added 2 ml of toluene. The addition of the sample should be dropwise (about 30 drops) shaking the dish to disperse the sample completely through the toluene. If the sample forms a lump which cannot be dispersed, it should be discarded and rerun.

4.3 Heat the dish for 20 min in a forced draft oven at 110± 2 C (Note 4) making certain that the shelf of the oven is level.

Note 3.--CAUTION--Adequate ventilation should be provided to prevent concentration of toluene vapors from building up to the danger level.

Note 4.--The temperature is taken with a bulb-type thermometer laid on the shelf with the bulb at the spot in the oven where the samples are placed. It is not satisfactory to use the temperature as recorded by the thermometer at the top of the oven.

4.4 Alternatively, position the dish at a location in the infrared oven where the temperature has been set at 110± 2 C (Note 5) making certain that the shelf of the oven is level. Only one dish should be placed under each lamp.

Note 5.--The temperature of the infrared oven is regulated by the powerstat. The temperature is taken with a bulb-type thermometer laid on the shelf with the bulb at the spots in the oven where the samples are placed. The stem of the thermometer should come out of the front of the oven parallel to the base and perpendicular to the projection of the lamps. The oven should be allowed to come to temperature equilibrium before the samples are placed in it. This may take 30 minutes or more.

4.5 Remove the samples from the oven, cool in a desiccator, and weigh.

5. CALCULATION

5.1 Calculate the percentage of volatile matter in paint as follows:

$$\text{Volatile matter, per cent} = \frac{A - B}{C} \times 100$$

where:

A = weight of dish plus sample,

B = weight of dish plus sample after heating,

C = weight of sample used.

Appendix B

Standard Method of Test for

VOLATILE CONTENT OF PAINTS

Fig. 1--Infrared Oven

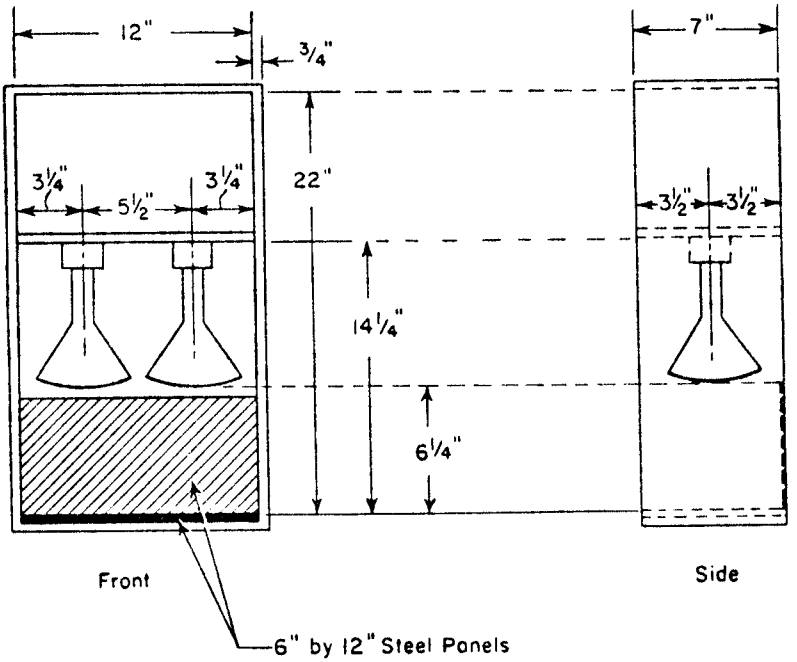


FIG. 1—Infrared Oven.

## Appendix C

## Standard Methods of Test for

## NONVOLATILE CONTENT OF VARNISHES

### SCOPE

1. These methods determine the fraction of a varnish which is relatively stable at the temperature of the test while volatile solvents are driven off. It is sometimes an approximate measure of the film-forming matter in a varnish.

### METHOD A. 3 Hr at 105 C

### PROCEDURE

2. Place a portion of the thoroughly mixed sample in a stoppered bottle, or alternatively, in a weighing pipet or a 10-ml syringe without a needle, and from this weigh by difference 1.2 ± 0.1 g of sample into a tared flat-bottomed metal or glass dish (Note 1), 80 to 100 mm in diameter and 5 to 10 mm in depth, such as friction-top can covers, ointment boxes, or petri dishes. By gentle tilting, spread the sample over the bottom of the dish and heat for 3 hr in a ventilated oven maintained at 105 ± 2 C (221 ± 4F). If necessary, a piece of stout wire can be included in the tare of the dish and used at intervals to break up skins by stirring during the heating period. Cool and weigh the dish.

   Note 1.--The term "tared, flat-bottomed dish" implies that the empty dish has no measureable weight change when subjected to the same heat schedule as prescribed for the dish containing the sample. If this is found to be not so, then more suitable vessels must be found, or corrections applied.

### CALCULATION

3. Calculate the nonvolatile matter as follows (Note 2):

$$\text{Nonvolatile matter, percent} = \frac{C - A}{B} \times 100$$

where:

A = weight of dish in grams,

B = grams of sample used, and

C = weight of dish and contents after heating in grams

Note 2.--Determinations of nonvolatile matter by this method may give high results due either to incomplete elimination of volatile matter or to absorption of oxygen by oxidizing type varnishes.

REPORT

4. Report the nonvolatile matter of the sample to the nearest 0.1 per cent.

## Appendix D

## WATER IN PAINTS AND VARNISHES

(Karl Fischer Titration Method)

1. SCOPE

1.1 This specific method for determining water is applicable to all types of enamels and varnishes. Interfering alkaline pigments, such as zinc oxide, are removed prior to titration with the reagent.

2. APPARATUS

2.1 Titration assembly. A suitable assembly to provide for a closed system during titration, for storing the Karl Fischer reagent, and for electrometric detection of the endpoint.

2.2 Titrimetric apparatus. Because paints usually form colored solutions, an electrometric endpoint detector should be used. Commercial detectors employing various endpoint detection techniques are available from laboratory supply houses.

3. REAGENTS

3.1 Karl Fischer reagent. This reagent may be prepared in the laboratory. However, it is more convenient to purchase the stabilized reagent, which requires less frequent standardizations, from laboratory supply houses.

3.1.1 Standardization of Karl Fischer reagent.

3.1.1.1 Add 25 or 50 ml. of methanol to a clean, dry titration flask containing a magnetic stirring bar. Close the neck of the flask with a two hole rubber cap. Adjust the magnetic stirrer to give smooth stirring action. Set the ammeter to give full-scale deflection when the electrodes are shorted. Titrate with Karl Fischer reagent until a full-scale reading is retained for about 30 seconds. Disregard this blank titration.

3.1.1.2 Transfer a suitable portion of the selected standard containing 0.2 to 0.3 g $H_2O$ to the titration flask containing the pretitrated methanol. Titrate with the Karl Fischer to the endpoint described in 3.1.1.1.

3.1.1.3 Calculate the water equivalent of the reagent as mg. of water per ml. of reagent.

3.2 Water Standard (a) Direct weighing of water, (b) certified or accurately prepared water in methanol, or (c) certified sodium tartrate dihydrate (containing 15.66 percent $H_2O$) may be used.

3.3 Pyridine, A.C.S. reagent grade.

3.4 Methanol, A.C.S. reagent grade.

## 4. PROCEDURE

4.1 Weigh 20 to 30 g. of paint or varnish into a dry 100 ml. volumetric flask. Add about 50 ml. of methanol or pyridine (see 5.1). Stopper the flask and mix for 15 minutes or longer to extract the water present, into the methanol or pyridine solvent.

4.2 Make up to volume with methanol, mix, and allow to stand until the supernatant liquid is clear of pigment. In some cases, centrifuging may be necessary.

4.3 Transfer a 25- or 50-ml. aliquot portion of the supernatant liquid to a titration flask. Titrate with Karl Fischer reagent to the same endpoint as described in 3.1.1.1.

4.4 Titrate an equal portion of the solvent used as blank.

4.5 Calculate the water content of the sample as follows:

$$\frac{(A - B)\ F \times 0.1}{W} = \text{Percent water in sample}$$

where:

A = ml. of reagent required to titrate sample aliquot.

B = ml. of reagent required to titrate solvent blank.

F = water equivalent of reagent in mg. of water per ml.

W = g. of sample in aliquot taken for analysis

## 5. NOTES

5.1 In some instances, due to vehicle insolubilities, use of pyridine may be preferable as the extration solvent.

## 6. PRECISION

6.1 No data.

Appendix E

# GAS ANALYSIS FOR CARBON DIOXIDE, OXYGEN, EXCESS AIR, AND DRY MOLECULAR WEIGHT

## 1. PRINCIPLE AND APPLICABILITY

1.1 Principle. A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, intergrated sampling. The gas sample is analyzed for percent carbon dioxide ($CO_2$), percent oxygen ($O_2$), and, if necessary, percent carbon monoxide (CO). If a dry molecular weight determination is to be made, either an Orsat or a Fyrite analyzer may be used for the analysis; for excess air or emission rate correction factor determination, an Orsat analyzer must be used.

1.2 Applicability. This method is applicable for determining $CO_2$ and $O_2$ concentrations, excess air, and dry molecular weight of a sample from a gas stream of a fossil-fuel combustion process. The method may also be applicable to other processes where it has been determined that compounds other than $CO_2$, $O_2$, CO and Nitrogen ($N_2$) are not present in concentrations sufficient to affect the results.

Other methods, as well as modifications to the procedure described herein, are also applicable for some or all of the above determinations. Examples of specific methods and modifications include: (1) a multi-point sampling method using an Orsat analyzer to analyze individual grab samples obtained at each point; (2) a method using $CO_2$ or $O_2$ and stoichiometric calculations to determine dry molecular weight and excess air; (3) assigning a value of 30.0 for dry molecular weight, in lieu of actual measurements, for processes burning natural gas, coal or oil. These methods and modifications may be used, but are subject to the approval of the Administrator.

## 2. APPARATUS

As an alternative to the sampling apparatus and systems described herein, other sampling systems (e.g., liquid displacement) may be used provided such systems are capable of obtaining a representative sample and maintaining a constant sampling rate, and are otherwise capable of yielding acceptable results. Use of such systems is subject to the approval of the Administrator.

2.1 Grab Sampling (Figure 3-1)

2.1.1 Probe. The probe should be made of stainless steel or borosilicate glass tubing and should be equipped with an in-stack or out-stack filter to remove particulate matter (a plug of glass wool is satisfactory for this purpose). Any other material inert to $O_2$, $CO_2$, CO, and $N_2$ and resistant to temperature at sampling conditions may be used for the probe; examples of such material are aluminum, copper, quartz glass and teflon.

2.1.2 Pump. A one-way squeeze bulb, or equivalent, is used to transport the gas sample to the analyzer.

2.2 Integrated Sampling (Figure 3-2)

2.2.1 Probe. A probe such as that described in Section 2.1.1 is suitable.

2.2.2 Condenser. An air-cooled or water-cooled condenser, or other condenser that will not remove $O_2$, $CO_2$, CO and $N_2$, may be used to remove excess moisture which would interfere with the operation of the pump and flow meter.

2.2.3 Valve. A needle valve is used to adjust sample gas flow rate.

2.2.4 Pump. A leak-free, diaphragm-type pump, or equivalent, is used to transport sample gas to the flexible bag. Install a small surge tank between the pump and rate meter to eliminate the pulsation effect of the diaphragm pump on the rotameter.

2.2.5 Rate Meter. The rotameter, or equivalent rate meter, used should be capable of measuring flow rate to within $\pm$ 2 percent of the selected flow rate. A flow rate range of 500 to 1000 $cm^3$/min is suggested.

2.2.6 Flexible Bag. Any leak-free plastic (e.g., Tedlar, Mylar, Teflon) or plastic-coated aluminum (e.g. aluminized Mylar) bag, or equivalent, having a capacity consistent with the selected flow rate and time length of the test run, may be used. A capacity in the range of 55 to 90 liters is suggested.

To leak-check the bag, connect it to a water manometer and pressurize the bag to 5 to 10 cm $H_2O$ (2 to 4 in. $H_2O$). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. An alternative leak-check method is to pressurize the bag to 5 to 10 cm $H_2O$ (2 to 4 in $H_2O$) and allow to stand overnight. A deflated bag indicates a leak.

2.2.7 Pressure Gauge. A water-filled U-tube manometer, or equivalent, of about 28 cm (12 in.) is used for the flexible bag leak-check.

2.2.8 Vacuum Gauge. A mercury manometer, or equivalent, of at least 760 mm Hg (30 in Hg) is used for the sampling train leak-check.

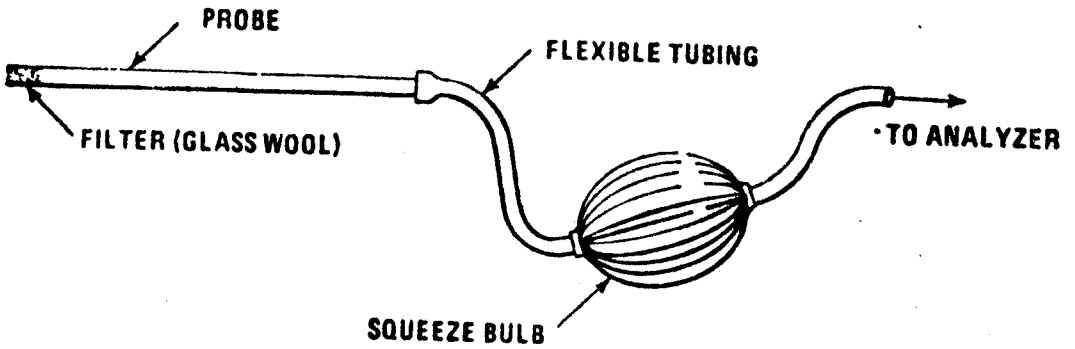


Figure 3-1. Grab-sampling train.

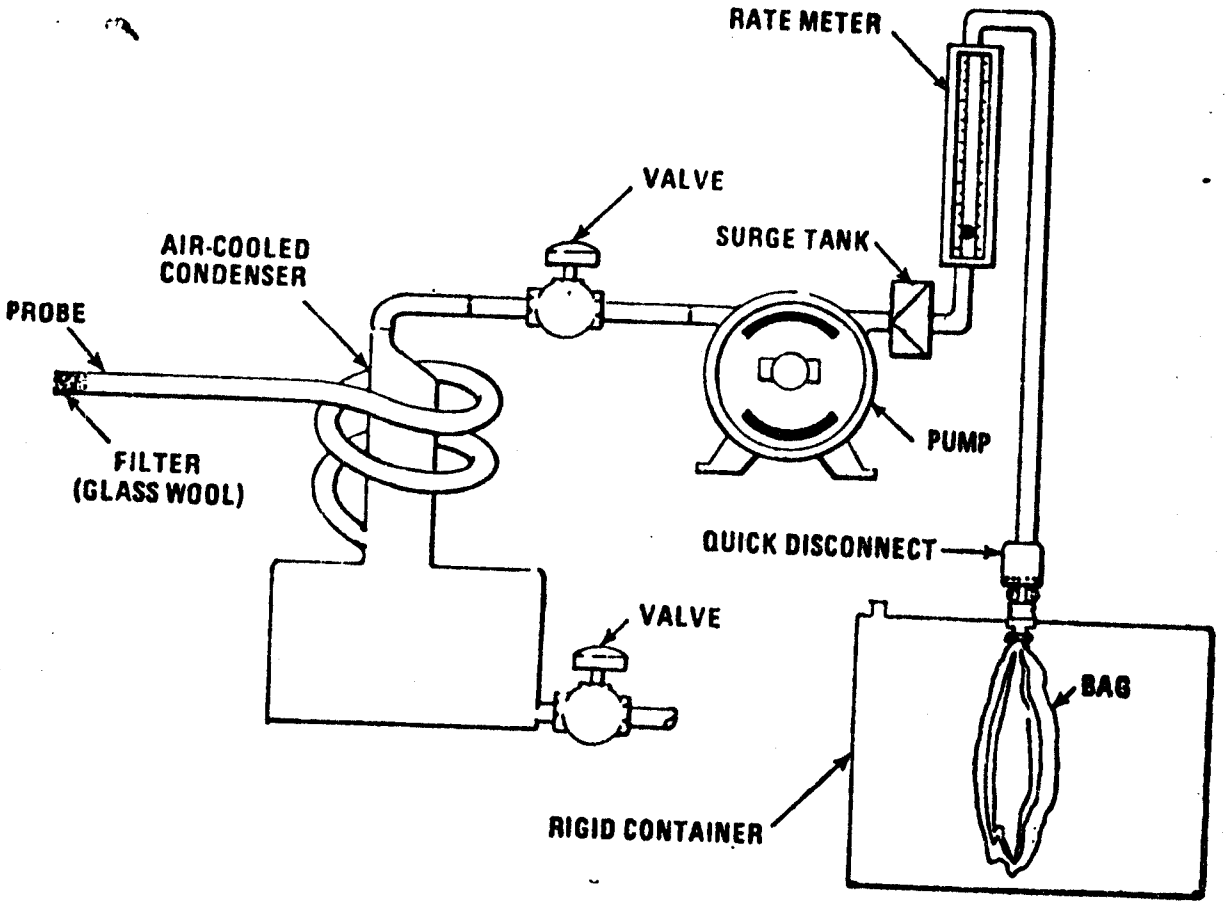


Figure 3-2. Integrated gas-sampling train.

## Appendix B - ITEM 3

Particulate Emissions Source Test Procedure

BOARD

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William C. Moore, Jr., D.M.D., Vice-Chairman
I. DeQuincey Newman, Secretary
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George G. Graham, D.D.S.
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C. Maurice Patterson

# SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Albert G. Randall, M.D., M.P.H.
Commissioner

Sims-Aycock Buildings
2600 Bull Street, Columbia, SC 29201

## PROCEDURES AND MINIMUM REQUIREMENTS FOR SOURCE TESTS OF PARTICULATE EMISSIONS

BUREAU OF AIR QUALITY CONTROL

TELEPHONE (803) 758-5406

Revised September 27, 1978

I. Three consecutive tests must be conducted for each individual source.

II. Location of sampling sites and the number of sampling points shall be determined by Method 1 from the Federal Register, Volume 42, No. 160, Part 60, Appendix A (August 18, 1977), as amended thereafter.

III. Sampling procedures and equipment shall follow that given in Methods 2 through 5 of the Federal Register mentioned above. Sample handling and analysis shall also follow Federal Register prescribed procedures.

IV. All leak checks required by above referenced Methods shall be performed.

V. Minimum sampling time will be two minutes per point and one hour per test.

VI. At least 30 cubic feet of dry gas should be monitored per test.

VII. Equipment should be calibrated before testing each plant. Calibration data and calculations must be included with the test report (dry gas meter, orifice ΔH@). Dry gas meter calibrations every three months will be accepted if field checks prior to testing each plant agree within 2% of the last calibration results.

VIII. Data required to be recorded.

A. For each test series or stack:

1. Stack diameter
2. Stack diameters upstream and downstream to disturbance or bend from ports. (Include sketch of sampling location)
3. Cross-sectional sketch of sampling port and point locations with dimensions.

B. For each test:

1. Filter number(s)
2. Equipment numbers
3. Impinger mls, initial, final, net
4. Silica gel number or grams
5. Start and stop time
6. Assumed Tm
7. Nomograph correction factor or K factor if nomograph is not used
8. Leak checks, cfm @ inches Hg.
9. Sampling time per point
10. Barometric pressure
11. Orifice ΔH@
12. Stack pressure, inches $H_2O$, plus or minus.

B. (Continued)

13. ORSAT analysis of integrated flue gas samples for fuel burning operations.
14. NOZZLE diameter (to nearest .001 inch) as determined by a micrometer previous to each test
15. Assumed % moisture.

C. For each sampling point:

1. Dry gas meter reading (initial and final at least to nearest 0.01 $ft^3$)
2. Pitot manometer $\Delta P$
3. Orifice manometer $\Delta H$
4. Dry gas meter inlet and outlet temperature
5. Pump vacuum
6. Stack temperature.

D. Lab data for each test:

1. Filter(s)
2. Probe and cyclone wash
3. Silica gel
4. Acetone blank (one for each series)

ALL lab data will be included in the test report - number, tare, final, net. Milliliters of acetone used in blank and each wash will be recorded.

X. Calculations Required* - the following information should be calculated for each test:

1. Volume of water collected, scf
2. Volume of dry gas metered, scf
3. Moisture content of stack gas, %
4. Molecular weight of stack gas
5. Average velocity of exit gas, fps
6. Flow rate of stack gas, ACFM
7. Flow rate of stack gas, SCFM
8. Emissions from stack in lbs/hr, gr/DSCF, and in lbs/$10^6$ BTU input for fuel burning operations
9. Per cent isokinetic for each test. This value should be between 90-110% for the test to be valid.

*ALL calculations should be explained in detail (include formulas and methods, etc.)

The following information should be recorded for each test:

1. Average square root of velocity head, $\overline{\sqrt{\Delta P}}$
2. Average orifice pressure drop, $\overline{\Delta H}$
3. Average meter temperature, $\overline{Tm}$
4. Average stack temperature, $\overline{Ts}$
5. Meter correction factor used
6. Total front half dry catch minus net blank weight
7. Total grams $H_2O$

NOTE: Standard conditions are 68°F and 29.92 inches Hg.

XI. Process weight rates in lbs/hr input should be recorded for each test. For fuel burning operations fuel samples should be taken at some time during each test and analyzed for BTU content, % sulfur, and % ash. Process design ratings and the load at which the test is conducted should also be recorded. The company being tested is responsible for obtaining the process weight data. This information should be recorded and an hourly process rate input be determined. A procedure of how this process weight was determined and calculations used should be included in the report with the process weight sheet. The process weight data sheet should be signed by the responsible company official. Tests shall be performed while the process is operating at rated capacity or normal load, whichever is higher.

XII. When sampling for compliance with South Carolina Regulations, this agency should be notified in writing at least two weeks in advance of any testing so that an observer can be present to approve testing methods; otherwise, retesting may be required.

XIII. All Federal Regulations and Requirements for stack tests should be followed.

XIV. Any deviations from these procedures and requirements should be thoroughly explained and must be previously approved by someone from this agency.

XV. Failure to observe any of these procedures or requirements may be grounds for non-acceptance of tests.

If there are any questions concerning these procedures and minimum requirements, you may contact the Facilities Evaluation Division of the Bureau of Air Quality Control.

The following personnel may assist you.

Otto E. Pearson, P. E., Director, Facilities Evaluation Division
John Prohaska, Engineer, Source Evaluation Section
William Culler, Engineer, Source Evaluation Section

# APPENDIX E

Emission Inventories, Air Quality Models (1979 PL)

# Appendix E - ITEM 1

Georgetown Particulate Inventory/AQDM

## Georgetown County Particulate Emissions Inventory for 1977

| Source Number * | Source | Facility |
|---|---|---|
| 1-39 | Sources numbered 1-39 consist of emissions from 20 area source categories. *These numbers coincide with the Grids in Table III-1 of the Georgetown, South Carolina Air Quality Maintenance Planning and Analysis Report and are reproduced here for convenience. The emissions rates from the Georgetown Report were updated for this inventory. *Emissions from each source category were added together to obtain a total area source emission rate for each grid area. | |
| 40 | Baghouse | M & T Chemicals |
| 41 | Recovery Boiler #1 | International Paper |
| 42 | Recovery Boiler #2 | " |
| 43 | Dissolving Tank | " |
| 44 | Dissolving Tank | " |
| 45 | Lime Kiln #1 | " |
| 46 | Lime Kiln #2 | " |
| 47 | Power Boiler | " |
| 48 | Power Boiler | " |
| 49 | Power Boiler | " |
| 50 | Conveyor | Georgetown Ferreduction |
| 51 | Metalizing | " |
| 52 | Wiper Bar Collector | " |
| 53 | Boiler | " |

* These sources are coincident with the sources shown as input to the AQDM model.

| Source Number* | Source | Facility |
|---|---|---|
| 54 | Baghouse | Georgetown Steel |
| 55 | Roof Monitor | " |
| 56 | Reheat Furnace | " |
| 57 | Ladle Heating | " |
| 58 | Lime Handling | " |
| 59 | Power Boiler | S.C. Public Service Auth. |
| 60 | Wood & Bark Boiler | Sampit Lumber |
| 61 | Aluminum Mfg. | American Cynamide |
| 62 | Disposal/Baghouse System | Georgetown Steel |
| 63 | Slag Handling | " |
| 64 | Skull Breaking | " |
| 65 | Unloading Raw Materials | Georgetown Ferreduction |
| 66 | Bauxite Crushing | American Cynamide |
| 67 | Landfilling Flyash | International Paper |
| 68 | Lime Kiln Operation | " |
| 69 | Yard Traffic | " |

# Appendix E - ITEM 2

Charleston Particulate Inventory/AQDM

Charleston County Particulate Emissions Inventory for 1977

| Source Number | Source | Facility |
|---|---|---|
| 1 | Unit #1 | S.C. Electric & Gas Company |
| 2 | Boiler | Verona Chemical |
| 3 | Boiler #9 | Charleston Naval Shipyard |
| 4 | Boiler #10 | " " " |
| 5 | Boiler #11 | " " " |
| 6 | Boiler #12 | " " " |
| 7 | Boiler #13 | " " " |
| 8 | Boiler FBM61-1 | " " " |
| 9 | Boiler FBM61-2 | " " " |
| 10 | Boiler NS44-1 | " " " |
| 11 | Boiler NS44-2 | " " " |
| 12 | Boiler NS2-1 | " " " |
| 13 | Boiler NS2-2 | " " " |
| 14 | Boiler 123-1 | " " " |
| 15 | Boiler 123-2 | " " " |
| 16 | Boiler 123-3 | " " " |
| 17 | Boiler 123-4 | " " " |
| 18 | Mobile Steam Generating Unit | " " " |
| 19 | Asphalt Plant | Truluck Construction |
| 20 | Asphalt Plant | Sloan Construction |
| 21 | Plywood Sanding | U.S. Plywood |
| 22 | Plywood Groovers | " " |

| Source Number | Source | Facility |
|---|---|---|
| 23 | Boiler #1 | U.S. Plywood |
| 24 | Boiler #2 | " " |
| 25 | Boiler #3 | " " |
| 26 | Boiler #1 | Westvaco |
| 27 | Boiler #2 | " |
| 28 | Boiler #4 | " |
| 29 | Boiler #5 | " |
| 30 | Boiler #6 | " |
| 31 | Dissolving Tank #6 | " |
| 32 | Dissolving Tank #7 | " |
| 33 | Dissolving Tank #8 | " |
| 34 | Dissolving Tank #9E | " |
| 35 | Smelt Dissovling Tank #9W | " |
| 36 | Recovery Boiler #6 | " |
| 37 | Recovery Boiler #7 | " |
| 38 | Recovery Boiler #8 | " |
| 39 | Recovery Boiler #9 Stack 9A | " |
| 40 | Recovery Boiler #9 Stack 9B | " |
| 41 | Lime Kiln #1 | " |
| 42 | Lime Kiln #2 | " |
| 43 | Lime Kiln #3 | " |
| 44 | Lime Kiln #4 | " |

| Source Number | Source | Facility |
|---|---|---|
| 45 | Asphalt Plant | Banks Construction |
| 46 | Boiler #1 | Mobil Chemical |
| 47 | Boiler #2 | " " |
| 48 | $H_2PO$'s Process | " " |
| 49 | Rock Mill Grinding | W. R. Grace |
| 50 | Super Phosphate Prod. | " " |
| 51 | $H_2SO_4$ Production | " " |
| 52 | Cooler/Dryer | " " |
| 53 | Ammoniator | " " |
| 54 | Boiler #1 | Raybestos Manhattan |
| 55 | Boiler #2 | " " |
| 56 | Rubberized Products | " " |
| 57 | Asbestósized Products | " " |
| 58 | Furnace #14 | Airco Alloys |
| 59 | Furnace #15 | " " |
| 60 | Boiler #1 | Charleston Air Force Base |
| 61 | Boiler #2 | " " " " |
| 62 | Boiler #3 | " " " " |
| 63 | Boiler #1 | Gulf Oil Company |
| 64 | Boiler #2 | " " " |
| 65 | Boiler #3 | " " " |
| 66 | Boiler | Amerada Hess |
| 67 | Asphalt Plant | Sanders Construction |
| 68 | Boiler #1 | Medical University of S.C. |
| 69 | Boiler #2 | " " " " |
| 70 | Boiler #3 | " " " " |

| Source Number | Source | Facility |
|---|---|---|
| 71 | Sludge Incinerator | Commission of Public Works |
| 72 | Boiler #1 | Bird and Son |
| 73 | Secondary Crushing | " " " |
| 74 | Screen, Convey, Handling | " " " |
| 75 | Rotary Dryer | " " " |
| 76 | Roofing Mfg. | " " " |
| 77 | Dry Fertilizer Mixing | Etiwan Fertilizer |
| 78 | Screen, Conveying, Handling | " " |
| 79 | Storage | " " |
| 80 | Guar Gum Process | Stein-Hall |
| 81 | Unit #1 | S.C. Electric & Gas-Hagood Plt |
| 82 | Unit #2 | " " " " " |
| 83 | Unit #3 | " " " " " |
| 84 | Aluminum Sweat Furnace | Charleston Steel |
| 85 | Concrete Mfg. | Concrete Products |
| 86 | Concrete Mfg. | Ford's Redi-Mix Concrete |
| 87 | Grain Elevator | State Ports Authority |
| 88 | Fugitive Emissions | W. R. Grace |
| 89 | Fugitive Emissions | Etiwan Fertilizer |
| 90 | Fugitive Emissions | Ford's Redi-Mix Concrete |
| 91 | Fugitive Emissions | Bird and Son |
| 92 | Fugitive Emissions | State Ports Authority |
| 93 | Fugitive Emissions | Airco Alloys |
| 94 | Fugitive Emissions | Westvaco |
| 95 | Fugitive Emissions (road) | Meeting Street |

Appendix E - ITEM 3

VOC Point/Area Source Inventory*

* See Attached

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
### BERKELEY COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 0420 | 1001 | Mitchum Enterprises<br>Berkeley Square Center | 72 | 13 | 15 | 17 |
| 0420 | 1002 | Moncks Corner Cleaners<br>204 E. Main, Moncks Corner | 72 | 3 | 3 | 4 |
| 0420 | 1003 | Gethers Cleaners<br>206 N. Highway 52, Moncks Corner | 72 | 1 | 1 | 1 |
| 0420 | 1004 | St. Stephens Dry Cleaners<br>Box 446, St. Stephens | 72 | 4 | 5 | 5 |
| 0420 | 1005 | Yeaman's Hall 1 Hour Mart<br>Hanahan | 72 | 16 | 18 | 21 |
| 0420 | 1033 | Macks Cleaners<br>Box 337, St. Stephens | 72 | 4 | 5 | 5 |
| 0420 | 1201 | Tomberlin Print Shop<br>104 Carolina Ave. | 27 | Negligible | | |
| 0420 | 1401 | Reliable Electric<br>St. Stephens | 39 | 2 | 2 | 2 |
| 0420 | 1402 | Master Sheet Metal<br>5912 Loftis Road | 34 | Negligible | | |
| 0420 | 1403 | Georgia-Pacific Part-Board Plant<br>Russelville | 24 | 2 | 2 | 2 |
| 0420 | 1404 | Plusa, Inc.<br>Jamestown | 22 | 5 | 6 | 6 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### BERKELEY COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 0420 | 1406 | Albany Felt Co.<br>St. Stephens | 22 | 0 | 1 | 1 |
| 0420 | 1407 | Uniroyal, Inc.<br>Moncks Corner | 30 | 55 | 69 | 81 |
| 0420 | 2001 | Brown's Grocery<br>Shulerville | 55 | 1 | 1 | 1 |
| 0420 | 2002 | Lincoln Grocery<br>Shulerville | 55 | 1 | 1 | 1 |
| 0420 | 2003 | Jamestown Texaco<br>Jamestown | 55 | 1 | 1 | 1 |
| 0420 | 2004 | Wando Supply<br>Wando | 55 | 1 | 1 | 1 |
| 0420 | 2005 | Camelot Shell<br>Goose Creek | 55 | 2 | 2 | 3 |
| 0420 | 2006 | Port Station<br>Highway 52 at Brandywine, Goose Creek | 55 | 16 | 18 | 21 |
| 0420 | 2007 | Port Station<br>Highway 176 at Brandywine, Goose Creek | 55 | 10 | 11 | 13 |
| 0420 | 2008 | Port Station<br>Highway 52, Moncks Corner | 55 | 5 | 6 | 6 |
| 0420 | 2009 | Port Station<br>Highway 17A and Highway 6, Moncks Corner | 55 | 15 | 17 | 19 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

BERKELEY COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 0420 | 2010 | Jerry's Exxon<br>Highway 52N and 17A, Moncks Corner | 55 | 3 | 3 | 4 |
| 0420 | 2011 | RA/EM Thornley Company<br>Main Street, Moncks Corner | 55 | 2 | 2 | 3 |
| 0420 | 2012 | Lake Moultrie Exxon<br>Main Street, Moncks Corner | 55 | 3 | 3 | 4 |
| 0420 | 2013 | Atkins Boat Landing<br>Moncks Corner | 55 | | Negligible | |
| 0420 | 2014 | James Metts<br>Oakley | 55 | | Negligible | |
| 0420 | 2015 | Agnes Rozier<br>Moncks Corner | 55 | | Negligible | |
| 0420 | 2016 | Williams<br>Mt. Holley | 55 | 1 | 1 | 1 |
| 0420 | 2017 | Gunnells Tackle Shop<br>Moncks Corner | 55 | | Negligible | |
| 0420 | 2018 | Woodham's Exxon<br>Moncks Corner | 55 | 1 | 1 | 1 |
| 0420 | 2019 | Mucks Tackle Shop<br>Highway 52-N, Moncks Corner | 55 | | Negligible | |
| 0420 | 2020 | The Dock<br>Tailrace Canal, Moncks Corner | 55 | | Negligible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### BERKLEY COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 0420 | 2021 | Marlows Exxon<br>Highway 52N, Moncks Corner | 55 | | Negligible | |
| 0420 | 2022 | Belle Isle Grocery<br>Pineville | 55 | | Negligible | |
| 0420 | 2023 | Garner Caddells 66<br>Moncks Corner | 55 | 1 | 1 | 1 |
| 0420 | 2024 | Myrtle Caddells<br>Cross | 55 | 1 | 1 | 1 |
| 0420 | 2025 | Davis Grocery<br>Bethera | 55 | | Negligible | |
| 0420 | 2026 | Funks Grocery<br>St. Stephen | 55 | | Negligible | |
| 0420 | 2027 | Hoffman 66<br>St. Stephen | 55 | 2 | 2 | 2 |
| 0420 | 2028 | Holleys 66<br>Moncks Corner | 55 | 1 | 1 | 1 |
| 0420 | 2029 | Hoods Grocery<br>St. Stephen | 55 | | Negligible | |
| 0420 | 2030 | Jamestown 66<br>Jamestown | 55 | 0 | 1 | 1 |
| 0420 | 2031 | Elick Jones Grocery<br>Cross | 55 | 0 | 0 | 1 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## BERKELEY COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 0420 | 2032 | McLennon Grocery<br>St. Stephen | 55 | | Negligible | |
| 0420 | 2033 | Thompsons 66<br>Bonneau | 55 | 0 | 1 | 1 |
| 0420 | 2034 | B. J. Thornhill<br>Pineville | 55 | 0 | 0 | 1 |
| 0420 | 2035 | J. T. Thornhill<br>Pineville | 55 | | Negligible | |
| 0420 | 2036 | John Wiggins<br>Pineville | 55 | | Negligible | |
| 0560 | 1404 | Laurentide Industries<br>915 Commerce Circle, Hanahan | 35 | | Negligible | |
| 0560 | 1430 | Verona Division, Mobay Chemical Company<br>P. O. Box 10,288, Chas | 28 | 3 | 4 | 5 |
| 0560 | 1433 | Dupont<br>Cypress Garden Road, Chas. | 28 | 2 | 3 | 3 |
| 0560 | | ATO Inc<br>N. Rhett and Redbank Road | 35 | 54 | 69 | 83 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1004 | Royal Cleaners, 47 Columbus | 72 | 5 | 6 | 6 |
| 560 | 1001 | Qwick Clean, Highway 171 | 72 | 8 | 9 | 10 |
| 560 | 1002 | Arrow Dry Cleaners 579 Rutledge | 72 | 13 | 15 | 17 |
| 560 | 1003 | Sindab Cleaners, 44 Morris Street | 72 | 2 | 2 | 3 |
| 560 | 1005 | Ideal White Laundry and Cleaners 723 King Street | 72 | 4 | 5 | 5 |
| 560 | 1006 | Sea Island Cleaners Sea Island Shopping Center | 72 | 2 | 2 | 3 |
| 560 | 1007 | Charleston Pressing Club 121 Spring | 72 | 4 | 5 | 5 |
| 560 | 1008 | Centerville Cleaners 854 Folly Road | 72 | 6 | 7 | 8 |
| 560 | 1009 | Convertino 1 Hour Cleaners 1369 Ashley | 72 | 4 | 5 | 6 |
| 560 | 1010 | Coplestons Klenday 537 Meeting Street | 72 | 10 | 11 | 13 |
| 560 | 1011 | Glamour Cleaners 526 King Street | 72 | 20 | 23 | 26 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1012 | One Hour Valet<br>Pinehaven Shopping Center | 72 | 12 | 14 | 15 |
| 560 | 1013 | Jones Dry Cleaners<br>131 Market Street | 72 | 19 | 22 | 24 |
| 560 | 1015 | One Hour Martinizing (O.H.M.)<br>1664 Highway 171 | 72 | 9 | 10 | 12 |
| 560 | 1016 | Sparkle Square<br>63 Spring Street | 72 | 8 | 9 | 10 |
| 560 | 1017 | One Hour Mart<br>730 Rutledge Ave. | 72 | 11 | 13 | 14 |
| 560 | 1018 | One Hour Valet,<br>1235 Savannah Highway | 72 | 8 | 9 | 10 |
| 560 | 1019 | James Island Cleaning and Laundry<br>1739 Maybank | 72 | 11 | 13 | 14 |
| 560 | 1020 | Smith O. H. M. Inc.<br>336 Folly Road | 72 | 2 | 2 | 3 |
| 560 | 1021 | One Hour Martinizing<br>1947 Maybank Highway | 72 | 5 | 6 | 6 |
| 560 | 1022 | One Hour Martinizing<br>1015 Harbor view | 72 | 4 | 5 | 5 |
| 560 | 1023 | Lyerlys Cleaners<br>1770 Highway 7 | 72 | 29 | 33 | 37 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1024 | Lyerlys Cleaners, 809 Savannah Highway | 2 | 26 | 30 | 33 |
| 560 | 1025 | Percolene Cleaners 96 Wentworth | 72 | 2 | 2 | 3 |
| 560 | 1026 | O. H. M., Ashley-Phosphate Road | 72 | 7 | 8 | 9 |
| 560 | 1027 | O. H. M. Nixson Avenue | 72 | 7 | 8 | 9 |
| 560 | 1028 | O. H. M. Dorchester Road | 72 | 7 | 8 | 9 |
| 560 | 1029 | O. H. M. 425 Highway 17 Bypass | 72 | 7 | 8 | 9 |
| 560 | 1030 | One Hour Valet of Rivers 3328 Rivers | 72 | 12 | 14 | 1 |
| 560 | 1031 | Byrd/Taylor Cleaners 113 Montague | 72 | 16 | 18 | 21 |
| 560 | 1032 | Richter Dry Cleaning | 72 | 8 | 9 | 10 |
| 560 | 1201 | Ideal Printers 4236 Grimke Street | 27 | | Negligible | |
| 560 | 1202 | Furlong John J. & Sons 420 King | 27 | | Negligible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1203 | Nelsons Sothrn Printing<br>100 Columbus | 27 | | Negligible | |
| 560 | 1204 | Netho Inc.<br>5600 Rivers Avenue | 27 | | Neglibible | |
| 560 | 1204 | Central Copying & Printing<br>2017 Reynolds | 27 | | Negligible | |
| 560 | 1207 | Charleston Litho Co.<br>4259 Pace Street | 7 | | Negligible | |
| 560 | 1209 | Wainwright Printers<br>666 King Street | 27 | | Negligible | |
| 560 | 1210 | Charleston Blueprint & Supply<br>284 E. Bay | 27 | | Negligible | |
| 560 | 1211 | Rowell Jr. Printing Co.<br>3839 Rivers | 7 | | Negligible | |
| 560 | 1212 | Quin Press,<br>29 Broad Street | 27 | | Negligible | |
| 560 | 1213 | Presto Print<br>1684 Highway 171 | 27 | | Negligible | |
| 560 | 1214 | PDQ Instant Press<br>15 State Street | 27 | | Negligible | |
| 560 | 1215 | Walker Evans & Cogswell<br>4 Broad Street | 27 | | Negligible | |

SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
CHARLESTON COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1216 | Hanahan Publishing<br>N. Charleston | 27 | | Negligible | |
| 560 | 1217 | Mills Printing<br>Mt. Pleasant | 27 | | Negligible | |
| 560 | 1218 | Custom Printing,<br>1162 Landsdowne | 27 | | Negligible | |
| 560 | 1219 | Tri-state Printing<br>210 W. Enterprise | 27 | 1 | 1 | 1 |
| 560 | 1401 | Sandblasters<br>308 Rivers Road | 37 | 17 | 17 | 18 |
| 560 | 1402 | Carolina Iron & Fence<br>33 Calhoun | 34 | 2 | 3 | 3 |
| 560 | 1403 | Narco McKesson<br>P. O. Box 10668 (Berkley Co.) | 38 | 1 | 1 | 1 |
| 560 | 1405 | Gulf Oil Co.<br>1882 Milford | 35 | 6 | 7 | 9 |
| 560 | 1406 | Westvaco Corp<br>Virginia Avenue | 26 | 22 | 22 | 22 |
| 560 | 1408 | Moore Drums<br>Stark Ind. Park | 34 | 11 | 14 | 18 |
| 560 | 1409 | Tassin & Tassin<br>2825 Rivers | 35 | | Negligible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1410 | Palmetto Rubber Products<br>2200 Peace Street | 39 | Negligible | | |
| 560 | 1411 | Norton Co.<br>Stark Ind. Park | 30 | 460 | 575 | 676 |
| 560 | 1412 | Amstar Corp.<br>Stark Ind. Park. | 26 | 207 | 208 | 208 |
| 560 | 1414 | Stein Hall/Celanese<br>246 E. Bay | 28 | 1 | 1 | 2 |
| 560 | 1415 | Renken Boat Mfg.<br>1750 Signal Point | 37 | 27 | 28 | 28 |
| 560 | 1416 | Triple S Wholesale<br>Fleming Road | 39 | 5 | 6 | 6 |
| 560 | 1417 | General Dynamics<br>Highway 503 | 33 | Negligible | | |
| 560 | 1418 | Lockheed-Ga. Co.<br>Pace Street | 37 | 27 | 28 | 28 |
| 560 | 1419 | Detyens Shipyards,<br>Route 2, Box 180 | 37 | 32 | 33 | 34 |
| 560 | 1420 | CTI Education Products<br>695 Coleman | 36 | 1 | 1 | 1 |
| 560 | 1421 | Evans Rule Co.<br>6555 Fain Street | 24 | 113 | 112 | 110 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1422 | General Electric Co.<br>P. O. Box 10167 | 34 | 16 | 21 | 26 |
| 560 | 1423 | Metal Trades<br>Highway 165 | 34 | 19 | 25 | 31 |
| 560 | 1424 | Drive Shaft Replacement<br>209 Irozuois | 37 | Negligible | | |
| 560 | 1425 | Burris Chemical Co.<br>196 E. Bay | 28 | 2 | 3 | 3 |
| 560 | 1426 | Goer Mfg Co.,<br>Goer Street | 25 | 26 | 31 | 37 |
| 560 | 1427 | Cummins Engine<br>2301 Reeds Avenue | 35 | 11 | 14 | 17 |
| 560 | 1428 | Bird & Son Inc.<br>P. O. Box 4336 | 29 | 2 | 2 | 2 |
| 560 | 1429 | Southeastern Steel Co.<br>King Street | 34 | 1 | 1 | 2 |
| 560 | 1432 | Industrial Machinery Corporation<br>Highway 165 | 34 | Negligible | | |
| 560 | 1434 | Picquets Roofing<br>285 E. Bay | 34 | Negligible | | |
| 560 | 1435 | Pelham Roofing & Sheet Metal | 34 | 1 | 1 | 2 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 1436 | Whites Mfg. Co.<br>4826 Leventis | 39 | 1 | 1 | 1 |
| 560 | 1438 | Carolina Chem. Equipment<br>1001 Buffalo | 9 | | Negligible | |
| 560 | 1439 | Braswell Shipyards<br>Box 317 | 37 | 16 | 16 | 17 |
| 560 | 2001 | 3600 Rivers Avenue | 55 | 1 | 1 | 1 |
| 560 | 2002 | 440 Coleman Blvd. | 55 | 2 | 2 | 3 |
| 560 | 2003 | Ashley Phosphate Road | 55 | 2 | 2 | 3 |
| 560 | 2004 | Lee & Meeting Streets | 55 | 2 | 2 | 3 |
| 560 | 2005 | Highway 7 and Highway 17 | 55 | 20 | 23 | 26 |
| 560 | 2006 | Highway 17 Bypass | 55 | 8 | 9 | 10 |
| 560 | 2007 | I-26 & Montague | 55 | 5 | 6 | 6 |
| 560 | 2008 | Highway 17 at Wappoo | 55 | 1 | 1 | 1 |
| 560 | 2009 | Rhett & Remount | 55 | 2 | 2 | 3 |
| 560 | 2010 | Coleman Blvd. & Simmons | 55 | 2 | 2 | 3 |
| 560 | 2011 | Dorchester Road Service Station | 55 | 4 | 5 | 5 |
| 560 | 2012 | 2111 Spruill Avenue | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2013 | Maybank Highway | 55 | 5 | 6 | 6 |
| 560 | 2014 | U. S. 52 and Otranto | 55 | 2 | 2 | 3 |
| 560 | 2015 | 5711 Rivers Avenue | 55 | 2 | 2 | 3 |
| 560 | 2016 | Cumbee Produce | 55 | 0 | 0 | 1 |
| 560 | 2017 | Cummings Exxon Highway 17 | 55 | | Negligible | |
| 560 | 2018 | Edwards Exxon Highway 17N | 55 | 1 | 1 | 1 |
| 560 | 2019 | Kountry Store, Highway 17 | 55 | | Negligible | |
| 560 | 2020 | Forts Gro. Highway 17 | 55 | 0 | 0 | 1 |
| 560 | 2021 | Longbay Exxon Highway 17 | 55 | 1 | 1 | 1 |
| 560 | 2022 | MacNeal Exxon Highways 17 & 45 | 55 | 2 | 2 | 3 |
| 560 | 2023 | McCleblanville Tkle Shop | 55 | | Negligible | |
| 560 | 2024 | McConnel Groc. Highway 17 at 45 | 55 | | Negligible | |
| 560 | 2025 | Middleton Groc. | 55 | 0 | 1 | 1 |
| 560 | 2026 | Pinckney Groc. | 55 | 1 | 1 | 1 |
| 560 | 2027 | Randolph, Santee Road | 55 | | Negligible | |
| 560 | 2028 | Seewee Supply, Highway 17 | 55 | 1 | 1 | 1 |
| 560 | 2029 | Breach Inlet Texaco | 55 | 4 | 5 | 5 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2030 | Fenders Grocery | 55 | 1 | 1 | 1 |
| 560 | 2031 | T & T Texaco Highway 17 & 41 | 55 | 3 | 3 | 4 |
| 560 | 2032 | Sullivans Is. Svc. Station | 55 | 1 | 1 | 1 |
| 560 | 2033 | Leland McClellanville | 55 | | Negligible | |
| 560 | 2034 | Nicks Texaco Highway 17 Bypass | 55 | 3 | 3 | 4 |
| 560 | 2035 | Pete & Belty | 55 | 1 | 1 | 1 |
| 560 | 2036 | Simmons Grocery | 55 | | Negligible | |
| 560 | 2037 | Six Mile Bait & Tackle | 55 | | Negligible | |
| 560 | 2038 | Taylors Texaco, Coleman Blvd. | 55 | 5 | 6 | 6 |
| 560 | 2039 | Willards Texaco, Highway 17 | 55 | 1 | 1 | 1 |
| 560 | 2040 | Frasier Shell, Mt. Pleasant | 55 | 0 | 1 | 1 |
| 560 | 2041 | Limehouse Mercantile | 55 | 1 | 1 | 1 |
| 560 | 2042 | Manigautt Shell | 55 | 1 | 1 | 1 |
| 560 | 2043 | So. Windemere Shell | 55 | 1 | 1 | 1 |
| 560 | 2044 | Highway 171 at 61 | 55 | 13 | 15 | 17 |
| 560 | 2045 | 5255 Rivers Avenue N. | 55 | 6 | 7 | 8 |
| 560 | 2046 | 4301 Spruill Ave. | 55 | 7 | 8 | 9 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2047 | 1906 Meeting St. | 55 | 7 | 8 | 9 |
| 560 | 2048 | 113 St. Andrews Blvd. | 55 | 4 | 5 | 5 |
| 560 | 2049 | Coleman Blvd. | 55 | 8 | 9 | 10 |
| 560 | 2050 | Center Street Folly Beach | 55 | 4 | 5 | 5 |
| 560 | 2051 | Highway 162 Hollywood | 55 | 3 | 3 | 4 |
| 560 | 2052 | Gate SS 6800 Rivers | 55 | 15 | 17 | 19 |
| 560 | 2053 | Bay Point Marina, Ediston Beach | 55 | | Negligible | |
| 560 | 2054 | Canady Grocery, Adams Run | 55 | | Negligible | |
| 560 | 2055 | Chicls Place, Ravenel | 55 | | Negligible | |
| 560 | 2056 | The Citadel | 55 | 2 | 2 | 3 |
| 560 | 2057 | Cordrays Grocery, Ravenel | 55 | | Negligible | |
| 560 | 2058 | Corkey's, Ravenel | 55 | | Negligible | |
| 560 | 2059 | Country Stores, Edisto Beach | 55 | 1 | 1 | 1 |
| 560 | 2060 | D & M Grocery, Younges Island | 55 | 0 | 0 | 1 |
| 560 | 2061 | Donaldson EXXon, Hollywood | 55 | 2 | 2 | 3 |
| 560 | 2062 | Edisto Marina, Edisto Beach | 55 | 1 | 1 | 1 |
| 560 | 2063 | James Grant, Edisto Island | 55 | 1 | 1 | 1 |

SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
CHARLESTON COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2064 | John Grant, Adams Run | | 1 | 1 | 1 |
| 560 | 2065 | Wm. Green, Johns Island | 55 | 1 | 1 | 1 |
| 560 | 2066 | Kwik Shop, Adams Run | 55 | 1 | 1 | 1 |
| 560 | 2067 | Humphries Exxon, Ravenel | 55 | 2 | 2 | 3 |
| 560 | 2068 | Island Pickup, Johns Island | 55 | | Negligible | |
| 560 | 2069 | Longview Exxon, Meggett | 55 | 1 | 1 | 1 |
| 560 | 2070 | 9 Day Store | 55 | 1 | 1 | 1 |
| 560 | 2071 | J. E. Meckenfuss | 55 | | Negligible | |
| 560 | 2072 | P & R Grocery, Yonges Island | 55 | | Negligible | |
| 560 | 2073 | R & M Grocery, Meggett | 55 | 0 | 0 | 1 |
| 560 | 2074 | Quick Stop # 6 Ravenel | 55 | 1 | 1 | 1 |
| 560 | 2075 | Rawl Grocery, Johns Island | 55 | | Negligible | |
| 560 | 2076 | Roybury, Johns Island | 55 | | Negligible | |
| 560 | 2077 | Dougs Place, Younges Island | 55 | | Negligible | |
| 560 | 2078 | S & H Grocery, Yonges Island | 55 | | Negligible | |
| 560 | 2079 | Sand Dollar, Edisto Island | 55 | 1 | 1 | 1 |
| 560 | 2080 | San Russ Pt., Edisto Island | 55 | | Negligible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2081 | So. Pt. Svcs., Edisto Beach | 55 | 1 | 1 | 1 |
| 560 | 2082 | Dorothy Meckenfuss | 55 | 1 | 1 | 1 |
| 560 | 2083 | Washington's Grocery | 55 | 0 | 0 | 1 |
| 560 | 2084 | Tri County Ice & Fuel | 55 | 2 | 2 | 3 |
| 560 | 2085 | By-Rite #2 Food Store, Durant Avenue | 55 | 1 | 1 | 1 |
| 560 | 2086 | By-Rite #1 Food Store, Ashley-Phosphate | 55 | | Negligible | |
| 560 | 2087 | Trico #2, Ashley-Phosphate | 55 | 7 | 8 | 9 |
| 560 | 2088 | Chessers Superette, Ravenel | 55 | 2 | 2 | 3 |
| 560 | 2090 | Gate SS, 1828 Ashley | 55 | 11 | 13 | 14 |
| 560 | 2089 | Gate SS, 2167 Savannah | 55 | 13 | 15 | 17 |
| 560 | 2091 | Gate SS, 4901 Dorchester Road | 55 | 6 | 7 | 8 |
| 560 | 2092 | Gate SS, 509 Maybank Hwy. | 55 | 15 | 17 | 19 |
| 560 | 2093 | Gate SS, 1265 Ben Sawyer Blvd. | 55 | 14 | 16 | 18 |
| 560 | 2094 | Gate SS, 1628 Remount Rd. | 55 | 9 | 10 | 12 |
| 560 | 2095 | Gate SS, 717 Folly Road | 55 | 8 | 9 | 10 |
| 560 | 2096 | Gate SS, 211 Coleman Blvd. | 55 | 11 | 13 | 14 |
| 560 | 2097 | Gate SS, Hwy 17 N | 55 | 18 | 21 | 23 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2098 | Gate SS, 2594 Ashley-Phosphate | 55 | 20 | 23 | 26 |
| 560 | 2099 | Shores SS Virginia Avenue | 55 | | Negligible | |
| 560 | 2100 | Eagle SS, Hwy. 7 | 55 | 1 | 1 | 1 |
| 560 | 2101 | Gate SS, Rt. 2, Box 23 | 55 | 9 | 10 | 12 |
| 560 | 2102 | Montgomery Ward | 55 | 7 | 8 | 9 |
| 560 | 2103 | Rm. King Grocery, Wadmalaw Island | 55 | | Negligible | |
| 560 | 2104 | Suggs Gulf Maybank Hwy. | 55 | 1 | 1 | 1 |
| 560 | 2105 | Progressive Club, River Road | 55 | | Negligible | |
| 560 | 2106 | Heywards Stop & Go | 55 | | Negligible | |
| 560 | 2107 | Whiteys Ladson | 55 | 8 | 9 | 10 |
| 560 | 2108 | Quick Stop #2, Cosgrove | 55 | 3 | 3 | 4 |
| 560 | 2109 | Isle of Palms Marina | 55 | | Negligible. | |
| 560 | 2110 | H. C. Adams, Hwy. 78 | 55 | 2 | 2 | 3 |
| 560 | 2111 | Saml. Ancrum, Davidson Road | 17 | | Negligible | |
| 560 | 2112 | Dewy Altman, 2495 Ashley River | 55 | 2 | 2 | 3 |
| 560 | 2113 | Ralph Boyan, Ladson | 55 | 1 | 1 | 1 |
| 560 | 2114 | Baysons Maybank Highway | 55 | 2 | 2 | 3 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2115 | Coastal Habilitation Ctc. | 55 | | Negligible | |
| 560 | 2116 | Dorchester Road 66 | 55 | 2 | 2 | 3 |
| 560 | 2117 | Harry Downing, Ashley & Westworth | 55 | 0 | 1 | 1 |
| 560 | 2118 | Jack Greas, Folly Beach | 55 | | Negligible | |
| 560 | 2119 | Arthur England, Magnolia Road | 55 | 1 | 1 | 1 |
| 560 | 2120 | J. E. Glover Grocery, Johns Island | 55 | 2 | 2 | 3 |
| 560 | 2121 | Ray Grubbs, Spruill Avenue | 55 | 1 | 1 | 1 |
| 560 | 2122 | John Hall, King-Romney | 55 | 2 | 2 | 3 |
| 560 | 2123 | Caleb Harper, Rivers Avenue | 55 | 2 | 2 | 3 |
| 560 | 2124 | Jas. Heyward, Spring & Rutledge | 55 | 1 | 1 | 1 |
| 560 | 2125 | In-out Car Wash #1, St. Andrews | 55 | 4 | 5 | 5 |
| 560 | 2126 | In-out Car Wash #2, Rivers Avenue | 55 | 2 | 2 | 3 |
| 560 | 2127 | Johns Island Discount, River Road | 55 | 0 | 1 | 1 |
| 560 | 2128 | Neal Johnson, Main Road | 55 | | Negligible | |
| 560 | 2129 | Richard Johnson, Wadmalaw Island | 55 | 0 | 0 | 1 |
| 560 | 2130 | Knights Garage, Montague Ave. | 55 | | Negligible | |
| 560 | 2131 | A. H. Logan, Cannon Street | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## CHARLESTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 2132 | J. H. McCants, Montague | 55 | 2 | 2 | 3 |
| 560 | 2133 | Roger Moore, Folly Road | 55 | | Negligible | |
| 560 | 2134 | Cecil Reynolds, Ravenel | 55 | 1 | 1 | 1 |
| 560 | 2135 | W. L. Sires, Hollywood | 55 | 1 | 1 | 1 |
| 560 | 2136 | Jas. Smalls, Johns Island | 55 | 1 | 1 | 1 |
| 560 | 2137 | S. A. Speights, Coleman Blvd. | 55 | 2 | 2 | 3 |
| 560 | 2138 | Wells Rim & Tire, Folly Road | 55 | 1 | 1 | 1 |
| 560 | 2139 | Whipper Baroney, Rivers Ave. | 55 | 3 | 3 | 4 |
| 560 | 2140 | H & W Grocery, Hollywood | 55 | | Negligible | |
| 560 | 2141 | Whitts 66, Highway 17 | 55 | 3 | 3 | 4 |
| 560 | 2142 | Archie Wigger, Harbor View Road | 55 | 3 | 3 | 4 |
| 560 | 2143 | Arthur Williams, Wadmalaw | 55 | 0 | 1 | 1 |
| 560 | 2144 | Arthur Wilson, Montague Ave. | 55 | | Negligible | |
| 560 | 2145 | Bobby Wyndham, Mtg. Street | 55 | 4 | 5 | 5 |
| 560 | 1431 | Roberts Neon SVC, 2425 Savannah | 39 | 3 | 4 | 4 |
| 560 | 8437 | Mobil Chemical Co. Chas Heights | 28 | 6 | 8 | 10 |
| | | Evaporative Loss | 28 | 600 | 794 | 983 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### CHARLESTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 560 | 9206 | Monarch Printing, 1938 Reynolds | 27 | 2 | 2 | 2 |
| 560 | 9216 | Island Publications, 2041 Wappoo | 27 | | Negligible | |
| 560 | 9217 | We Willis Co., 1 W. Surrey Dr. | 27 | 1 | 1 | 1 |
| 560 | 9218 | Fastprint, 153 Erbay St. | 27 | 1 | 1 | 1 |
| 560 | 9431 | American Development Corp. 2399 Air Park | 34 | 13 | 17 | 21 |
| 560 | 9432 | Robert Bosch Corp, 8001 Dorchester | 37 | 120 | 123 | 126 |
| 560 | 9433 | Raybestos Manhattan Ind. Pro. | 30 | 160 | 200 | 235 |
| 560 | 9434 | EZ Furniture, 414 Whilden | 25 | 16 | 19 | 22 |
| 560 | 9436 | Folbot Corp., Stark Ind. Pk | 37 | 3 | 3 | 3 |
| 560 | 9437 | Consolidated SVC Inc., 1 Prosperity | 39 | 1 | 1 | 1 |
| 560 | 9438 | Terry Sign SVC & Assoc. | 39 | 1 | 1 | 1 |
| 560 | 1207 | Evening Post Pub. Co., 134 Columbus St. | 27 | 92 | 101 | 110 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2092 | Oil Service Co. Affiliate<br>4130 Bethel Church | 55 | 1 | 1 | 1 |
| 1900 | 2093 | Oil Service Co. Affiliate<br>Cedar Creek - Bluff Road | 55 | NEGLIGIBLE | | |
| 1900 | 2095 | Oil Service Co. Affiliate<br>Hopkins | 55 | NEGLIGIBLE | | |
| 1900 | 1434 | Jewel Mfg.<br>1224 Lincoln | 39 | NEGLIGIBLE | | |
| 1900 | 1236 | Crowson-Stone Co.<br>819 Main Cola | 27 | 8 | 9 | 10 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2080 | Monts Texaco | 55 | 4 | 4 | 5 |
| 1900 | 2081 | North 555 Grocery | 55 | 1 | 1 | 1 |
| 1900 | 2082 | Shulers Market<br>4500 Bluff Road | 55 | NEGLIGIBLE | | |
| 1900 | 2083 | Youngs Texaco<br>Rt 4 Box 397 | 55 | 1 | 1 | 1 |
| 1900 | 2084 | Rocke Kwik Thrift<br>1013 Percival Road | 55 | 4 | 4 | 5 |
| 1900 | 2085 | Oil Service Co Affiliate<br>7301 Two Notch | 55 | 1 | 1 | 1 |
| 1900 | 2086 | Oil Service Co Affiliate<br>3933 W. Beltline | 55 | 0 | 0 | 1 |
| 1900 | 2087 | Oil Service Co Affiliate<br>1955 Percival Road | 55 | 1 | 1 | 1 |
| 1900 | 2088 | Oil Service Co Affiliate<br>1800 Leesburg Road | 55 | 0 | 0 | 1 |
| 1900 | 2089 | Oil Service Co Affiliate<br>9810 Garner Ferry | 55 | NEGLIGIBLE | | |
| 1900 | 2090 | Oil Service Co Affiliate<br>2000 Harden Street | 55 | NEGLIGIBLE | | |
| 1900 | 2091 | Oil Service Co Affiliate<br>1912 Rosewood Drive | 55 | 0 | 0 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2069 | Convenience Store<br>Leesburg & Trotter | 55 | 1 | 1 | 1 |
| 1900 | 2070 | Caseys Union 76<br>I26 Piney Grove | 55 | 3 | 3 | 4 |
| 1900 | 2071 | Union 76<br>Taylor & Two Notch | 55 | 8 | 9 | 10 |
| 1900 | 2072 | Chevron | 55 | NEGLIGIBLE | | |
| 1900 | 2073 | Convenience St.<br>Percival Road | 55 | 0 | 0 | 1 |
| 1900 | 2074 | Chevron<br>Springdale | 55 | NEGLIGIBLE | | |
| 1900 | 2075 | Chevron<br>Gervais & Gadsen | 55 | 1 | 1 | 1 |
| 1900 | 2076 | Union 76<br>Yacht Cove | 55 | 1 | 1 | 1 |
| 1900 | 2077 | G & S Texaco<br>1715 Leesburg Road, Cola | 55 | 3 | 3 | 4 |
| 1900 | 2078 | Lady Street SS | 55 | 1 | 1 | 1 |
| 1900 | 2079 | Liberty SS<br>3409 Farrow Road | 55 | 1 | 1 | 1 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2053 | Assembly Street Amoco | 55 | NEGLIGIBLE | | |
| 1900 | 2054 | Pear SVC | 55 | 1 | 1 | 1 |
| 1900 | 2055 | Platt Apgs. Road SVC Station | 55 | NEGLIGIBLE | | |
| 1900 | 2056 | Burgest Coles SS | 55 | NEGLIGIBLE | | |
| 1900 | 2057 | Grice Grocery | 55 | NEGLIGIBLE | | |
| 1900 | 2058 | Carroll Ward | 55 | NEGLIGIBLE | | |
| 1900 | 2059 | Moose Adams SS | 55 | Negligible | | |
| 1900 | 2060 | S D Goodlett SS | 55 | NEGLIGIBLE | | |
| 1900 | 2061 | Bennie Folk | 55 | NEGLIGIBLE | | |
| 1900 | 2062 | Pontiac Plaza | 55 | NEGLIGIBLE | | |
| 1900 | 2063 | Delk SS | 55 | 1 | 1 | 1 |
| 1900 | 2064 | Joe Brooks | 55 | NEGLIGIBLE | | |
| 1900 | 2065 | G Mart | 55 | 1 | 1 | 1 |
| 1900 | 2066 | B St Service | 55 | NEGLIGIBLE | | |
| 1900 | 2067 | Barsletts Union 76 | 55 | NEGLIGIBLE | | |
| 1900 | 2068 | Convenience Store Broad River Road | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2038 | Rosewood SVC<br>Rosewood Drive, Cola | 55 | 2 | 2 | 2 |
| 1900 | 2039 | A F Andrews<br>1627 Two Notch, Cola | 55 | NEGLIGIBLE | | |
| 1900 | 2040 | 800 Sumter Hwy | 55 | 1 | 1 | 1 |
| 1900 | 2041 | Bayview | 55 | 1 | 1 | 1 |
| 1900 | 2042 | Preston Free | 55 | 1 | 1 | 1 |
| 1900 | 2043 | College Drive | 55 | NEGLIGIBLE | | |
| 1900 | 2044 | Forest Drive | 55 | NEGLIGIBLE | | |
| 1900 | 2045 | Lower Richland | 55 | NEGLIGIBLE | | |
| 1900 | 2046 | North 21 | 55 | 1 | 1 | 1 |
| 1900 | 2047 | Barnes Amoco<br>Percivel Road | 55 | NEGLIGIBLE | | |
| 1900 | 2048 | Andersons Amoco | 55 | 0 | 0 | 1 |
| 1900 | 2049 | South Congress SS | 55 | 1 | 1 | 1 |
| k900 | 2050 | Trenholm Road SS | 55 | 1 | 1 | 1 |
| 1900 | 2051 | Hwy 204 SS | 55 | 1 | 1 | 1 |
| 1900 | 2052 | Autrys Amoco | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2027 | Geo. Derrick Inc.<br>Bull Street | 55 | 2 | 2 | 2 |
| 1900 | 2028 | E F Dubose 66<br>Covenant Road, Cola | 55 | 2 | 2 | 2 |
| 1900 | 2029 | Carroll Johnson 66<br>Farrow Road, Cola | 55 | 5 | 6 | 6 |
| 1900 | 2030 | H F Hall Grocery<br>Blythewood | 55 | NEGLIGIBLE | | |
| 1900 | 2031 | Bills 66<br>Percival Road, Cola | 55 | 3 | 3 | 4 |
| 1900 | 2032 | Hyatts 66<br>Laurel Street, Cola | 55 | 3 | 3 | 4 |
| 1900 | 2033 | A Johnson 66<br>Millwood Avenue, Cola | 55 | 3 | 3 | 4 |
| 1900 | 2034 | S L Jones 66<br>Gervais & Millwood, Cola | 55 | 1 | 1 | 1 |
| 1900 | 2035 | Lake Murray Marina<br>Ballentine | 55 | NEGLIGIBLE | | |
| 1900 | 2036 | North 21 General Store<br>Hwy 21, N. Cola | 55 | NEGLIGIBLE | | |
| 1900 | 2037 | Poboys Bait & Tackle<br>Sumter Hwy, Cola | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2016 | Christmas Grocery<br>Hwy 601, Eastover | 55 | 1 | 1 | 1 |
| 1900 | 2017 | H & H One Stop<br>3118 Augusta, Cola | 55 | 2 | 2 | 2 |
| 1900 | 2018 | Jackson Country Store<br>Hwy 321, Cola | 55 | 1 | 1 | 1 |
| 1900 | 2019 | DeCells Fried Chicken<br>3530 River Drive | 55 | NEGLIGIBLE | | |
| 1900 | 2020 | Nunns Grocery<br>Eastover | 55 | 1 | 1 | 1 |
| 1900 | 2021 | Murrays Gulf<br>Farrow Road | 55 | 2 | 2 | 2 |
| 1900 | 2022 | Brawlwys Grocery<br>N. Main, Cola | 55 | 0 | 0 | 1 |
| 1900 | 2023 | Bundrick 66<br>Monticello Road, Cola | 55 | 2 | 2 | 2 |
| 1900 | 2024 | Cohens Grocery<br>Hopkins | 55 | NEGLIGIBLE | | |
| 1900 | 2025 | Cook 66<br>I20 & Hwy 1, Dentsville | 55 | 4 | 4 | 5 |
| 1900 | 2026 | Crickett Sports Shop<br>Bluff Road, Cola | 55 | 1 | 1 | 1 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 2004 | EF House Grocery<br>Chaingang Road, Eastover | 55 | NEGLIGIBLE | | |
| 1900 | 2005 | Midway Exxon<br>Hwy 601 & 76, Eastover | 55 | 1 | 1 | 1 |
| 1900 | 2006 | Sard Hill Mercantile<br>Hwy 76, Eastover | 55 | NEGLIGILBE | | |
| 1900 | 2007 | Hilltop Exxon<br>Hwy 76, Eastover | 55 | NEGLIGIBLE | | |
| 1900 | 2008 | Tylers Grocery<br>Hwy 76 Eastover | 55 | NEGLIGIBLE | | |
| 1900 | 2009 | FK Nunn Grocery<br>Hwy 76, Eastover | 55 | 3 | 3 | 4 |
| 1900 | 2010 | Outdoorsman | 55 | NEGLIGIBLE | | |
| 1900 | 2011 | Sims Exxon<br>Hwy 48, Gadsden | 55 | 1 | 1 | 1 |
| 1900 | 2012 | Brazzells Grocery<br>Hopkins | 55 | NEGLIGIBLE | | |
| 1900 | 2013 | Ballantine Gulf<br>Ballantine | 55 | NEGLIGIBLE | | |
| 1900 | 2015 | Blacks Gulf<br>Ballantine | 55 | 5 | 6 | 6 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1467 | Mt Vernon Mills Cola Div<br>Box 888 | 22 | 4 | 4 | 4 |
| 1900 | 1468 | Cola Products<br>6111 Shakes Pease Road | 39 | 30 | 34 | 39 |
| 1900 | 1469 | Westinghouse Elec Nucl Fuel<br>Div Drawer | 28 | 41 | 44 | 48 |
| 1900 | 1470 | Kings Lab<br>120 Dumer Blythewood | 39 | 3 | 3 | 4 |
| 1900 | 1471 | Lindau Chemicals<br>750 Granby Lane Cola | 28 | 40 | 43 | 47 |
| 1900 | 1472 | Colwood Co. Inc.<br>Flintlake Box 192, Cola | 39 | NEGLIGIBLE | | |
| 1900 | 1473 | Anchor Continental<br>2000 S. Beltline Blvd. | 26 | 6040 | 6963 | 7886 |
| 1900 | 1474 | Allied Chem Corp<br>Box 1788 Cola | 39 | NEGLIGIBLE | | |
| 1900 | 2001 | Hwy 21 N. Cola | 55 | 7 | 8 | 9 |
| 1900 | 2002 | Richland Supply Co<br>Main Street Eastover | 55 | 1 | 1 | 1 |
| 1900 | 2003 | Scotts Grocery<br>Main Street Eastover | 55 | NEGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1456 | Palmetto AMC-Jeep<br>3010 Two Notch Road | 75 | 3 | 3 | 4 |
| 1900 | 1457 | Pulliam Motor Co<br>2800 Two Notch Road | 75 | 16 | 19 | 21 |
| 1900 | 1458 | Wilson Lincoln Mercury<br>1101 Harden | 75 | 17 | 20 | 23 |
| 1900 | 1459 | Dick Smith Motors<br>4030 Beltline Blvd | 75 | 25 | 29 | 33 |
| 1900 | 1460 | Dyer & Beck Inc<br>3215 Two Notch Road | 75 | 6 | 7 | 8 |
| 1900 | 1461 | Burnside Dodge<br>2015 Gervais Street | 75 | 10 | 12 | 13 |
| 1900 | 1462 | Columbia Chry-Ply<br>7201 Sumter Hwy | 75 | 6 | 7 | 8 |
| 1900 | 1463 | Nix Volkswagen<br>3821 W. Beltline Blve | 75 | 13 | 15 | 17 |
| 1900 | 1464 | Central Chevrolet<br>4013 W. Beltline Cola | 75 | 17 | 20 | 23 |
| 1900 | 1465 | Commodity Engr Co<br>Cola | 34 | 9 | 9 | 10 |
| 1900 | 1466 | Mepco/Electra<br>6071 St. Andrews Road Cola | 36 | 58 | 70 | 82 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1445 | Hobart Corp.<br>Box 11989 Cola | 36 | 36 | 43 | 51 |
| 1900 | 1446 | Colonial Iron Works<br>300 Planters Drive | 34 | 2 | 2 | 2 |
| 1900 | 1447 | Thermal Engr<br>Box 868 Cola Industrial Park | 35 | 4 | 5 | 6 |
| 1900 | 1448 | John Harris Auto Painting<br>847 S. Stadium | 75 | 6 | 7 | 8 |
| 1900 | 1449 | Jeffery Entp<br>821 Pepper Street Cola | 75 | 1 | 1 | 1 |
| 1900 | 1450 | SC Hwy Dept<br>Depot Shop Road | 75 | 1 | 1 | 1 |
| 1900 | 1451 | Hancock Buick<br>1750 Laurel Street | 75 | 6 | 7 | 8 |
| 1900 | 1452 | Jim Moore Olds<br>2222 Main | 75 | 25 | 29 | 33 |
| 1900 | 1453 | Rockwell Intl<br>Box 1765 Hwy 1 N | 35 | 25 | 30 | 35 |
| 1900 | 1454 | Oliver Motor<br>2425 Main Cola | 75 | 6 | 7 | 8 |
| 1900 | 1455 | Hampton Pontiac<br>2024 Main Street | 75 | 18 | 21 | 24 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1433 | Carter-Miot Engrs Co<br>1829 Shop Road | 39 | 7 | 8 | 9 |
| 1900 | 1435 | Eastern Equip & Chem Co<br>5617 Fairfield | 39 | NEGLIGIBLE | | |
| 1900 | 1436 | Sefab Inc.<br>1501 Key Road Cola | 35 | 1 | 1 | 1 |
| 1900 | 1437 | Dutrow Prog Signs<br>2641 Commerce Drive | 39 | 1 | 1 | 1 |
| 1900 | 1438 | Food Service Supplies<br>Cola Industrial | 39 | 0 | 1 | 1 |
| 1900 | 1439 | MDK Corp<br>6200 N Main Cola | 34 | 1 | 1 | 1 |
| 1900 | 1440 | All Craft Steel<br>400 Planters Road | 34 | 5 | 5 | 6 |
| 1900 | 1441 | Atlas Steel Atlas Way<br>Atlas Way Cola | 34 | 3 | 3 | 3 |
| 1900 | 1442 | Chemical Co 11-A<br>Cola | 28 | 11 | 12 | 13 |
| 1900 | 1443 | Company 22-B<br>Cola | 28 | 17 | 18 | 20 |
| 1900 | 1444 | Seaco Inc.<br>2700 Industrial Drive | 29 | NEGLIGIBLE | | |

## SUMMARY OF VOC POINT SOU..E EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1421 | Technology Diversified<br>2 Falmetto Sq | 36 | NEGLIGIBLE | | |
| 1900 | 1422 | Trojan Sign Co<br>1717 Peeples St | 39 | NEGLIGIBLE | | |
| 1900 | 1423 | Laberne Mfg<br>819 Leesburg Cola | 38 | 1 | 1 | 1 |
| 1900 | 1424 | Earl Scheib Auto Painting<br>2414 Dillion | 75 | 2 | 2 | 3 |
| 1900 | 1425 | Ashland Chemical Co<br>916 Rosewood Drive | 28 | 5 | 5 | 6 |
| 1900 | 1426 | Commercial Metal Fab Co<br>3629 Pine Belt | 34 | 2 | 2 | 2 |
| 1900 | 1427 | Robertson Optical Lab | 38 | NEGLIGIBLE | | |
| 1900 | 1428 | Columbia Optical Supply<br>1612 Bull Cola | 38 | NEGLIGIBLE | | |
| 1900 | 1429 | Pacific Columbia Mills Co<br>Box 207 Cola | 22 | 3 | 3 | 3 |
| 1900 | 1430 | Bac Steel Prods<br>1308 Cook Street | 34 | NEGLIGIBLE | | |
| 1900 | 1431 | Baush & Lomb<br>1911 Hampton Street | 38 | NEGLIGIBLE | | |
| 1900 | 1432 | Realty Ad Co<br>1704 Calvin Road Cola | 39 | 2 | 2 | 3 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1410 | Southland Tool & Die & Machine<br>853 Universal | 35 | NEGLIGIBLE | | |
| 1900 | 1411 | Consolidated Systems<br>650 Rosewood Drive | 34 | 932 | 981 | 1025 |
| 1900 | 1412 | Owen Steen Co.<br>801 Blossom Street Cola | 34 | 78 | 82 | 86 |
| 1900 | 1413 | Square D Co.<br>9247 E. Sumter Hwy | 36 | 37 | 44 | 52 |
| 1900 | 1414 | Wander Iron Works<br>1401 Blaine St | 34 | 5 | 5 | 6 |
| 1900 | 1415 | Midland Steel Corp<br>1940 Shop Road Cola | 34 | 3 | 3 | 3 |
| 1900 | 1416 | Wheel Trueing Tool Co.<br>US Hwy in Cola | 34 | 8 | 8 | 9 |
| 1900 | 1417 | Robbins & Myers<br>US Hwy in Cola | 39 | 1 | 1 | 1 |
| 1900 | 1418 | UAP Components<br>2620 Blvd Cola Ind Park | 39 | NEGLIGIBLE | | |
| 1900 | 1419 | Velvetex Inc<br>1144 Shop Road | 39 | 4 | 5 | 5 |
| 1900 | 1420 | Southern Table Corp<br>400 Calhoun Street | 25 | 18 | 18 | 18 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1239 | Central Ad Co.<br>4505 Devine Street | 27 | 4 | 5 | 5 |
| 1900 | 1240 | York Tape & Label Corp.<br>2800 Alpine | 27 | 10 | 11 | 13 |
| 1900 | 1241 | Carolina Photoengraving<br>721 Elmwood | 27 | NEGLIGIBLE | | |
| 1900 | 1401 | Hobgood Electric<br>P.O. Box 3073 Cola | 35 | 1 | 1 | 1 |
| 1900 | 1402 | Carolina Door Prod<br>P.O. Box 4475 Cola | 34 | NEGLIGIBLE | | |
| 1900 | 1403 | Ebert Sportswear<br>5000 Fernadina Road | 23 | NEGLIGIBLE | | |
| 1900 | 1404 | Hewitt-Robins<br>P.O. Box 1481 Cola | 35 | 12 | 14 | 17 |
| 1900 | 1405 | East Coast Steel<br>P.O. Box 76 Eastover | 34 | 239 | 252 | 263 |
| 1900 | 1406 | Risdon Q-Mist Corp.<br>Pontial Industrial Blvd | 34 | 1 | 1 | 1 |
| 1900 | 1407 | Sumner Co. Inc.<br>US 1 North P.O. Box 6575 | 22 | NEGLIGIBLE | | |
| 1900 | 1409 | Galaxy Boat Mfg<br>21N P.O. Box 3848 | 37 | 43 | 63 | 83 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1227 | Southeastern Printing<br>1510 Barnwell | 27 | 1 | 1 | 1 |
| 1900 | 1228 | Bobbin Publication<br>1110 Shop Road | 27 | NEBLIGIBLE | | |
| 1900 | 1229 | Carolina Reprographics<br>4419 Devine Street | 27 | NEGLIGIBLE | | |
| 1900 | 1230 | Columbia Newspapers<br>Stadium Road | 27 | 125 | 143 | 161 |
| 1900 | 1231 | Capital Blueprint Co.<br>2730 Millwood | 27 | NEGLIGIBLE | | |
| 1900 | 1232 | Ye Olde Printing Press<br>1420 Lady Street | 27 | NEGLIGIBLE | | |
| 1900 | 1233 | Kwik-Kopy<br>6701-A Two Notch Cola | 27 | NEGLIGIBLE | | |
| 1900 | 1234 | Vogue Press<br>1223 Frankling Street | 27 | 3 | 3 | 4 |
| 1900 | 1235 | Mark Graphics Inc.<br>3021 Rosewood Drive | 27 | NEGLIGIBLE | | |
| 1900 | 1237 | Capital Printing<br>5706 Farrow Drive, Cola | 27 | NEGLIGIBLE | | |
| 1900 | 1238 | Union Print Shop<br>Russell House Univ SoC | 27<br>27 | NEGLIGIBLE<br>NEGLIGIBLE | | |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## RICHLAND COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1216 | Service Printing<br>1425 Shop Road | 27 | NEGLIGIBLE | | |
| 1900 | 1217 | Printers Inc.<br>712 Huger Street | 27 | NEGLIGIBLE | | |
| 1900 | 1218 | A Minute Printing<br>1209 Broad River Road | 27 | NEGLIGIBLE | | |
| 1900 | 1219 | Insty Prints<br>1332 Assembly | 27 | NEGLIGIBLE | | |
| 1900 | 1220 | Spring Printing Co.<br>2135 Devine Street, Cola | 27 | NEGLIGIBLE | | |
| 1900 | 1221 | Downtown Printers<br>1217 Blanding | 27 | NEGLIGIBLE | | |
| 1900 | 1222 | American Printing Co.<br>5934 Two Notch | 27 | NEGLIGIBLE | | |
| 1900 | 1223 | Smittys Print Shop Inc.<br>2923 Main | 27 | 1 | 1 | 1 |
| 1900 | 1224 | State Printing<br>1305 Sumter | 27 | 22 | 25 | 28 |
| 1900 | 1225 | RL Bryan Co.<br>P.O. Box 368, Cola | 27 | 20 | 23 | 26 |
| 1900 | 1226 | Collins Printing<br>3122 Boltline Boulevard | 27 | NEGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1205 | Coastal Printing Co.<br>108 Helm Avenue | 27 | NEGLIGIBLE | | |
| 1900 | 1206 | Colonial Printing Co.<br>504 Bluff Road | 27 | NEGLIGIBLE | | |
| 1900 | 1207 | Schwartz Typesetters<br>4402 Main | 27 | NEGLIGIBLE | | |
| 1900 | 1208 | Mac Kohn Printing Inc.<br>207 Pickens Street | 27 | 2 | 2 | 3 |
| 1900 | 1209 | Sam-Mar Printing<br>4927 Alpine Road | 27 | NEGLIGIBLE | | |
| 1900 | 1210 | Copie-Kwik<br>1449 Sumter | 27 | NEGLIGIBLE | | |
| 1900 | 1211 | Forest Publishing Co.<br>7401 Parklane Road | 27 | NEGLIGIBLE | | |
| 1900 | 1212 | University Printing Services<br>506 Assembly Street | 27 | 1 | 1 | 1 |
| 1900 | 1213 | Curtis 1000 Speedi-print<br>1205 Lady Street | 27 | NEGLIGIBLE | | |
| 1900 | 1214 | Curtis 1000 Speedi-print<br>2712 Middleburg | 27 | NEGLIGIBLE | | |
| 1900 | 1215 | Columbia Office<br>1112 Lady | 27 | 2 | 2 | 3 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1034 | Rainbow Cleaners<br>5 Boozer Shopping Center | 72 | 3 | 3 | 4 |
| 1900 | 1035 | Rainbow Cleaners<br>3 Sunset Shopping Center | 72 | 3 | 3 | 4 |
| 1900 | 1036 | Rainbow Cleaners<br>Midland Shopping Center | 72 | 3 | 3 | 4 |
| 1900 | 1037 | Robinson-Skipper 1 Hour Mart<br>742 St. Andrews | 72 | 9 | 10 | 12 |
| 1900 | 1038 | Robinson-Skipper 1 Hour Mart<br>6179 St. Andrews | 72 | 5 | 6 | 7 |
| 1900 | 1039 | Richardsons Laundry & Cleaners<br>6001 Farrow Road | 72 | 8 | 9 | 11 |
| 1900 | 1040 | 1 Hour Martinizing<br>6331 N. Main Street | 72 | 7 | 8 | 9 |
| 1900 | 1201 | Action Graphics<br>532 Knox Abbott Drive | 27 | NEGLIGIBLE | | |
| 1900 | 1202 | Ashley Printing<br>1445 Shop Road | 27 | 0 | 0 | 1 |
| 1900 | 1203 | Printed Communications Inc.<br>3029 Rivers | 27 | NEGLIGIBLE | | |
| 1900 | 1204 | Kuik-Kopy Printing<br>3952 Rivers Avenue | 27 | NEGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1023 | Master Cleaners<br>1908 Blossom Street, Cola | 72 | 54 | 63 | 72 |
| 1900 | 1024 | Tokunagas 1 Hour Martinizing<br>3023 Millwood | 72 | 2 | 2 | 3 |
| 1900 | 1025 | Patrone Cleaners<br>1128 Devine | 72 | 2 | 2 | 3 |
| 1900 | 1026 | Richard French Cleaning<br>2524 Forest Drive | 72 | 5 | 6 | 7 |
| 1900 | 1027 | Pressleys Cleaners<br>2305 Read Street | 72 | 2 | 2 | 3 |
| 1900 | 1028 | Gillespie Cleaners Inc.<br>5213 Trenholm Road | 72 | 3 | 3 | 4 |
| 1900 | 1029 | Custom Cleaners<br>2801 Two Notch Road | 72 | 8 | 9 | 11 |
| 1900 | 1030 | Dreher & Dreher<br>2201 Two Notch Road | 72 | 6 | 7 | 8 |
| 1900 | 1031 | Warwick Laundry & Cleaners Inc.<br>1616 Sumter | 72 | 5 | 6 | 7 |
| 1900 | 1032 | Labelle Cleaners & Furrier<br>1709 Taylor Street | 72 | 6 | 7 | 8 |
| 1900 | 1033 | Zip Kleen Inc.<br>1320 Main Street | 72 | 3 | 3 | 4 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1012 | Ed Robinson Cleaners Laundry Inc.<br>2551 Forest | 72 | 44 | 51 | 58 |
| 1900 | 1013 | Burnettes 1 Hour Cleaners<br>6320 Garnes Ferry | 72 | 7 | 8 | 9 |
| 1900 | 1014 | Burnetts 1 Hour Mart<br>7045 Parklane Road | 72 | 13 | 15 | 17 |
| 1900 | 1015 | Peters & Son<br>1429 Sumter Street, Cola | 72 | 4 | 5 | 5 |
| 1900 | 1016 | Arnolds Professional Garmet Care<br>2601 Main Street | 72 | 2 | 2 | 3 |
| 1900 | 1017 | Arnolds Professional Garment Care<br>3104 Broad River | 72 | 16 | 19 | 21 |
| 1900 | 1018 | 60 Minute Cleaners<br>3010 Rosewood Drive, Cola | 72 | 4 | 5 | 5 |
| 1900 | 1019 | 1 Hour Martinizing<br>4011 Main | 72 | 7 | 8 | 9 |
| 1900 | 1020 | H & L Cleaners<br>4013 Farrow Road | 72 | 7 | 8 | 9 |
| 1900 | 1021 | Burnetts/Cleaners<br>623 Beltline Boulevard | 72 | 18 | 21 | 24 |
| 1900 | 1022 | Moores Cleaners<br>1636 Blue Ridge Terrace | 72 | 4 | 5 | 5 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

RICHLAND COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1900 | 1001 | One Hour Martinizing<br>Box 21458, Cola | 72 | 17 | 20 | 23 |
| 1900 | 1002 | Sunshine Laundry/Cleaners<br>601 Main Street, Cola | 72 | 32 | 37 | 42 |
| 1900 | 1003 | Bolands Martinizing<br>2601 Notch Road | 72 | 6 | 7 | 8 |
| 1900 | 1004 | Rosenblum Cleaners Inc.<br>5319 Forest Drive | 72 | 4 | 5 | 5 |
| 1900 | 1005 | 50 Minit Kleen Rite<br>2303 Taylor Street, Cola | 72 | 12 | 14 | 16 |
| 1900 | 1006 | N. Main Coin Laundry<br>4824 N. Main, Cola | 72 | 1 | 1 | 1 |
| 1900 | 1007 | Pro-Brite Dry Cleaners<br>1749 Decker Boulevard | 72 | 6 | 7 | 8 |
| 1900 | 1008 | Belvedere Cleaners<br>3400 Two Notch Road | 72 | 4 | 5 | 5 |
| 1900 | 1009 | Arnolds Uniform Rental<br>3151 Forest Drive | 72 | 4 | 5 | 5 |
| 1900 | 1010 | Palmetto Cleaners Launders<br>3504 River Drive, Cola | 72 | 12 | 14 | 16 |
| 1900 | 1011 | 60 Minute Valet<br>1637 Main Street | 72 | 2 | 2 | 3 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2118 | Lyhard Motors<br>Leesville | 55 | NEGLIGIBLE | | |
| 1560 | 2119 | Leesville Mobile Service<br>Leesville, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2120 | Sloner Tire Service<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2121 | Billy's Hand Mart<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2122 | Springdale IGA<br>2927 Platt Spring Road | 55 | 2 | 2 | 2 |
| 1560 | 2123 | Oakgrove Superette<br>Lexington Hwy., Lexington | 55 | 5 | 6 | 6 |
| 1560 | 2124 | Hanks Exxon<br>Main Street, South Congaree | 55 | 1 | 1 | 1 |
| 1560 | 2125 | Tri-City Fuel & Heating<br>640 Lex Street, W. Cola | 55 | 4 | 4 | 5 |
| 1560 | 1408 | Browning Metal Products Inc.<br>5311 Bush River Road | 34 | 3 | 3 | 3 |
| 1560 | 1415 | Kline Iron and Steel | 34 | 226 | 238 | 249 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2107 | M S Hendrix<br>Lexington | 55 | 1 | 1 | 1 |
| 1560 | 2108 | Wayne R. Clamp<br>Hwy 1 & 378, Lexington | 55 | 9 | 10 | 11 |
| 1560 | 2109 | Charlies Quick Pic<br>Lexington, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2110 | W B Rhoten<br>Hwy 1, North Lexington | 55 | 1 | 1 | 1 |
| 1560 | 2111 | L. H. King<br>Lexington, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2112 | J. H. Hallman<br>Leesville, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2113 | Batesburg Gulf<br>Church & Line Street | 55 | 4 | 4 | 5 |
| 1560 | 2114 | E C Dominick<br>Leesville, S.C. | 55 | 1 | 1 | 1 |
| 1560 | 2115 | A E Miller<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2116 | J C Keisler<br>Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2117 | W. Shealy<br>Leesville | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2096 | Shoppong Center<br>Batesburg, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2097 | S & S Market<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2098 | Rankin Grocery<br>Batesburg, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2099 | Rish Food Store<br>Leesville | 55 | 2 | 2 | 2 |
| 1560 | 2100 | Little General Store<br>Gilbert, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2101 | Pete Addy<br>Leesville, S.C. | 55 | NEGLIGIBLE | | |
| 1560 | 2102 | A J Snelgrove<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2103 | Gem Oil Co<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2104 | W. J. Smith Grocery<br>Leesville, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2105 | W E McCullough<br>Gilbert, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2106 | Bill Ruder<br>Gilbert, S. C. | 55 | NEGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2085 | Red Top Sport Shop<br>Leesville, S.C. | 55 | NEGLIGIBLE | | |
| 1560 | 2086 | Airport 66<br>I-26, Hwy 215, W. Cola | 55 | 4 | 4 | 5 |
| 1560 | 2087 | Aughtry 66<br>Frink St., Cayce | 55 | NEGLIGIBLE | | |
| 1560 | 2088 | Baughman 66<br>I-26 & Bush River | 55 | 3 | 3 | 4 |
| 1560 | 2089 | Derrick 66<br>Chapin, S. C. | 55 | 5 | 6 | 6 |
| 1560 | 2090 | Rags to Riches<br>Hwy 378, Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2091 | Shealy 66<br>Augusta Road, W. Cola | 55 | 1 | 1 | 1 |
| 1560 | 2092 | Seyfer Grocery<br>Hwy 215, Edmund, S.C. | 55 | NEGLIGIBLE | | |
| 1560 | 2093 | Sunset 66<br>I26 & Hwy 378, Cayce | 55 | 3 | 3 | 4 |
| 1560 | 2094 | Varn & Rucker 66<br>State St., Cayce | 55 | NEGLIGIBLE | | |
| 1560 | 2095 | Eagle 66<br>Batesburg, S. C. | 55 | 2 | 2 | 2 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2074 | Fox Texaco<br>702 E. Church, Batesburg | 55 | 1 | 1 | 1 |
| 1560 | 2075 | Town & Country<br>Gilbert, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2076 | W. W. Temples<br>Batesburg, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2077 | C. J. Taylor<br>Lexington, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2078 | Lake Murray Shores<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2079 | Lakeside Marina<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2080 | McKays Texaco | 55 | NEGLIGIBLE | | |
| 1560 | 2081 | Dooley's Sport Shop<br>Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2082 | Keences Grocery<br>Batesburg, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2083 | Martin's Spting Ctr.<br>Leesville, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2084 | Paul's Auto Sales<br>Leesville, S. C. | 55 | 1 | 1 | 1 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2063 | McFarlin Texaco<br>West Cola | 55 | 1 | 1 | 1 |
| 1560 | 2064 | Wilton Rish<br>Leesville | 55 | 2 | 2 | 2 |
| 1560 | 2065 | Paul Hoffman<br>Swansea, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2066 | J. E. Schumpert<br>Pelion, S.C. | 55 | NEGLIGIBLE | | |
| 1560 | 2067 | Schumpert SS<br>Pelion, S. C. | 55 | 7 | 8 | 9 |
| 1560 | 2068 | Jack Anderson Texaco<br>3526 Charleston Hwy | 55 | 1 | 1 | 1 |
| 1560 | 2069 | Buff Texaco<br>Rt. 10, Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2070 | Cook's Texaco<br>1901 Airport Blvd. Cayce | 55 | 1 | 1 | 1 |
| 1560 | 2071 | Martin Texaco<br>2005 Platt Springs | 55 | 2 | 2 | 2 |
| 1560 | 2072 | Odom Texaco<br>1902 Augusta Road | 55 | 1 | 1 | 1 |
| 1560 | 2073 | Rawl Texaco<br>1400 Sunsel Blvd., W. Cola | 55 | 2 | 2 | 2 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2052 | Roland Service<br>Red Bank | 55 | 2 | 2 | 2 |
| 1560 | 2053 | Sander's Super Market<br>Bluff Road, Cola | 55 | NEGLIGIBLE | | |
| 1560 | 2054 | State Cab<br>5647 1/2 Forest Drive, Cola | 55 | 2 | 2 | 2 |
| 1560 | 2055 | Sand Mt. Grocery<br>Fish Hatchery Road, W. Cola | 55 | 1 | 1 | 1 |
| 1560 | 2056 | Taylor's Grocery<br>Platt Springs Road, W. Cola | 55 | 1 | 1 | 1 |
| 1560 | 2057 | Davis Texaco<br>Swansea, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2058 | Belford Texaco<br>Gaston, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2059 | Lacklain Texaco<br>Gaston, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2060 | Courtesy Food Mart<br>Gaston, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2061 | Dots Place<br>Lexington, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2062 | E & J Disc<br>Pelion, S. C. | 55 | NEGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2041 | W. W. Wessenger | 55 | 2 | 2 | 2 |
| 1560 | 2042 | Swaggerts<br>US 378, Leesville | 55 | 1 | 1 | 1 |
| 1560 | 2043 | Mae Keisler<br>Leesville, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2044 | Plato Kneece<br>Batesbirg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2045 | Baughman Services Station<br>2335 Charleston Hwy, Cayce | 55 | 2 | 2 | 2 |
| 1560 | 2046 | Bloom's<br>3601 Main Street, Cola | 55 | 2 | 2 | 2 |
| 1560 | 2047 | Corner Grocery<br>Jessamine Road, W. Cola | 55 | 2 | 2 | 2 |
| 1560 | 2048 | Congaree Service<br>Frink Street, Cayce | 55 | 1 | 1 | 1 |
| 1560 | 2049 | Hilltop Grocery<br>Sandy Run, W. Cola | 55 | NEGLIGIBLE | | |
| 1560 | 2050 | Lucas Service<br>1001 S. Main, Cola | 55 | 2 | 2 | 2 |
| 1560 | 2051 | Rich's Service | 55 | 2 | 2 | 2 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

### LEXINGTON COUNTY

### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2030 | Dooley's Store<br>Rt 6, Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2031 | Thompson's Grocery<br>107 Thompson, Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2032 | Turner's Landing<br>Rt. 2, Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2033 | Jake's Landing<br>Rt. 1, Lexington | 55 | 0 | 0 | 1 |
| 1560 | 2034 | Lorick's Grocery<br>Irmo, S. C. | 55 | 0 | 0 | 1 |
| 1560 | 2035 | The Outpost<br>Hwy 176, Irmo, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2036 | Haltiwanger's<br>Chapin, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2037 | Duncan Amoco<br>Batesburg, S. C. | 55 | 5 | 6 | 6 |
| 1560 | 2038 | Wright Amoco<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2039 | Caper House<br>Leesville, S. C. | 55 | 3 | 3 | 4 |
| 1560 | 2040 | Varney Amoco<br>Hwy 378, Leesville | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2019 | Bederbaugh Shell<br>Hwy 378 | 55 | NEGLIGIBLE | | |
| 1560 | 2020 | J. D. Caughman<br>Hwy 378 | 55 | 1 | 1 | 1 |
| 1560 | 2021 | Caper House #33<br>Hwy 1, Lexington | 55 | 2 | 2 | 2 |
| 1560 | 2022 | Fox Shell<br>Hwy 23, Leesville | 55 | 1 | 1 | 1 |
| 1560 | 2023 | Midway Shell<br>I-20 & US 178, Leesville | 55 | 2 | 2 | 2 |
| 1560 | 2024 | Oxner Shell<br>Hwy 1, Leesville | 55 | 1 | 1 | 1 |
| 1560 | 2025 | J. H. Oswald<br>Lexington | 55 | NEGLIGIBLE | | |
| 1560 | 2026 | Town and Country<br>Rt. 4, Lexington | 55 | 1 | 1 | 1 |
| 1560 | 2027 | H & H Gro.<br>Rt. 6, Lexington | 55 | 1 | 1 | 1 |
| 1560 | 2028 | Emory's Gro.<br>Lexington | 55 | 1 | 1 | 1 |
| 1560 | 2029 | C. J. Kyzer Co.<br>Rt. 3, Lexington | 55 | NRGLIGIBLE | | |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 2008 | Circle Grocery<br>Leesville, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2009 | Sease's<br>Hwy 378, Gilbert | 55 | 1 | 1 | 1 |
| 1560 | 2010 | Derrick's Exxon<br>Gilbert, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2011 | H. W. Black<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2012 | Top ' O' Lake Marina<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2013 | Alcapulco USA Marina<br>Leesville, S.C. | 55 | NEGLIGIBLE | | |
| 1560 | 2014 | A A Shealy<br>Leesville, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2015 | Handimat<br>Hwy 1, Gilbert, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2016 | Barnes Oil Co.<br>Batesburg, S. C. | 55 | 1 | 1 | 1 |
| 1560 | 2017 | McNeil Store<br>Batesburg, S. C. | 55 | NEGLIGIBLE | | |
| 1560 | 2018 | Batesburg Shell<br>Hwy 23, Batesburg | 55 | 1 | 1 | 1 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1442 | Imperial Casket Co.<br>Hwy. 23, Leesville | 39 | 23 | 26 | 30 |
| 1560 | 1443 | Roses Quality Paints<br>Frink Street, Cayce | 28 | 7 | 8 | 8 |
| 1560 | 1444 | Monroe Calculators<br>787 Litton Road | 35 | 11 | 13 | 15 |
| 1560 | 1446 | Safti-Kleen<br>US 1 & I-20, Lexington | 72 | 435 | 506 | 577 |
| 1560 | 2001 | Shumpert Gro.<br>Pelion Hwy., W. Columbia | 55 | NEGLIGIBLE | | |
| 1560 | 2002 | Frank's Exxon<br>Church & Salada, Batesburg | 55 | 2 | 2 | 2 |
| 1560 | 2003 | Richard's Exxon<br>Hwy 1 & Pine, Batesburg | 55 | 2 | 2 | 2 |
| 1560 | 2004 | Leaphart's Exxon<br>Gilbert, S. C. | 55 | 2 | 2 | 2 |
| 1560 | 2005 | Shealy's Exxon<br>Hwy 1, Batesburg | 55 | 2 | 2 | 2 |
| 1560 | 2006 | Swaygerts Exxon<br>Hwy 1, Gilbert | 55 | 1 | 1 | 1 |
| 1560 | 2007 | Crossroads Grocery<br>Gilbert, S. C. | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1431 | Dixianna Steel<br>Pine Ridge Drive | 34 | 24 | 25 | 26 |
| 1560 | 1432 | Metro Signs<br>520 Sunset, W. Cola | 39 | 1 | 1 | 1 |
| 1560 | 1433 | Metalex, Inc.<br>Brun Street, Swansea | 34 | NEGLIGIBLE | | |
| 1560 | 1434 | Owen Misc. Metals, Inc.<br>2804 Taylor, Cayce | 34 | 14 | 15 | 15 |
| 1560 | 1435 | Toyota Center<br>1640 Airport Blvd. | 75 | 2 | 2 | 3 |
| 1560 | 1436 | Love Chevrolet<br>1255 Knox Abbott Drive, Cayce | 75 | 12 | 14 | 16 |
| 1560 | 1437 | Amer Std-Wabco US &SD<br>Russell St., Batesburg | 36 | 4 | 5 | 6 |
| 1560 | 1438 | Allis Chalmers<br>P.O. Box 128, Lex | 37 | 49 | 71 | 94 |
| 1560 | 1439 | Canron Railgroup<br>2401 Edmund, W. Cola | 37 | 30 | 44 | 58 |
| 1560 | 1440 | Wellington Synthetic Fibers<br>Hwy 1, Leesville | 22 | NEGLIGIBLE | | |
| 1560 | 1441 | ES Copeland Mfg<br>Columbia Avenue, Batesburg | 39 | 7 | 8 | 9 |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1421 | W C Mfg and Spec. Co<br>2020 Chas. Hwy., Cayce | 34 | 3 | 3 | 3 |
| 1560 | 1422 | Atlantic Bolt & Screw<br>1769 Edmond Road., Cayce | 34 | NEGLIGIBLE | | |
| 1560 | 1423 | Columbia Wilbert Vault<br>1241 Airport Blvd. | 39 | 1 | 1 | 1 |
| 1560 | 1424 | Pioneer Steel<br>2200 Congaree Drive, Cayce | 34 | 66 | 69 | 73 |
| 1560 | 1425 | Colite Ind<br>229 Parson St., W. Cola | 33 | 29 | 36 | 43 |
| 1560 | 1426 | Horsman Dolls, Inc.<br>Hwy 321, S. Cayce | 39 | 20 | 23 | 26 |
| 1560 | 1427 | Glassmaster Plastics Co.<br>I 20 & SC Hwy. 6, Lex | 37 | 80 | 117 | 154 |
| 1560 | 1428 | Westco Enterprises<br>124 Whiteside Cir., Lex | 39 | NEGLIGIBLE | | |
| 1560 | 1429 | Lexco Sales & Engineering<br>682 Dixianna, Cayce | 34 | 14 | 15 | 15 |
| 1560 | 1430 | George Associates<br>Old Dunbar Road | 39 | NEGLIGIBLE | | |

## SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

## LEXINGTON COUNTY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1409 | Southern Plastics<br>2121 Old Dunbar, W. Cola | 30 | NEGLIGIBLE | | |
| 1560 | 1410 | Nassan Recycle Corp.<br>Hwy 321, Gaston | 28 | 4 | 4 | 5 |
| 1560 | 1411 | Reco-South Carolina, Inc.<br>W. Columbia | 34 | 19 | 20 | 21 |
| 1560 | 1412 | Revco Inc.<br>1100 Memorial Drice | 35 | 11 | 13 | 15 |
| 1560 | 1413 | Carolina Chemicals<br>Columbia AP, W. Cola | 28 | 19 | 21 | 22 |
| 1560 | 1414 | Harris Corp - Lecom Div.<br>Main Street, Batesburg | 36 | 4 | 5 | 6 |
| 1560 | 1416 | Owen Joist Corp.<br>850 Taylor Street. Cayce | 34 | 166 | 175 | 183 |
| 1560 | 1417 | Dixie Fabs, Inc.<br>Pineridge Drive, Cayce | 34 | 59 | 62 | 65 |
| 1560 | 1418 | Columbia Airoblind<br>2122 Platt Springs, W. Cola | 34 | NEGLIGIBLE | | |
| 1560 | 1419 | Burlington Ind. Catlin Farish Div.<br>Batesburg | 22 | 3 | 3 | 3 |
| 1560 | 1420 | Carolina Wire/Steel Corp<br>I 20/Hwy 6, Lexing | 34 | 11 | 12 | 12 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY

LEXINGTON COUNTY

(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1219 | Weisz Delcomania, Inc.<br>Chapin | 27 | 2 | 2 | 3 |
| 1560 | 1220 | Carolina Printing Center, Inc.<br>1500 Ave L. Cayce | 27 | 2 | 2 | 3 |
| 1560 | 1221 | B & L Office Supply<br>111 W. Church Street | 27 | NEGLIGIBLE | | |
| 1560 | 1221 | Recco Tape & Label, Inc.<br>1800 Edmund Road | 27 | 3 | 3 | 4 |
| 1560 | 1401 | United Tool and Die<br>3792 Platt Springs Road | 34 | 1 | 1 | 1 |
| 1560 | 1402 | General Tool and Die<br>511 N. Parson, W. Cola | 34 | 1 | 1 | 1 |
| 1560 | 1403 | Van Craft Ind.<br>3725 Sunset Bl., W. Cola | 39 | 2 | 2 | 3 |
| 1560 | 1404 | Automated Indus. Elec. Co.<br>10 Granite | 36 | NEGLIGIBLE | | |
| 1560 | 1405 | Redmond Signs<br>2021 State St., Cayce | 39 | 1 | 1 | 1 |
| 1560 | 1407 | Taylor Bros.<br>Hampton St., Gilbert | 39 | 0 | 0 | 1 |
| 1560 | 1408 | Columbia Engr. Co.<br>Lexington | 39 | NEGLIGIBLE | | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY
## LEXINGTON COUNTY
## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1208 | Bruner Publishing Co.<br>I 20 & Highway 6 | 27 | 2 | 2 | 3 |
| 1560 | 1209 | Wentworth Printing Corp.<br>W. Cola | 27 | 1 | 1 | 1 |
| 1560 | 1210 | Taylor Print, Inc.<br>112 E. Main, Lexington | 27 | | Negligible | |
| 1560 | 1211 | Lithoprint, Inc.<br>430 Center Street | 27 | | Negligible | |
| 1560 | 1212 | Collie Fausts Printing Co.<br>Fishhatchery | 27 | | Negligible | |
| 1560 | 1213 | Printed Displays<br>107 Sholem Drive, Gaston | 27 | | Negligible | |
| 1560 | 1214 | Ashley Printing<br>1111 St. Andrews Blvd. | 27 | 1 | 1 | 1 |
| 1560 | 1215 | Printer No. 1-C | 27 | 150 | 171 | 193 |
| 1560 | 1216 | NCR Corp<br>3325 Platt Springs Rd. | 27 | 6 | 7 | 8 |
| 1560 | 1217 | Geo M. Lewis<br>N. Railroad Ave., Batesburg | 27 | | Negligible | |
| 1560 | 1218 | Zippy Print<br>108 N. Parson Street | 27 | | Megigible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### LEXINGTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1012 | Stork Cleaners<br>1931 State, Cayce | 72 | 3 | 3 | 4 |
| 1560 | 1013 | Rainbow Cleaners<br>4 Saluda Plaza, W. Cola | 72 | 3 | 3 | 4 |
| 1560 | 1014 | Robinson-Skipper, 1 Hr. Mart<br>1621 Edmond | 72 | 8 | 9 | 11 |
| 1560 | 1201 | Professional Printers<br>Dunbar Rd., W. Cola | 27 | 2 | 2 | 3 |
| 1560 | 1202 | Lexington Printing Service<br>Oakwood Dr., Lexington | 27 | | Negligible | |
| 1560 | 1203 | Pioneer Printing<br>2008 State Street, Cayce | 27 | | Negligible | |
| 1560 | 1204 | B & T Offset Printers<br>1401 Sunset Blvd. | 27 | | Negligible | |
| 1560 | 1205 | Dispatch-News<br>131 E. Main, Lexington | 27 | | Negligible | |
| 1560 | 1206 | J. H. Garland Co.<br>3430 Platt Springs Rd. W. Cola | 27 | 5 | 6 | 6 |
| 1560 | 1207 | Southwestern, Inc.<br>989 Knox Abbott, Cayce | 27 | 2 | 2 | 3 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

### LEXINGTON COUNTY
### (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 1560 | 1001 | Bercknells Irmo Day Cleaners<br>1248 Newberry | 72 | 4 | 5 | 5 |
| 1560 | 1002 | Robinson-Skipper - 1 Hr. Mart<br>1312 Sunset | 72 | 6 | 7 | 8 |
| 1560 | 1003 | Virgil G. Price Cleaners<br>Lexington Avenue | 72 | 2 | 2 | 3 |
| 1560 | 1004 | Lexington Cleaners Laundry<br>510 Columbia | 72 | 4 | 5 | 5 |
| 1560 | 1005 | Becknells Westside Cleaner<br>607 Meeting | 72 | 11 | 13 | 15 |
| 1560 | 1006 | Spradley Bailey<br>310 State Street, W. Cola | 72 | 25 | 29 | 33 |
| 1560 | 1007 | Robinson-Skipper 1 Hr . Mart<br>318 W. Main St. | 72 | 8 | 9 | 11 |
| 1560 | 1008 | Shealys Cleaners<br>26 Granite St. Batesburg | 72 | 4 | 5 | 5 |
| 1560 | 1009 | Jackson Cleaners<br>7 E. Columbia, Batesburg | 72 | 4 | 5 | 5 |
| 1560 | 1010 | One Hour Martinizing<br>919 Knox Abbott | 72 | 4 | 5 | 5 |
| 1560 | 1011 | Thrifty Cleaners<br>2223 Augusta Rd., W. Cola | 72 | 19 | 22 | 25 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Norgetown Laundry & Dry Cleaners<br>2036 Cherry Road | 72 | 2 | 2 | 3 |
| 2440 | | Sawyer Dry Cleaning Co.<br>2001 N. Cherry Road | 72 | | Negligible | |
| 2440 | | York 1 Hour Cleaners<br>120 S. Congres Street | 72 | 5 | 6 | 7 |
| 2440 | | Hicks Cleaners<br>205 S. Main St. | 72 | 5 | 6 | 7 |
| 2440 | | Brownies Cleaners, Box 236 | 72 | 3 | 4 | 4 |
| 2440 | | Chuck's Laundry & Cleaners<br>935 E. Main, RockHill | 72 | 13 | 16 | 19 |
| 2440 | | Burns Chev. Inc.<br>2515 Cherry Road | 75 | 3 | 4 | 4 |
| 2440 | | Mike's Wheel Alignment<br>1601 Roosevelt Blvd. | 55 | 1 | 2 | 2 |
| 2440 | | E Z Mart<br>Route 8, McLuain | 55 | | Negligible | |
| 2440 | | Grace Ave. Minute Mart<br>609 Grav Ave | 55 | 2 | 2 | 3 |
| 2440 | | Boyce Elliotts EXXon<br>1308 Cherry Road | 55 | 3 | 3 | 4 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | South Main Exxon, 902 S. Main | 55 | 1 | 1 | 1 |
| 2440 | | Saverance Sunoco<br>2161 India Hooks Road | 55 | 3 | 3 | 4 |
| 2440 | | Little Giant Market<br>1001 Saluda Street | 55 | 1 | 1 | 1 |
| 2440 | | Barkfield Chevron Station<br>100 S. Congress | 55 | 1 | 1 | 1 |
| 2440 | | Samo Exxon Service Center<br>203 Saluda Street | 55 | 3 | 3 | 4 |
| 2440 | | Cobbs Sunoco Service<br>York Road, Clover | 55 | 3 | 3 | 4 |
| 2440 | | D & D Service Station<br>Route 3, Clover | 55 | 1 | 1 | 1 |
| 2440 | | Neadway Sunoco<br>1210 Cherry Road | 55 | 2 | 2 | 3 |
| 2440 | | Jack's Sunoco<br>2550 Cherry Road | 55 | | Negligible | |
| 2440 | | Cherry Road Exxon Service<br>710 Cherry Road | 55 | 4 | 5 | 5 |
| 2440 | | Davers Sunoco<br>18 E. Liberty Street | 55 | 2 | 2 | 3 |
| 2440 | | York Tire Store Inc.<br>P. O. Box 357 | 55 | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Branhams Exxon<br>25 S. Congress Street | 55 | 9 | 10 | 12 |
| 2440 | | Jimmy Garaher 66 Service<br>427 E. Main | 55 | 2 | 2 | 3 |
| 2440 | | Lillians 66 Station<br>102 Bekhel Street | 55 | 3 | 3 | 4 |
| 2440 | | Anderson Chevron Service<br>369 Charlotte Ave | 55 | 1 | 1 | 1 |
| 2440 | | Thomas Raceway<br>Hwy. 49, Sharon | 55 | 2 | 2 | 3 |
| 2440 | | Battle Ground Exxon<br>Rt. 1 Box 368 | 55 | 1 | 1 | 1 |
| 2440 | | Pulsent Valley<br>Rt. 2 Fort Mill | 55 | 1 | 1 | 1 |
| 2440 | | Elliotts Sonoco Station<br>990 W. Main Street | 55 | 2 | 2 | 2 |
| 2440 | | Kavo Oil Co.<br>Soult 200 | 55 | 8 | 9 | 10 |
| 2440 | | Arant's N. Main Amoco<br>P. O. Box 1111 | 55 | 2 | 2 | 3 |
| 2440 | | Kelly Service Station<br>409 S. Main St. | 55 | | Negigible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Roberto Grocery & Station<br>Route 2, Box 207 | 55 | 1 | 1 | 1 |
| 2440 | | Bypass Shell and Tire Center<br>Hwy. #9 Bypass | 55 | 1 | 1 | 1 |
| 2440 | | Catawba Tire Co.<br>609 S. Main Street | 55 | 1 | 1 | 1 |
| 2440 | | G. L. Twilly & Sons, City Service Station<br>White & Gay Sts. | 55 | Negligible | | |
| 2440 | | Linglo Grocery<br>Route 6, Lancaster | 55 | 2 | 2 | 3 |
| 2440 | | R & W Food Market<br>110 W. Meeting St. | 55 | 3 | 3 | 4 |
| 2440 | | South Main Texaco<br>331 S. Main St. | 55 | 1 | 1 | 1 |
| 2440 | | B. G. Exxon Station<br>131 Synwood Dr. | 55 | 1 | 1 | 1 |
| 2440 | | Catawbo Oil<br>Brookling Avenue | 55 | 1 | 1 | 1 |
| 2440 | | Parker's Sporting Goods & Groc.<br>310 Springdale Road | 55 | Negligible | | |
| 2440 | | Rutlidge Service Station<br>521 Kershaw Highway | 55 | Negligible | | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Gate Petroleum Co.<br>P. O. Box 2367 | 55 | 10 | 12 | 13 |
| 2440 | | Southern Screen Engraving Inc.<br>Box 1010 Lancaster | 7 | 10 | 11 | 12 |
| 2440 | | Heath Springs Dry Cleaners<br>Box 327 Heath Springs | 72 | 4 | 5 | 6 |
| 2440 | | Stanton Cleaning Inc.<br>126 S. Main | 72 | 2 | 2 | 3 |
| 2440 | | 60 Minute Cleaners<br>1160 Cherry Road | 72 | 16 | 19 | 23 |
| 2440 | | Horne's Laundry & Cleaners<br>202 Spratt | 72 | 2 | 2 | 3 |
| 2440 | | Boones Highlander Center<br>1144 Mt. Gallant Rd. | 72 | 3 | 4 | 4 |
| 2440 | | Campbell Laundry & Dry Cleaner<br>114 Academy | 72 | 6 | 7 | 9 |
| 2440 | | One Hour Martinizing<br>121 Caldwell St. | 72 | 10 | 12 | 14 |
| 2440 | | Sawyer Dry Cleaning Co.<br>325 S. Cherry Road | 72 | 21 | 26 | 30 |
| 2440 | | Sherer's Cleaners<br>320 Dave Lyle Blvd. | 72 | 5 | 6 | 7 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Murdock Sign Co.<br>P. O. Box 3174, Rock Hill | 39 | 4 | 4 | 5 |
| 2440 | | Edward's Body Shop<br>1140 E. Black St. | 75 | 2 | 2 | 3 |
| 2440 | | Morris Grocery, Clover | 55 | 5 | 6 | 7 |
| 2440 | | Brandon's Grocery, York | 55 | 3 | 3 | 4 |
| 2440 | | Pattersons Grocery Smyrna | 55 | 1 | 1 | 1 |
| 2440 | | 2101 Cherry Road Rock Hill | 55 | 7 | 8 | 9 |
| 2440 | | 1001 Oakland Ave., Rock Hill | 55 | 8 | 9 | 10 |
| 2440 | | 203 Salvda Hwy. Rock Hill | 55 | 3 | 3 | 4 |
| 2440 | | I-77 Carowinds Blvd, Fort Mill | 55 | 8 | 9 | 10 |
| 2440 | | Gardners 66 SS<br>427 E. Main St. Rock Hill | 55 | 2 | 2 | 2 |
| 2440 | | Davis Superette<br>Porter Rd. Rock Hill | 55 | 1 | 1 | 1 |
| 2440 | | Cooks Garage<br>116 Massey, Fort Mill | 55 | | Negligible | |
| 2440 | | Gladden Gro.<br>Ebenezer Rd. Rock Hill | | 1 | 1 | 1 |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

## (TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | S & F. Grocery<br>Route 3, Rock Hill | 55 | 1 | 1 | 1 |
| 2440 | | Nichols, Rt. 2, Rock Hill | 55 | 1 | 1 | 1 |
| 2440 | | Bobs Superette<br>Highway 327 Clover | 55 | | Negligible | |
| 2440 | | Riverview Superette<br>Highway 274 Clover | 55 | | Negligible | |
| 2440 | | Miller Oil Co.Hwy. 5, York | 55 | | Negligible | |
| 2440 | | Boyd's Superette<br>Hwy 321, York | 55 | | Negligible | |
| 2440 | | B & F Sales<br>Ebenezer Rd. Rock Hill | 55 | | Negligible | |
| 2440 | | Busy Bee Groc. Rock Hill | 55 | | Negligible | |
| 2440 | | Leslie Amoco, Leslie | 55 | | Negligible | |
| 2440 | | Porters Amoco, Rock Hill | 55 | | Negligible | |
| 2440 | | Hands Self Serve, Clover | 55 | | Negligible | |
| 2440 | | York Amoco Cherry Rd. Rock Hill | 55 | | Negligible | |
| 2440 | | Moss Amoco Clover | 55 | | Negligible | |
| 2440 | | Montgomery's, York | 55 | | Negligible | |

## SUMMARY OF VOC POINT SOURCE EMMISSION INVENTORY

YORK COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 2-DIGIT SIC | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| 2440 | | Mt. Gallant Sup. Rock Hill | 55 | Negligible | | |
| 2440 | | Mozingo's Self Serve Cherry Road | 55 | 9 | 10 | 12 |
| 2440 | | Fred's Shell Cherry Road | 55 | 2 | 2 | 3 |
| 2440 | | Mr. Zips, Highway 5 | 55 | 3 | 3 | 4 |
| 2440 | | Mr. Zips, Hwy. 161 | 55 | 3 | 3 | 4 |
| 2440 | | Mr. Zips, Willowbrook Ave. | 55 | 3 | 3 | 4 |
| 2440 | | Pinetuck Grocery, Hwy 901 | 55 | 2 | 2 | 3 |
| 2440 | | Ludlums Grocery Lesslie | 55 | 2 | 2 | 3 |
| 2440 | | Shaver's Grocery, Lesslie | 55 | 1 | 1 | 1 |
| 2440 | | Fowler's Grocery, Hwy 21 | 55 | 1 | 1 | 1 |
| 2440 | | Sawyer's Grocery, India Hook Rd. | 55 | 2 | 2 | 3 |
| 2440 | | Browine's Sales & Ser, Sharion | 55 | 3 | 3 | 4 |
| 2440 | | Southern Wholesalers 1144 Black St. | 75 | 1 | 1 | 1 |
| 2440 | | York Body Shop York SC McNeel St. | 75 | 1 | 1 | 1 |
| 2440 | | Hwy 21 & Hwy 21 By Pass Rock Hill, S.C. | 55 | 3 | 3 | 4 |

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY
RICHLAND COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | EMISSIONS* TYP 1977 | 1982 TYP & 1987 |
|---|---|---|---|---|
| 1900 | 0025 | Keenan Oil-Columbia | 32 | 1.41 |
| 1900 | 0026 | Benson Oil-Columbia | 22 | 0.98 |
| 1900 | 0027 | Barnett Oil-Columbia | 18 | 0.70 |
| 1900 | 0028 | Couch Oil-Columbia | 17 | 0.71 |
| 1900 | 0029 | Oil Service Co.-Columbia | 2 | 0.21 |
| 1900 | 0030 | Associated Oil-Columbia | 14 | 0.64 |
| 1900 | 0031 | Eastover Oil Co.-Eastover | 5 | 0.20 |
| 1900 | 0032 | Blythewood Oil-Blythewood | 9 | 0.42 |
| | | Total | 119 | 5.27 |

*Some 1977 Emissions Inventories not fully completed and Emissions have been estimated using available data.

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY
LEXINGTON COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | EMISSIONS* TYP 1977 | 1982 | TYP & 1987 |
|---|---|---|---|---|---|
| 1560 | 0024 | Slover Oil-Batesburg | 5 | | 0.21 |
| 1560 | 0025 | Owen Oil-Batesburg | 12 | | 0.78 |
| 1560 | 0026 | Barnes Oil-Batesburg | 17 | | 0.81 |
| 1560 | 0027 | Havird Oil-Batesburg | 7 | | 0.31 |
| 1560 | 0028 | Hall Oil-Batesburg | 9 | | 0.43 |
| 1560 | 0029 | Bodie Oil-Leesville | 10 | | 0.64 |
| 1560 | 0030 | Schumpert Oil-Leesville | 11 | | 0.55 |
| 1560 | 0031 | Harmon Oil-Lexington | 6 | | 0.22 |
| 1560 | 0032 | Schumpert Oil-Pelion | 26 | | 1.18 |
| 1560 | 0033 | Tri-City Fuel & Htg.-W. Cola. | 12 | | 0.51 |
| 1560 | 0034 | Public Oil-West Columbia | 16 | | 0.74 |
| | | Total | 131 | | 6.38 |

*Some 1977 Emissions Inventories not fully completed and Emissions have been estimated using available data.

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY
BERKELEY COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | EMISSIONS* TPY 1977 | TPY 1982 & 1987 |
|---|---|---|---|---|
| 0420 | 0018 | Belangia Oil Co.-St. Stephen | 7 | 0.48 |
| 0420 | 0019 | Thornley Oil Co.-Moncks Corner | 14 | 0.90 |
| 0420 | 0020 | W. Reeves Lewis-Moncks Corner | 6 | 0.31 |
| 0420 | 0021 | Suburban Gas-Summerville | 15 | 0.75 |
| | | Total | 42 | 2.44 |

*Some 1977 Emissions Inventories not fullycompleted and Emissions have been estimated using available data.

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY
CHARLESTON COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | EMISSIONS* TYP 1977 | 1982 TYP & 1987 |
|---|---|---|---|---|
| 0560 | 0147 | Wilson Oil, Tire, & Battery - McClellanville | 12 | 0.56 |
| 0560 | 0148 | Soloman Oil Co.-Charleston | 29 | 1.35 |
| 0560 | 0149 | Cel Oil Products Corp.-N. Chas. | 8 | 0.53 |
| 0560 | 0150 | F. Gregorie & Sons-Mt. Pleasant | 9 | 0.40 |
| 0560 | 0151 | Hay Oil Distributors-Charleston | 32 | 1.49 |
| 0560 | 0152 | Port Oil Co. - Charleston | 32 | 1.96 |
| 0560 | 0153 | Seabrook Oil Co.-Charleston | 8 | 0.33 |
| 0560 | 0154 | Youmans Gas & Oil Co.-Meggett | 17 | 0.88 |
| 0560 | 0155 | M&M Oil Inc.-Johns Island | 3 | 0.21 |
| 0560 | 0156 | Tri County Ice & Fuel-N. Chas. | 12 | 0.50 |
| | | Total | 162 | 8.21 |

*Some 1977 Emissions Inventories not full completed and Emissions have been estimated using available data.

SUMMARY OF VOC POINT SOURCE EMISSION INVENTORY
CHARLESTON COUNTY
(TONS/YEAR)

| IDENTIFICATION NUMBER COUNTY | PLANT | COMPANY NAME AND ADDRESS | 1977 EMISSIONS* |
|---|---|---|---|
| 0560 | 0015 | Exxon Refining Company<br>P. O. Box 10407 | |
| 0560 | 0020 | Gulf Oil Company<br>P. O. Box 10128 | |
| 0560 | 0022 | Amerada Hess Corporation<br>8140 Virginia Avenue | |
| 0560 | 0038 | Phillips Petroleum<br>5166 Virginia Avenue | |
| 0560 | 0039 | Texaco Sales Terminal<br>P. O. Box 5226 | |
| 0560 | 0146 | Shell Oil Company<br>P. O. Box 5267 | |

* Completed 1977 Emissions Inventories have not been returned to this office.

# BASELINE AND PROJECTED EMISSION INVENTORIES FOR NONATTAINMENT AREAS IN SOUTH CAROLINA

CONTRACT 68-02-2869

TASK DIRECTIVE NO. 11

DRAFT REPORT

Submitted to

U. S. Environmental Protection Agency
Region IV
345 Courtland Street, N. E.
Atlanta, Georgia 30309

and

South Carolina Department of Health
and Environmental Control
Bureau of Air Quality Control

Submitted by

Engineering-Science
7903 Westpark Drive
McLean, Virginia 22102

October 1978

TABLE 3

VEHICLE CLASSIFICATION SUMMARY

| Vehicle Type | Interstate System Per Cent | Federal-Aid Primary System Per Cent | Other State Primary System Per Cent | State Secondary System[4] Per Cent |
|---|---|---|---|---|
| Passenger Cars | | | | |
| Local | 41.8 | 66.6 | 74.9 | 73.2 |
| Foreign | 24.0 | 10.3 | 3.7 | 2.8 |
| Subtotal | 65.8 | 76.9 | 78.6 | 76.0 |
| Lt. Tr'l Units | | | | |
| Passenger Cars | 1.0 | 0.6 | 0.2 | 0.4 |
| Other | 0.8 | 0.4 | 0.3 | 0.4 |
| Subtotal | 1.8 | 1.0 | 0.5 | 0.8 |
| Single Unit Trucks: | | | | |
| Panel, Pickup | 7.4 | 13.2 | 15.3 | 16.8 |
| Single Rear Tire | 0.7 | 0.4 | 0.2 | 0.2 |
| Dual Rear Tire | 3.3 | 3.0 | 2.7 | 3.2 |
| 3-Axle | 0.3 | 0.4 | 0.3 | 1.4 |
| Tractor Semi-Trlrs. | | | | |
| 3-Axle | 0.3 | 0.1 | 0.1 | 0.1 |
| 4-Axle | 3.3 | 0.9 | 0.3 | 0.3 |
| 5-Axle or more | 16.8 | 3.7 | 1.5 | 0.6 |
| Subtotal All Trucks | 32.1 | 21.7 | 20.4 | 22.6 |
| Buses | 0.2 | 0.3 | 0.4 | 0.5 |
| Motorcycles | 0.1 | 0.1 | 0.1 | 0.1 |
| Total: All Vehicles | 100.0 | 100.0 | 100.0 | 100.0 |

Extracted from Traffic Summary for Calendar Year 1976, South Carolina State Highway Department.

Table 3 has been extracted from Traffic Summary for Calendar Year 1976, South Carolina State Highway Department. It is a summary of vehicle classification counts obtained at key stations during the year. This table shows that there are significant differences in the composition of traffic according to road class. Note, for example, that the highest percentage of heavy duty trucks is found on the interstate system. Engineering-Science used the guidance provided by these vehicle classification summaries to assign a vehicle class distribution to the specific road classes. This assignment, the hot/cold start percentages mentioned above, and an elaboration of the average speed assumptions to include York County, are presented in Table 4.

The travel characteristics assumed for York County differ somewhat from those assumed in the report submitted previously. However, the traffic summary for 1976 and the data submitted by DHPT in Tables 1 and 2 were not available for the earlier report. These emission estimates for York County, then, must be considered as an update of those reported previously.

## EMISSION FACTORS

The NMHC emission factors computed for these travel scenarios are presented in Table 5. They have been tabulated by road class and by county, the primary difference between the counties being the estimated speeds on several of the road classes. The effect of the Federal Motor Vehicle Control Program is clearly and dramatically shown in the reduction evident from 1977 to 1987. It is on the order of 70%.

Emission factors were also calculated under the assumption that a strong inspection/maintenance program was begun in 1981. A stringency, or failure rate, of 30% was assumed and, in addition, mechanics training was assumed. The results are presented in Table 6. Note that the effect is small in 1981, on the order of 5% reduction. However, by 1987 a reduction of more than 20% is realized in most cases.

Emission factors for carbon monoxide without and with inspection/maintenance are given in Tables 7 and 8. Note that these emission factors cannot be applied to other travel scenarios than those defined for this study. They are composite emission factors and so the vehicle mix is specified as well as physical parameters.

## TABLE 2

## CHARACTERISTICS OF VARIOUS TRAVEL SCENARIOS

AVERAGE SPEEDS*

| | Freeway | Arterial | Collector | Local |
|---|---|---|---|---|
| Berkeley | none | 34 | 31 | 23 |
| Charleston | 48 | 32 | 28 | 18 |
| Lexington | 50 | 33 | 30 | 23 |
| Richland | 50 | 31 | 29 | 20 |
| Rural | 59 | 55 | 48 | 40 |

*Urban speeds based on urban transportation study data.
Rural speeds based on statewide rural speed study.

OPERATING MODE:

Cold Start (catalyst and non-catalyst) = 21%

Hot Start (catalyst and non-catalyst) = 27%

EQUIPMENT FACTORS:

| | Air Conditioning Being Used | 500-Pound Extra Load | Hauling Trailers |
|---|---|---|---|
| LDV | 66% | 4% | 2% |
| $LDT_1$ | 25% | 20% | - |
| $LDT_2$ | 25% | 25% | - |

OTHER FACTORS

Temperature, 75°F; humidity, 75 grains per pound

Provided by South Carolina Dept. of Highways and Public Transportation.

TABLE 1

VEHICLE REGISTRATION DATA

SOUTH CAROLINA; 1976

| Age of Vehicles | Autos | Percent of Registration (by type) Light Duty Trucks* $LDT_1$ | $LDT_2$ | All Other Trucks |
|---|---|---|---|---|
| 1 | 6.7 | 3.2 | 3.2 | 7.4 |
| 2 | 9.8 | 5.2 | 5.2 | 10.6 |
| 3 | 11.9 | 5.3 | 5.3 | 12.7 |
| 4 | 10.9 | 4.9 | 4.9 | 10.8 |
| 5 | 8.6 | 3.2 | 3.2 | 6.8 |
| 6 | 8.5 | 3.2 | 3.2 | 6.8 |
| 7 | 8.6 | 3.8 | 3.8 | 7.4 |
| 8 | 7.5 | 2.9 | 2.9 | 5.9 |
| Other than 8 | 27.5 | 18.3 | 18.3 | 31.8 |
| TOTAL | 100.0. | 50.0 | 50.0 | 100.0 |
| Percent of total registration | 80.6 | 16.1 | | 3.3 |

Provided by South Carolina Department of Highways and Public Transportation.

*$LDT_1$ indicates trucks with gross vehicle weight between 0 and 6000 pounds; $LDT_2$, between 6000 and 8500 pounds.

to the VMT data provided or, in the case of York County, estimated in house. The calculations were made twice so that the potential impact of inspection/maintenance could be assessed.

This report documents these actions and presents the NMHC and CO emissions from highway vehicles for 1977, 1982 and 1987 for five South Carolina counties.

MOBILE I INPUT

Tables 1 and 2 present the data transmitted to Engineering-Science as input data for the emission factor program. The vehicle registration data was used to establish the age distribution of South Carolina's highway vehicles. It was necessary to assume that both heavy duty gasoline trucks (HDG) and heavy duty diesel trucks (HDD) had the same age distribution since no distinction was indicated. Moreover, since the percent of vehicles is each model year up to 20 years of age is required for the model, it was necessary to assign estimates for ages 9 to 20. The national average was used for guidance and the residual percentage in the over 8 years category was assigned so as to fit the given data smoothly and then parallel the national average. Finally, the national age distribution for motorcycles was used.

The other travel characteristics were entered as required, except that the hot/cold start operational mode percentages were modified. The transmitted data actually indicated that default values should be used and Engineering-Science interpreted this to mean the percentages used in the Federal Test Procedure, 21% cold start and 27% hot start. These percentages might be suitable for a regional study that does not consider various road classes, but should be modified for more detailed studies such as this. Therefore, Engineering-Science made road class specific estimates not inconsistent with their previous estimates in the York County emission inventory cited and consistent with EPA-450/3-77-023, Determination of Percentages of Vehicles Operating in the Cold Start Mode by T. P. Midurski and A. H. Castaline of GCA Corp. The suggested temperature of 75°F was used even though it was not the annual average temperature. It is a very typical value for much of the driving in South Carolina, including the morning peak hour driving during the oxidant season.

## SOUTH CAROLINA HIGHWAY EMISSIONS

Engineering-Science has been assisting the South Carolina Department of Health and Environmental Control compile an inventory of hydrocarbon emission sources in those counties which are nonattaining for oxidants: Berkeley, Charleston, Lexington, Richland and York. Task directive 8, of Contract No. 68-02-2869 with U. S. Environmental Protection Agency, Region IV, Atlanta, Georgia specifically directs Engineering-Science to assist in the NMHC mobile source emission inventory. This report covers the hydrocarbon emissions from highway vehicles which comprise the dominant mobile source. In addition, carbon monoxide emissions have been calculated since the cities of Rock Hill and Columbia have been designated as non-attaining for this pollutant.

In cooperation with transportation specialists of the Department of Highways and Public Transportation, Engineering-Science surveyed the data available at DHPT and found it to be adequate for emission inventory purposes, though not in directly usable format. Engineering-Science later conducted a seminar on EPA's emission factor program, Mobile I, for both DHEC and DHPT personnel stressing the data input requirements and the need to have transportation personnel reformat, interpolate and extend transportation data. Detailed travel data were required with as much disaggregation as possible into vehicle classes, road classes and physical characteristics of the travel. VMT were needed for the base year and two projection years, again disaggregated to the degree possible.

Travel scenarios and VMT data for Berkeley, Charleston, Lexington, and Richland counties were subsequently provided to Engineering-Science. These had been prepared by DHPT personnel and reviewed by the Charleston and Columbia municipal planning organizations. No data were provided for York County because DHPT personnel indicated they had no basis for modifying the emissions estimated for York County in an earlier, though unrelated report by Engineering-Science. This task, then, was accomplished by reviewing and refining the travel data provided for various highway classifications for four counties; supplementing them with data for York County; computing emission factors with the Mobile I program and these input data; and applying the emission factors

# SOUTH CAROLINA

# HIGHWAY EMISSIONS

# FOR

# CONTRACT 68-02-2869

# TASK ORDER NO. 8

FINAL REPORT

Submitted to

U.S. Environmental Protection Agency
Region IV
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

and

South Carolina Department of Health
and Environmental Control
Bureau of Air Quality Control

Submitted by

Engineering-Science, Inc.
7903 Westpark Drive
McLean, Virginia 22102

October 1978

Appendix E - ITEM 4

VOC Mobil Source Inventory*

*See Attached

TABLE A-2 (CONTINUED)

SUMMARY OF CARBON MONOXIDE AREA SOURCE EMISSION

CITY OF ROCK HILL
(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| Miscellaneous | | | |
| Solid Waste | | | |
| Incineration | 3 | 4 | 3 |
| Internal Combustion | | | |
| Construction Equipment | 2 | 3 | 4 |
| Small Gasoline Engines | 180 | 191 | 201 |
| Wildfires | | | |
| Structural Fires | 29 | 32 | 32 |
| TOTAL | 339 | 355 | 364 |

TABLE A-1

SUMMARY OF CARBON MONOXIDE AREA SOURCE EMISSION

CITY OF COLUMBIA
(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| Fuel Combustion | | | |
| Residential | 41 | 42 | 43 |
| Commercial/Institutional | 21 | 23 | 25 |
| Industrial | 14 | 15 | 16 |
| Transportation | | | |
| Aircraft | -- | -- | -- |
| Railroads | 12 | 14 | 16 |
| Miscellaneous | | | |
| Solid Waste | | | |
| Incineration | 9 | 10 | 0 |
| Internal Combustion | | | |
| Construction Equipment | 11 | 12 | 13 |
| Small Gasoline Engines | 557 | 564 | 580 |
| Wildfires | | | |
| Structural Fires | 90 | 93 | 95 |
| TOTAL | 755 | 776 | 797 |

TABLE A-2

SUMMARY OF CARBON MONOXIDE AREA SOURCE EMISSION

CITY OF ROCK HILL
(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| Fuel Combustion | | | |
| Residential | 100 | 96 | 90 |
| Commercial/Institutional | 8 | 10 | 12 |
| Industrial | -- | -- | -- |
| Transportation | | | |
| Aircraft | -- | -- | -- |
| Railroads | 17 | 19 | 22 |

## APPENDIX A

## AREA SOURCE CARBON MONOXIDE EMISSION INVENTORY

The cities of Columbia and Rock Hill have been designated as nonattainment areas for carbon monoxide. Area sources of carbon monoxide are primarily combustion sources. In the main body of the report each of the area source categories was discussed, activity data presented, and VOC emissions calculated. In Tables A-1 and A-2 the carbon monoxide emissions by area source category are summarized.

The area source emissions with each city were determined by calculating the county-wide area source emissions and disaggregating the county-wide estimates based upon the ratio between the city's population and the county's. The following estimates of the population of the two cities were used:

| | 1977 | 1982 | 1987 |
|---|---|---|---|
| Columbia | 112,200 | 114,200 | 117,100 |
| Rock Hill | 36,300 | 38,500 | 40,700 |

It was assumed that no emissions from the following categories would occur inside the city limits: vessels, open burning, agricultural equipment, forest fires, and prescribed burning.

TABLE V-5

SUMMARY OF VOLATILE ORGANIC COMPOUND AREA SOURCE EMISSIONS

YORK COUNTY

(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| FUEL COMBUSTION | | | |
| Residential | 20 | 20 | 19 |
| Commercial/Institutional | 7 | 8 | 10 |
| Industrial | - | - | - |
| TRANSPORTATION | | | |
| Aircraft | 3 | 5 | 6 |
| Vessels | 420 | 470 | 516 |
| Railroads | 60 | 75 | 90 |
| EVAPORATIVE LOSSES | | | |
| Surface Coating | 2 | 3 | 3 |
| Asphalt Paving | 217 | 238 | 262 |
| MISCELLANEOUS | | | |
| Solid Waste | | | |
| Incineration | 2 | 3 | 3 |
| Open Burning | 217 | 238 | 262 |
| Internal Combustion | | | |
| Construction Equipment | 2 | 3 | 3 |
| Agricultural Equipment | 82 | 83 | 86 |
| Small Gasoline Engines | 77 | 85 | 94 |
| Wildfires | | | |
| Forest Fires | 12 | 10 | 10 |
| Prescribed Burning | 1 | - | - |
| Structural Fires | 13 | 15 | 16 |
| TOTAL | 1375 | 1518 | 1684 |

TABLE V-4

SUMMARY OF VOLATILE ORGANIC COMPOUND AREA SOURCE EMISSIONS

RICHLAND COUNTY

(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| FUEL COMBUSTION | | | |
| Residential | 25 | 26 | 28 |
| Commercial/Institutional | 18 | 21 | 23 |
| Industrial | 13 | 14 | 15 |
| TRANSPORTATION | | | |
| Aircraft | - | - | - |
| Vessels | 99 | 105 | 112 |
| Railroads | 20 | 24 | 28 |
| EVAPORATIVE LOSSES | | | |
| Surface Coating | 1127 | 1199 | 1274 |
| Asphalt Paving | 131 | 163 | 196 |
| MISCELLANEOUS | | | |
| Solid Waste | | | |
| Incineration | 6 | 7 | 7 |
| Open Burning | 503 | 536 | 570 |
| Internal Combustion | | | |
| Construction Equipment | 8 | 9 | 10 |
| Agricultural Equipment | 54 | 55 | 55 |
| Small Gasoline Engines | 204 | 217 | 230 |
| Wildfires | | | |
| Forest Fires | 112 | 89 | 89 |
| Prescribed Burning | 323 | 274 | 274 |
| Structural Fires | 35 | 38 | 40 |
| TOTAL | 2678 | 2777 | 2951 |

TABLE V-3

SUMMARY OF VOLATILE ORGANIC COMPOUND AREA SOURCE EMISSIONS

LEXINGTON COUNTY

(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| FUEL COMBUSTION | | | |
| Residential | 10 | 12 | 14 |
| Commercial/Institutional | 3 | 4 | 4 |
| Industrial | 11 | 12 | 13 |
| TRANSPORTATION | | | |
| Aircraft | 73 | 89 | 104 |
| Vessels | 1314 | 1590 | 1850 |
| Railroads | 17 | 20 | 23 |
| EVAPORATIVE LOSSES | | | |
| Surface Coating | 570 | 689 | 802 |
| Asphalt Paving | 73 | 91 | 109 |
| MISCELLANEOUS | | | |
| Solid Waste | | | |
| Incineration | 3 | 4 | 5 |
| Open Burning | 264 | 316 | 366 |
| Internal Combustion | | | |
| Construction Equipment | 5 | 5 | 6 |
| Agricultural Equipment | 264 | 108 | 108 |
| Small Gasoline Engines | 103 | 125 | 145 |
| Wildfires | | | |
| Forest Fires | 44 | 35 | 35 |
| Prescribed Burning | 97 | 83 | 83 |
| Structural Fires | 18 | 22 | 25 |
| TOTAL | 2712 | 3080 | 3547 |

TABLE V-2

SUMMARY OF VOLATILE ORGANIC COMPOUND AREA SOURCE EMISSIONS

CHARLESTON COUNTY

(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| FUEL COMBUSTION | | | |
| Residential | 22 | 23 | 23 |
| Commercial/Institutional | 8 | 8 | 9 |
| Industrial | 1 | 1 | 1 |
| TRANSPORTATION | | | |
| Aircraft | 326 | 363 | 276 |
| Vessels | 183 | 199 | 214 |
| Railroads | 100 | 119 | 140 |
| EVAPORATIVE LOSSES | | | |
| Surface Coating | 1224 | 1306 | 1380 |
| Asphalt Paving | 165 | 206 | 247 |
| MISCELLANEOUS | | | |
| Solid Waste | | | |
| Incineration | 7 | 7 | 8 |
| Open Burning | 536 | 573 | 606 |
| Internal Combustion | | | |
| Construction Equipment | 11 | 13 | 14 |
| Agricultural Equipment | 46 | 49 | 51 |
| Small Gasoline Engines | 221 | 236 | 249 |
| Wildfires | | | |
| Forest Fires | 118 | 94 | 94 |
| Prescribed Burning | 1691 | 713 | 713 |
| Structural Fires | 38 | 41 | 43 |
| TOTAL | 4697 | 3951 | 4168 |

TABLE V-1

SUMMARY OF VOLATILE ORGANIC COMPOUND AREA SOURCE EMISSIONS

BERKELEY COUNTY

(TONS/YEAR)

| SOURCE CATEGORY | 1977 | 1982 | 1987 |
|---|---|---|---|
| FUEL COMBUSTION | | | |
| Residential | 15 | 15 | 15 |
| Commercial/Institutional | - | - | - |
| Industrial | - | - | - |
| TRANSPORTATION | | | |
| Aircraft | 34 | 72 | 79 |
| Vessels | 1187 | 1358 | 1524 |
| Railroads | 73 | 87 | 102 |
| EVAPORATIVE LOSSES | | | |
| Surface Coating | 345 | 295 | 443 |
| Asphalt Paving | 79 | 99 | 119 |
| MISCELLANEOUS | | | |
| Solid Waste | | | |
| Incineration | 2 | 2 | 3 |
| Open Burning | 156 | 178 | 200 |
| Internal Combustion | | | |
| Construction Equipment | 5 | 5 | 6 |
| Agricultural Equipment | 62 | 67 | 70 |
| Small Gasoline Engines | 62 | 71 | 80 |
| Wildfires | | | |
| Forest Fires | 236 | 188 | 188 |
| Prescribed Burning | 2010 | 1706 | 1706 |
| Structural Fires | 11 | 12 | 14 |
| TOTAL | 4277 | 4755 | 7549 |

# CHAPTER V

## SUMMARY OF EMISSIONS

Area source VOC emissions are summarized in Tables V-1 through V-5. The methodology used in projecting emissions does not generally account for changes that may result from regulatory action. For example, waterborne paints may become more widespread because of EPA efforts to curb solvent usage. Similarly, the inventory does not account for the seasonal variations in emissions. Only 2% of all prescribed burning occurs during the summer months. More detailed analysis may be required before certain data presented herein can be used to develop oxidant control strategies.

TABLE IV-19 (CONTINUED)

STRUCTURAL FIRE EMISSIONS

| COUNTY | YEAR | NUMBER OF EQUIVALENT HOUSES | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Richland | 1977 | 141.6 | 35 |
| | 1982 | 150.6 | 38 |
| | 1987 | 160.1 | 40 |
| York | 1977 | 53.5 | 13 |
| | 1982 | 59.1 | 15 |
| | 1987 | 65.5 | 16 |

TABLE IV-18

FOREST FIRE AND PRESCRIBED BURNING EMISSIONS

| COUNTY | YEAR | FOREST FIRES ACRES BURNED | FOREST FIRES EMISSIONS (TONS/YEAR) | PRESCRIBED ACRES BURNED | PRESCRIBED EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|---|
| Berkeley | 1977 | 2,185 | 236 | 55,827 | 2,010 |
| | 1982 | 1,744 | 188 | 47,392 | 1,706 |
| | 1987 | 1,744 | 188 | 47,392 | 1,706 |
| Charleston | 1977 | 1,094 | 118 | 46,971 | 1,691 |
| | 1982 | 873 | 94 | 19,793 | 713 |
| | 1987 | 873 | 94 | 19,793 | 713 |
| Lexington | 1977 | 404 | 44 | 2,703 | 97 |
| | 1982 | 322 | 35 | 2,295 | 8383 |
| | 1987 | 322 | 35 | 2,295 | 83 |
| Richland | 1977 | 1,037 | 112 | 8,975 | 323 |
| | 1982 | 828 | 89 | 7,619 | 274 |
| | 1987 | 828 | 89 | 7,619 | 274 |
| York | 1977 | 114 | 12 | 15 | 1 |
| | 1982 | 91 | 10 | 13 | -- |
| | 1987 | 91 | 10 | 13 | -- |

TABLE IV-19

STRUCTURAL FIRE EMISSIONS

| COUNTY | YEAR | NUMBER OF EQUIVALENT HOUSES | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 43.3 | 11 |
| | 1982 | 49.6 | 12 |
| | 1987 | 55.7 | 14 |
| Charleston | 1977 | 153.8 | 38 |
| | 1982 | 164.1 | 41 |
| | 1987 | 173.4 | 43 |
| Lexington | 1977 | 71.7 | 18 |
| | 1982 | 86.7 | 22 |
| | 1987 | 100.9 | 25 |

TABLE IV-17

SMALL GASOLINE ENGINE EMISSIONS

| COUNTY | YEAR | FUEL USAGE (1,000 GALLONS) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 203 | 62 |
| | 1982 | 232 | 71 |
| | 1987 | 261 | 80 |
| Charleston | 1977 | 721 | 221 |
| | 1982 | 769 | 236 |
| | 1987 | 813 | 249 |
| Lexington | 1977 | 336 | 103 |
| | 1982 | 406 | 125 |
| | 1987 | 473 | 145 |
| Richland | 1977 | 664 | 204 |
| | 1982 | 706 | 217 |
| | 1987 | 750 | 230 |
| York | 1977 | 251 | 77 |
| | 1982 | 277 | 85 |
| | 1987 | 307 | 94 |

Prescribed burning in Charleston County has fluctuated greatly during the last eight years. The eight-year averages for Berkeley and Charleston Counties were used as projections for each of these counties. The proportion of acres burned in Berkeley during the latest fiscal year to the eight year average was used to project the other counties. Emissions from forest fires and prescribed burning are shown in Table IV-18.

The average per capita loss from fire in the Untied States during 1974 was $15.09. The median value of a house in 1974 was $27,200. Tnus, 0.55 equivalent houses per 1,000 people were totally destroyed by fire. Assuming that this value will not change substantially and that the average house contains 16.8 tons of wood (based on an average 1,500 sq. ft. house) and four tons of furniture, emissions from structural fires were calculated. These emission estimates are given in Table IV-19.

TABLE IV-16

AGRICULTURAL EQUIPMENT EMISSIONS

| COUNTY | YEAR | GASOLINE (1,000 GALLONS) | DIESEL (1,000 GALLONS) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|
| Berkeley | 1977 | 570 | 143 | 62 |
| | 1982 | 617 | 155 | 67 |
| | 1987 | 642 | 161 | 70 |
| Charleston | 1977 | 418 | 104 | 46 |
| | 1982 | 453 | 113 | 49 |
| | 1987 | 471 | 117 | 51 |
| Lexington | 1977 | 980 | 245 | 107 |
| | 1982 | 991 | 248 | 108 |
| | 1987 | 991 | 248 | 108 |
| Richland | 1977 | 498 | 124 | 54 |
| | 1982 | 504 | 125 | 55 |
| | 1987 | 504 | 125 | 55 |
| York | 1977 | 756 | 189 | 82 |
| | 1982 | 758 | 190 | 83 |
| | 1987 | 785 | 196 | 86 |

National data indicates that there is approximately one small gasoline engine per every five people (AP-42 reports a total of 44 million units in 1970). If it is assumed that each unit uses 13 gallons of gasolien per year, emissions from such engines can be calculated. (Volume 7 of the AQMA Guidelines suggests 13 gallons per person but fuel usage rates found in AP-42 suggest that 13 gallons per unit is more realistic). Emissions from small gasoline engines and fuel usage based upon population are given in Table IV-17.

Wildfires

The South Carolina State Commission of Forestry provided data for the 1977-1978 fiscal year on forest fires and prescribed burning. It was assumed that 9 tons/acre of fuel would be available for forest fires but only 3 tons/acre for prescribed burning. Statewide forest fire data from 1969-1978 and prescribed burning data for Berkeley and Charleston Counties for 1970-1978 were also provided. The proportion of acres burned in the state during the 1977 fiscal year to the long-term average for the state was used to project forest fires.

TABLE IV-14 (CONTINUED)

OPEN-BURNING EMISSIONS

| COUNTY | YEAR | WASTE BURNED (TONS/YEAR) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| York | 1977 | 14,462 | 217 |
| | 1982 | 15,838 | 238 |
| | 1987 | 17,460 | 262 |

TABLE IV-15

CONSTRUCTION EQUIPMENT EMISSIONS

| COUNTY | YEAR | FUEL USAGE (1,000 GALLONS) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 319 | 5 |
| | 1982 | 376 | 5 |
| | 1987 | 433 | 6 |
| Charleston | 1977 | 726 | 11 |
| | 1982 | 855 | 13 |
| | 1987 | 985 | 14 |
| Lexington | 1977 | 319 | 5 |
| | 1982 | 348 | 5 |
| | 1987 | 377 | 6 |
| Richland | 1977 | 550 | 8 |
| | 1982 | 600 | 9 |
| | 1987 | 651 | 10 |
| York | 1977 | 160 | 2 |
| | 1982 | 199 | 3 |
| | 1987 | 238 | 3 |

TABLE IV-13

ON-SITE INCINERATION EMISSIONS

| COUNTY | YEAR | WASTE INCINERATED (TONS/YEAR) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 1,313 | 2 |
| | 1982 | 1,503 | 2 |
| | 1987 | 1,688 | 3 |
| Charleston | 1977 | 4,659 | 7 |
| | 1982 | 4,972 | 7 |
| | 1987 | 5,254 | 8 |
| Lexington | 1977 | 2,171 | 3 |
| | 1982 | 2,625 | 4 |
| | 1987 | 3,055 | 5 |
| Richland | 1977 | 4,291 | 6 |
| | 1982 | 4,563 | 7 |
| | 1987 | 4,849 | 7 |
| York | 1977 | 1,622 | 2 |
| | 1982 | 1,790 | 3 |
| | 1987 | 1,992 | 3 |

TABLE IV-14

OPEN-BURNING EMISSIONS

| COUNTY | YEAR | WASTE BURNED (TONS/YEAR) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 10,406 | 156 |
| | 1982 | 11,873 | 178 |
| | 1987 | 13,302 | 200 |
| Charleston | 1977 | 35,760 | 536 |
| | 1982 | 38,207 | 573 |
| | 1987 | 40,432 | 606 |
| Lexington | 1977 | 17,604 | 264 |
| | 1982 | 21,082 | 316 |
| | 1987 | 24,388 | 366 |
| Richland | 1977 | 33,546 | 503 |
| | 1982 | 35,736 | 536 |
| | 1987 | 38,021 | 570 |

1,596 lbs/day was reported. In Charleston County, 28,152 lbs/day was reported. Assuming that the same per capita pounds of waste was incinerated in other counties for six days per week, incinerated waste for each year was calculated for each county based upon population. It was assumed that multiple-chamber incinerators are used for all incineration. Table IV-13 shows the emissions from on-site incineration.

Volume 7 of the AQMA Guidelines gives the following factors for estimating the amount of refuse open burning:

1. Residential - 122 tons/1,000 population year
2. Commercial/institutional - 12 tons/1,000 population/year
3. Industrial - 160 tons/1,000 manufacturing employees/year

Using these factors and the population and manufacturing employees projections from Chapter II, open burning tonnage and emissions were estimated and are shown in Table IV-14.

Slash burning, agricultural burning and frost control have not been reported in any of the five counties inventoried.

Internal Combustion

According to the 1974 Census of Agriculture, there were 45,312 farm tractors in South Carolina. Assuming that 20% of these burn diesel and that the average tractor consumes 1,000 gallons per year, the total diesel consumption by farm tractors would be 9,062.4 x $10^3$ gallons. EDR for 1974 reported 17,388 x $10^3$ gallons consumed in the state by off-highway vehicles. Thus, by subtraction, 8,325.6 x $10^3$ gallons were consumed in the state by construction equipment. With 76,000 contract construction employees in the state during 1974, average consumption per employee was 110 gallons/employee. Table IV-15 shows the baseline and projected construction equipment fuel usage calculated using this factor and the emissions.

It was assumed that 20% of the farm tractors reported in the Census of Agriculture burn diesel and the remainder burn gasoline. It was also assumed that 1,000 gallons/year is consumed by each tractor. Emissions were projected using the factors in Table II-6. Agricultural equipment fuel usage and emissions are shown in Table IV-16.

TABLE IV-11

SURFACE COATING EMISSIONS
(TONS/YEAR)

| COUNTY | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 345 | 395 | 443 |
| Charleston | 1,224 | 1,306 | 1,380 |
| Lexington | 570 | 689 | 802 |
| Richland | 1,127 | 1,199 | 1,274 |
| York | 426 | 470 | 523 |

TABLE IV-12

CUT-BACK ASPHALT USAGE AND EMISSIONS

| COUNTY | YEAR | USAGE (GALLONS) | EMISSIONS (TONS/YEAR) |
|---|---|---|---|
| Berkeley | 1977 | 60,257 | 79 |
| | 1982 | 75,322 | 99 |
| | 1987 | 90,387 | 119 |
| Charleston | 1977 | 125,396 | 165 |
| | 1982 | 156,746 | 206 |
| | 1987 | 188,096 | 247 |
| Lexington | 1977 | 55,424 | 73 |
| | 1982 | 69,279 | 91 |
| | 1987 | 83,134 | 109 |
| Richland | 1977 | 99,460 | 131 |
| | 1982 | 124,325 | 163 |
| | 1987 | 149,190 | 196 |
| York | 1977 | 45,903 | 60 |
| | 1982 | 57,378 | 75 |
| | 1987 | 68,853 | 90 |

## EVAPORATIVE LOSSES

VOC evaporative loss categories include petroleum marketing, dry cleaning, surface coating, and asphalt paving. Petroleum marketing and dry cleaning emissions were covered by the point source inventory. Major surface coating operations were included in the point source inventory.

Trade-paint application was not covered in the point source inventory. Trade-paint application refers to paint, enamel, varnish, etc., used by individuals and contractors for exterior and interior surface coating. The National Paint and Coating Association estimated that 2.1 gallons per capita (45% waterborne and 55% oil-based) are used on a national basis.

An emission factor of 1,120 lbs/ton of paint from AP-42 was used to estimate emissions from oil-based paints. The volatile section of waterborne paint ranges from 25 to 50% (35% of weighted average) by weight. Of this 5 to 20% (15% weighted average) are volatile organics. Thus, an emission factor of 5.25% by weight of waterborne paint was used. A density of 8.5 lbs/gal for waterborne paint and 13.0 lb/gal for oil-based paint was assumed. Although the usage of water-borne paint will probably increase, no assumptions concerning change in paints was made. Surface coating emissions were projected to increase with population. Table IV-11 presents emission data for surface coating.

DHEC obtained data on the usage of cut-back asphalt paving in each county for 1977, 1979, and 1981. These data were extrapolated to obtain usage rates for 1982 and 1987. The percentage of volatiles in the cut-back was estimated to be 30% and the density to be 8.75 lbs/gal. Table IV-12 shows the cut-back usage by county and the resulting emissions.

## MISCELLANEOUS SOURCES

Miscellaneous sources include solid waste disposal (on-site incineration, open burning, slash burning, and frost control), internal combustion (construction equipment, agricultural equipment, and small gasoline engines), and wildfires (forest fires, prescribed burning, and structural fires).

### Solid Waste Disposal

In the earlier particulate inventory in Berkeley and Charleston Counties, DHEC supplied data concerning on-site incineration. In Berkeley County in 1974,

TABLE IV-9

RAILROAD FUEL USAGE
(1,000 GALLONS)

| COUNTY | FUEL USAGE 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 1,561 | 1,854 | 2,178 |
| Charleston | 2,132 | 2,532 | 2,975 |
| Lexington | 362 | 425 | 500 |
| Richland | 434 | 510 | 599 |
| York | 660 | 776 | 911 |

TABLE IV-10

RAILROAD EMISSIONS
(TONS/YEAR)

| COUNTY | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 73 | 87 | 102 |
| Charleston | 100 | 119 | 140 |
| Lexington | 17 | 20 | 24 |
| Richland | 20 | 24 | 28 |
| York | 31 | 36 | 43 |

TABLE IV-7

VESSEL FUEL USAGE
(1,000 GALLONS)

| COUNTY | BOAT USAGE | FUEL TYPE | FUEL USAGE 1977 | 1982 | 1987 |
|---|---|---|---|---|---|
| Berkeley | --- | Distillate | 5,106 | 5,106 | 5,106 |
| | 13,404 | Gasoline | 2,145 | 2,455 | 2,757 |
| Charleston | --- | Residual | 8,849 | 11,943 | 15,037 |
| | --- | Distillate | 6,514 | 6,854 | 7,194 |
| | 1,806 | Gasoline | 289 | 308 | 326 |
| Lexington | 14,935 | Gasoline | 2,390 | 2,890 | 3,363 |
| Richland | 1,128 | Gasoline | 180 | 191 | 203 |
| York | 4,772 | Gasoline | 764 | 843 | 938 |

TABLE IV-8

VESSEL EMISSIONS
(TONS/YEAR)

| COUNTY | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 1,187 | 1,358 | 1,524 |
| Charleston | 183 | 199 | 214 |
| Lexington | 1,314 | 1,590 | 1,850 |
| Richland | 99 | 105 | 112 |
| York | 420 | 464 | 516 |

TABLE IV-6

BASELINE AND PROJECTED

AIRCRAFT EMISSIONS
(TONS/YEAR)

| COUNTY | EMISSIONS 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 34 | 72 | 79 |
| Charleston | 326 | 363 | 376 |
| Lexington | 73 | 89 | 104 |
| Richland | -- | -- | -- |
| York | 3 | 5 | 6 |

Boat registration data were obtained from the South Carolina Wildlife and Marine Resources Department. In those counties with no large recreational lakes, it was assumed that only 10% of the boats from the county would be used inside the county. It was assumed that 90% of the boats in the county in which a major lake is located and 30% of boats in surrounding counties use that lake. Gasoline usage was assumed to be 160 gallons/year/boat. Recreational boat usage was projected to increase with population.

Vessel fuel usage is presented in Table IV-7. Vessel emission are given in Table IV-8.

Railroads

Railroad fuel usage in Berkeley and Charleston Counties was provided for 1974 by the railroad operating companies. Railroad usage in York County for 1976 was estimated based upon the proportion of the states track mileage in the county and the state's railroad distillate fuel usage as reported in the Energy Data Reports. Railroad fuel usage in Lexington and Richland Counties was also estimated based upon the track mileage in those counties. A compound growth rate of 3.5% per year was used to project railroad fuel usage. Table IV-9 shows the railroad fuel usage by county and Table IV-10 shows the railroad emissions by county.

TABLE IV-5 (CONTINUED)

AIRCRAFT OPERATION DATA

| COUNTY | AIRPORT | TYPE OF AIRCRAFT | NUMBER OF ENGINES | LANDING/TAKEOFF OPERATIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| Charleston (Cont.) | Wilson Memorial | General Aviation | | | | |
| | | Piston | 1 | 3,638 | 5,175 | 6,712 |
| | John's Island | General Aviation | | | | |
| | | Busines Jet | 2 | 42 | 58 | 74 |
| | | Piston | 1 | 22,006 | 31,263 | 40,520 |
| Lexington | Columbia Municipal | Air Carrier | | | | |
| | | Medium Range Jet | 2 | 12,000 | 14,300 | 15,800 |
| | | Air Taxi | | | | |
| | | Turbo-Prop | 2 | 500 | 500 | 500 |
| | | General Aviation | | | | |
| | | Piston | 1 | 63,500 | 87,900 | 127,400 |
| York | York County | General Aviation | | | | |
| | | Piston | 1 | 9,705 | 22,844 | 35,983 |
| | | Piston | 2 | 863 | 2,031 | 3.199 |
| | | Business Jet | 2 | 215 | 506 | 797 |

TABLE IV-5

AIRCRAFT OPERATION DATA

| COUNTY | AIRPORT | TYPE OF AIRCRAFT | NUMBER OF ENGINES | LANDING/TAKEOFF OPERATIONS 1977 | 1982 | 1987 |
|---|---|---|---|---|---|---|
| Berkeley | Moncks Corner | General Aviation | | | | |
| | | Business Jet | 2 | 28 | 76 | 124 |
| | | Turbo-Prop | 2 | 28 | 84 | 140 |
| | | Piston Transport | 2 | 656 | 1,382 | 2,108 |
| | | Piston | 1 | 3,582 | 6,403 | 9,224 |
| | St. Stephens | General Aviation | | | | |
| | | Piston | 1 | 260 | 390 | 520 |
| | Pineville | General Aviation | | | | |
| | | Piston | 1 | 591 | 836 | 1,081 |
| Charleston | Charleston | Air Carrier | | | | |
| | | Long Range Jet | 4 | 487 | 487 | 487 |
| | | Medium Range Jet | 2 | 11,362 | 13,795 | 16,228 |
| | | Turbo-Prop | 2 | 1,027 | 757 | 487 |
| | | Air Taxi | | | | |
| | | Piston Transport | 1.5 | 250 | 250 | 250 |
| | | Turbo-Prop | 2 | 250 | 250 | 250 |
| | | Military | | | | |
| | | Transport | 3.93 | 30,552 | 30,552 | 30,552 |
| | | Piston | 1.78 | 1,562 | 1,562 | 1,562 |
| | | Jet | 1 | 1,042 | 1,042 | 1,042 |
| | | Turbo-Prop | 2.33 | 521 | 521 | 521 |
| | | Helicopter | 1 | 1,042 | 1,042 | 1,042 |
| | | General Aviation | | | | |
| | | Business Jet | 2 | 1,654 | 2,989 | 4,234 |
| | | Turbo-Prop | 2 | 551 | 995 | 1,439 |
| | | Piston Transport | 2 | 138 | 249 | 360 |
| | | Piston | 1 | 25,211 | 45,554 | 65,897 |

TABLE IV-4

FUEL COMBUSTION VOC EMISSIONS
(TONS/YEAR)

| COUNTY | YEAR | RESIDENTIAL | COMMERCIAL/ INSTITUTIONAL | INDUSTRIAL |
|---|---|---|---|---|
| Berkeley | 1977 | 15 | -- | -- |
| | 1982 | 15 | -- | -- |
| | 1987 | 15 | -- | -- |
| Charleston | 1977 | 22 | 8 | 1 |
| | 1982 | 23 | 8 | 1 |
| | 1987 | 23 | 9 | 1 |
| Lexington | 1977 | 10 | 3 | 11 |
| | 1982 | 12 | 4 | 12 |
| | 1987 | 14 | 4 | 13 |
| Richland | 1977 | 25 | 18 | 13 |
| | 1982 | 26 | 21 | 14 |
| | 1987 | 28 | 23 | 15 |
| York | 1977 | 20 | 7 | -- |
| | 1982 | 20 | 8 | -- |
| | 1987 | 19 | 10 | -- |

4. Residual oil usage will remain constant;
5. Residential wood usage will remain constant;
6. Commercial/institutional coal usage will remain constant; and
7. For industrial fuel combustion, the split between residual and distillate usage will remain constant.

The resulting projected fuel usage for 1982 and 1987 for each county is given in Tables IV-1 through IV-3.

Baseline and projected area source fuel combustion emissions are given in Table IV-4.

## TRANSPORTATION

Transportation source categories include motor vehicles, aircraft, vessels, and railroads. Motor vehicle emissions are covered in a separate report.

### Aircraft

There are two major airports in the five counties: Charleston Municipal Airport/Air Force Base and Columbia Municipal Airport. There are a number of other smaller general aviation airports. Data for the two major airports were available from the Federal Aviation Administration. Data concerning the smaller non-FAA airports were obtained from local airport officials. Terminal Area Forecast, 1976-1986 (FAA Publication No. AD/A-006-504) gives projections of operations at all FAA controlled airports and statewide projections of general aviation. These projection data were used to project aircraft operations. Table IV-5 shows the baseline and projected airport data and Table IV-6 shows aircraft emissions for each county for each year.

### Vessels

Charleston is a major port city. Berkeley, Lexington, and York Counties have major recreational lakes within their borders. Distillate and residual oil usage by large ships was determined earlier for Berkeley and Charleston Counties and projected. To determine this usage for 1977, 1982, and 1987, the values for these years were interpolated and extrapolated from the earlier Charleston AQMA inventory.

TABLE IV-3

BASELINE AND PROJECTED INDUSTRIAL FUEL USAGE

| COUNTY | YEAR | COAL (TONS) | LPG (1,000 GALS.) | NATURAL GAS ($10^6$ CU.FT.) | OIL DISTILLATE (1,000 GALS.) | OIL RESIDUAL (1,000 GALS.) |
|---|---|---|---|---|---|---|
| Berkeley | 1977 | -- | 62 | -- | 772 | -- |
| | 1982 | -- | 62 | -- | 846 | -- |
| | 1987 | -- | 62 | -- | 920 | -- |
| Charleston | 1977 | -- | 452 | -- | 1,404 | -- |
| | 1982 | -- | 452 | -- | 1,567 | -- |
| | 1987 | -- | 452 | -- | 1,731 | -- |
| Lexington | 1977 | -- | -- | 2,063 | 1,501 | 4,080 |
| | 1982 | -- | -- | 2,063 | 1,991 | 5,411 |
| | 1987 | -- | -- | 2,063 | 2,480 | 6,741 |
| Richland | 1977 | -- | -- | 2,480 | 1,804 | 4,905 |
| | 1982 | -- | -- | 2,480 | 2,392 | 6,505 |
| | 1987 | -- | -- | 2,480 | 2,981 | 8,104 |
| York | 1977 | -- | -- | -- | -- | -- |
| | 1982 | -- | -- | -- | -- | -- |
| | 1987 | -- | -- | -- | -- | -- |

TABLE IV-2

BASELINE AND PROJECTED COMMERCIAL/

INSTITUTIONAL FUEL USAGE

| COUNTY | YEAR | COAL (TONS) | LPG (1,000 GALS.) | NATURAL GAS ($10^6$ CU.FT.) | OIL DISTILLATE (1,000 GALS.) | OIL RESIDUAL (1,000 GALS.) |
|---|---|---|---|---|---|---|
| Berkeley | 1977 | -- | 305 | 44 | 78 | -- |
| | 1982 | -- | 305 | 44 | 159 | -- |
| | 1987 | -- | 305 | 44 | 241 | -- |
| Charleston | 1977 | -- | 476 | 1,553 | 2,284 | -- |
| | 1982 | -- | 476 | 1,553 | 4,148 | -- |
| | 1987 | -- | 476 | 1,553 | 6,012 | -- |
| Lexington | 1977 | -- | -- | 786 | 265 | -- |
| | 1982 | -- | -- | 900 | 303 | -- |
| | 1987 | -- | -- | 1,014 | 342 | -- |
| Richland | 1977 | -- | -- | 4,353 | 1,466 | -- |
| | 1982 | -- | -- | 4,984 | 1,679 | -- |
| | 1987 | -- | -- | 5,616 | 1,891 | -- |
| York | 1977 | 80 | 170 | 1,321 | 3,471 | -- |
| | 1982 | 80 | 170 | 1,321 | 5,833 | -- |
| | 1987 | 80 | 170 | 1,321 | 8,191 | -- |

TABLE IV-1

BASELINE AND PROJECTED RESIDENTIAL FUEL USAGE

| COUNTY | YEAR | COAL (TONS) | LPG (1,000 GALS.) | NATURAL GAS ($10^6$ CU.FT.) | OIL DISTILLATE (1,000 GALS.) | OIL RESIDUAL (1,000 GALS.) | WOOD (TONS) |
|---|---|---|---|---|---|---|---|
| Berkeley | 1977 | - | 3,374 | 201 | 1,885 | 40 | 4,731 |
| | 1982 | - | 3,374 | 201 | 2,228 | 40 | 4,731 |
| | 1987 | - | 3,374 | 201 | 2,563 | 40 | 4,731 |
| Charleston | 1977 | - | 1,893 | 2,288 | 6,057 | 75 | 3,729 |
| | 1982 | - | 1,893 | 2,288 | 6,695 | 75 | 3,729 |
| | 1987 | - | 1,893 | 2,288 | 7,272 | 75 | 3,729 |
| Lexington | 1977 | - | -- | 1,421 | 8,489 | -- | -- |
| | 1982 | - | -- | 1,718 | 10,263 | -- | -- |
| | 1987 | - | -- | 1,999 | 11,945 | -- | -- |
| Richland | 1977 | - | -- | 2,926 | 25,968 | -- | -- |
| | 1982 | - | -- | 3,112 | 27,617 | -- | -- |
| | 1987 | - | -- | 3,306 | 29,344 | -- | -- |
| York | 1977 | 382 | 1,412 | 448 | 9,689 | -- | 3,662 |
| | 1982 | 292 | 1,412 | 448 | 10,281 | -- | 3,662 |
| | 1987 | 202 | 1,412 | 448 | 10,990 | | 3,662 |

Area sources of VOCs can be grouped into four general classes: fuel combustion, transportation (exclusing highway vehicles, which are covered in a separate report), evaporative losses. and miscellaneous sources.

## FUEL COMBUSTION

Area source fuel combustion is sub-divided into three area source categories: residential, commercial/institutional, and light industrial. County fuel usage by fuel type is presented in Tables IV-1 through IV-3 for 1977, 1982, and 1987.

In the earlier inventory efforts fuel usage for Berkeley, Charleston, and York Counties was determined by surveys of fuel distributors. Theoretical residential fuel usage determined from census data using procedures outlined in Volume 13 of the AQMA Guideline series was compared with the fuel survey results. The fuel usage for these counties contained in Tables IV-1 through IV-3 was determined by interpolating between the baseline year and the projected 1980 fuel usage.

Baseline year fuel usage for Lexington and Richland Counties was calculated by disaggregating statewide fuel usage data published by the U. S. Department of Energy in the Energy Data Reports. Each county's proportion of population, commercial/institutional employees, and industrial employees (adjusted for different fuel intensiveness for various industries) were used to disaggregate individual EDR fuel categories. Such statewide data are not appropriate for determining exact fuel usage in individual counties but can provide general estimates of county fuel usage.

Projection of residential, commercial/institutional, and light industrial fuel usage is based upon projection of population, commercial/institutional employees, and industrial employees, respectively. However, other factors must be considered. It is likely that substantial changes in usage by fuel types must be expected. To modify the fuel usage projections to account for changes in fuel types, the following assumptions were made:

1. Natural and LP gas usage will remain constant;
2. Residential coal usage will decrease by two-thirds between 1970 and 1985;
3. Of new dwelling units and dwelling units switching from coal or other fuels which will remain constant, 60% will be heated by electricity and 40% by distillate oil;

# CHAPTER IV

## AREA SOURCE EMISSION INVENTORY

Air pollution sources are often categorized into three general classes: point, area, and line. Point sources are identifiable, discreet stationary sources such as electric power generating plants, chemical plants, refineries, etc. Line sources are primarily highway vehicles and other such sources which emit pollutants along definite lines. Area sources are those emitting operations which are so numerous that each individual source cannot be identified singly or which emit air pollutants over a broad area rather than discreet points. Open burning is an example of the first type of area source. Although each open burning site might be identified, the number and size of the sites preclude their treatment as point sources. In some regions of the nation, large land areas are exposed to natural wind forces. The windblown dust from such areas must be treated as area sources.

In order to estimate area source VOC emissions, data on area source activity levels must be obtained. In some cases, area aource activity data such as residential fuel usage can be obtained directly through fuel surveys or calculation of theoretical values from census data. For other categories, surrogate parameters such as population must be used to estimate area source activity levels and emissions. Particulate emissions were inventoried for Berkeley and Charleston Counties during 1974. The results of this inventory were reported in Charelston, South Carolina Air Quality Maintenance Planning and Analysis (an unpublished report submitted to EPA and DHEC in September, 1976). Many of the area source categories inventoried during that study emit VOCs as well as particulate. VOC emissions in York County were inventoried in 1976 and reported in Area Source Emission Inventory for York County, South Carolina (EPA Publication No. 904/9-77-029). Basic emission inventory data from both of these previous efforts have been used to develop the current inventory for 1977. Lexington and Richland Counties have not previously been inventoried. Procedures outlined in the two previous reports on inventories for the other counties and in EPA's 14-volume series Guidelines for Air Quality Maintenance Planning and Analysis as well as Procedures for the Preparation of Emission Inventories for Volatile Organic Compounds (EPA Publication No. 450/2-77-028) have been used to estimate area source emissions for Lexington and Richland Counties. Projection data have been presented in Chapter II, earlier.

TABLE III-6

SUMMARY OF VOLATILE ORGANIC COMPOUND

POINT SOURCE EMISSIONS

YORK COUNTY

| SOURCE CATEGORY | 1977 | 1982 | 1988 |
|---|---|---|---|
| Gasoline Marketing | 155 | 166 | 200 |
| Manufacturing | - | - | - |
| Surface Coating | 11 | 12 | 14 |
| Degreasing | - | - | - |
| Drycleaning | 97 | 117 | 139 |
| Graphic Arts (Printing) | 10 | 11 | 12 |

TABLE III-5

SUMMARY OF VOLATILE ORGANIC COMPOUND

POINT SOURCE EMISSIONS

RICHLAND COUNTY

| SOURCE CATEGORY | 1977 | 1982 | 1988 |
|---|---|---|---|
| Gasoline Marketing | 98 | 102 | 119 |
| Manufacturing | 59 | 63 | 70 |
| Surface Coating | 7649 | 8704 | 9757 |
| Degreasing | 203 | 231 | 263 |
| Drycleaning | 360 | 416 | 478 |
| Graphic Arts (Printing) | 199 | 226 | 257 |

TABLE III-4

SUMMARY OF VOLATILE ORGANIC COMPOUND

POINT SOURCE EMISSIONS

LEXINGTON COUNTY

| SOURCE CATEGORY | 1977 | 1982 | 1988 |
|---|---|---|---|
| Gasoline Marketing | 151 | 156 | 166 |
| Manufacturing | 30 | 33 | 35 |
| Surface Coating | 841 | 960 | 1085 |
| Degreasing | 491 | 570 | 648 |
| Drycleaning | 105 | 122 | 139 |
| Graphic Arts (Printing) | 176 | 199 | 228 |

TABLE III-3

SUMMARY OF VOLATILE ORGANIC COMPOUND
POINT SOURCE EMISSIONS

CHARLESTON COUNTY

| SOURCE CATEGORY | 1977 | 1982 | 1988 |
|---|---|---|---|
| Gasoline Marketing | 384 | 433 | 502 |
| Manufacturing | 606 | 802 | 993 |
| Surface Coating | 706 | 768 | 826 |
| Degreasing | 638 | 770 | 889 |
| Drycleaning | 288 | 331 | 371 |
| Graphic Arts (Printing) | 97 | 106 | 115 |

TABLE III-2

SUMMARY OF VOLATILE ORGANIC COMPOUND

POINT SOURCE EMISSIONS

BERKELEY COUNTY

| SOURCE CATEGORY | 1977 | 1982 | 1988 |
|---|---|---|---|
| Gasoline Marketing | 67 | 75 | 88 |
| Manufacturing | 5 | 7 | 8 |
| Surface Coating | 59 | 66 | 90 |
| Degreasing | 59 | 73 | 85 |
| Drycleaning | 41 | 47 | 53 |
| Graphic Arts (Printing) | | negligible | |

After the initial baseline data had been compiled from the emission inventory the results had to be projected to give values for the years 1982 and 1987. This was done by using the employment projections presented in Chapter II to project future rates of emission based on total employment. This assumes that employment, level of activity, and emissions are directly linked in a constant linear correlation.

A summary of the baseline data and projections by county are contained in Tables III-2 through III-6.

## TABLE III-1

## COMMON CHEMICALS AND THEIR DENSITIES

| SOLVENT | DENSITY (LBS/GAL) | SOLVENT | DENSITY (LBS/GAL) |
|---|---|---|---|
| Acetone | 6.59 | MIBK | 6.68 |
| Alcohol | 6.76 | Mineral Spirits | 6.4 |
| 2 Butanone | 6.71 | Naptha | 7.31 |
| Butyl Acetate | 7.35 | Ortho Dichloro Benzene | 10.89 |
| Butyl Cellosolve | 7.4 | Paint | 13.0 |
| Cellosolve | 7.8 | Perchloroethylene | 13.47 |
| Cellosolve Acetate | 8.13 | Pine Oil | 7.17 |
| Creosote Oil | 8.92 | Polyurethane | 9.2 |
| Enamel | 8.1 | Primer | 11.0 |
| Ethanol | 6.61 | Stoddard | 6.38 |
| Ethyl Acetate | 7.51 | Styrene | 7.56 |
| Freon | 12.48 | Thinner | 7.2 |
| Hexane | 5.53 | Toluene | 7.26 |
| Isopropyl Acetate | 7.4 | Trichloroethylene | 12.47 |
| Isopropyl Alcohol | 6.55 | Varnish | 10.2 |
| Kerosene | 6.84 | Varsol | 6.4 |
| Lacquer | 8.6 | VMP | 7.0 |
| Lactol (Nathal) Spirits | 6.13 | Xylene | 7.23 |
| Metaxylol | 7.2 | Xylol | 7.2 |
| Methanol | 6.63 | | |
| Methylene Chloride | 11.12 | | |
| Methyl Ethyl Ketone (MEK) | 6.71 | | |

# CHAPTER III

## POINT SOURCE VOC EMISSION INVENTORY

Point source emission data for Berkeley, Charleston, Lexington, and Richland Counties were obtained from an ES/DHEC questionnaire which was sent to potential sources in the study areas. The data for York County was based on a similar study conducted by the State of North Carolina in an emission inventory of the Charlotte area.

The actual emission inventory, as outlined in the contract work plan, was carried out in four parts:

- identification of potential sources
- development of a questionnaire for each source type
- ES training of DHEC personnel in inventory techniques
- ES compilation of inventory data

In addition to this report of the inventory results Engineering-Science will also provide computer punchcard or magnetic tape storage of data for input into the Emission Inventory System/Permits and Registration (EIS/P&R).

The emission factors used in the emissions calculations were taken from the procedures outlined in EPA publication AP-42, Compilation of Air Pollutant Emission Factors, whenever applicable. In addition, the densities of the various solvents shown in Table III-1 were used to calculate VOC emissions. The following assumptions were also necessary:

- recovery of spent solvents was 95% efficient
- 2% of the volatiles in a solution are lost during mixing
- the precent solvent given was on a weight basis
- 50% of the spent solvents are volatilized when burned as a fuel
- a 1.5% solution of 60% MEK (Methyl Ethyl Ketone) is used as a catalyst for polyester gelcoat used in fiberglass boat construction
- whenever actual amounts of a substance where not reported consistent proportions to similar operations were accurate
- whenever a density could not be found a density of 7 lbs/gal could be used.

TABLE II-6

AGRICULTURAL PROJECTION FACTORS

| COUNTY | PROJECTION FACTORS 1982 | 1987 |
|---|---|---|
| Berkeley<br>Charleston | 1.0832 | 1.1270 |
| Lexington<br>Richland | 1.0115 | 1.0115 |
| York | 1.0032 | 1.0390 |

## AGRICULTURE PROJECTIONS

Although agricultural land use and the number of farms have generally been decreasing, agricultural production has increased. There have been over the past few decades some substantial changes in agricultural practices. Many of these changes have resulted in an increasing reliance upon farm machinery. The 1972 Series E OBERS projections by the U. S. Bureau fo Economic Analysis (BEA) shows an increase in agricultural earnings for the State of South Carolina from 1970 to 1990. These projections appear to be appropriate for projecting emissions from agricultural equipment. Table II-6 shows the resulting projection factors for each area. Data for the Charleston and Columbia Standard Metropolitan Statistical Areas (SMSAs) and the Charlotte, North Carolina BEA Economic Areas were assumed to be applicable to the counties under consideration.

TABLE II-5

EMPLOYMENT PROJECTION FACTORS YORK COUNTY

| EMPLOYMENT CLASSIFICATION | EMPLOYEES 1977[1] | 1982[1] | 1987[2] |
|---|---|---|---|
| TOTAL ALL INDUSTRIES | 89,290 | 100,100 | 110,900 |
| Construction | 6,060 | 7,540 | 9,020 |
| Manufacturing | 44,250 | 46,740 | 49,240 |
| Durable Goods | 3,980 | 4,500 | 5,030 |
| Ordnance | 0 | 0 | 0 |
| Lumber & Wood Products | 700 | 720 | 740 |
| Furniture & Fixtures | 20 | 20 | 20 |
| Stone, Clay & Glass | 230 | 240 | 260 |
| Primary Metals | 380 | 470 | 560 |
| Fabricated Metals | 470 | 530 | 600 |
| Nonelectric Machinery | 1,230 | 1,440 | 1,640 |
| Electrical Machinery | 580 | 660 | 730 |
| Trans. Equipment | 30 | 50 | 70 |
| Instruments | 20 | 30 | 30 |
| Miscellaneous Manufacturing | 320 | 360 | 400 |
| Nondurable Goods | 40,270 | 42,240 | 44,210 |
| Food & Kindred Products | 470 | 480 | 480 |
| Tobacco | 0 | 0 | 0 |
| Textile Mill Products | 31,060 | 32,550 | 34,050 |
| Apparel & Textile Products | 4,200 | 4,340 | 4,480 |
| Paper & Allied Products | 1.070 | 1,140 | 1.220 |
| Printing & Publishing | 490 | 530 | 580 |
| Chemicals & Allied Products | 2,670 | 2,810 | 2,960 |
| Petroleum & Coal | 20 | 20 | 20 |
| Rubber & Plastic Products | 290 | 360 | 430 |
| Leather Products | 0 | 0 | 0 |
| Commercial and Institutional | 37,370 | 44,210 | 51,040 |

[1] Interpolated from 1974-1985 employment projections for Planning District III provided by DES. These data include employees in Chester, Lancaster, and Union Counties.

[2] Extrapolated from the 1974-1985 DES employment projections, Chester, Lancaster, and Union Counties are included.

TABLE II-4

EMPLOYMENT PROJECTION FACTORS LEXINGTON AND RICHLAND COUNTIES

| EMPLOYMENT CLASSIFICATION | EMPLOYEES 1977[1] | 1982[1] | 1987[2] |
|---|---|---|---|
| TOTAL ALL INDUSTRIES | 193,080 | 217,820 | 242,560 |
| Construction | 19,540 | 21,330 | 23,120 |
| Manufacturing | 33,700 | 36,840 | 39,980 |
| Durable Goods | 14,810 | 16,900 | 18,980 |
| Ordnance | 80 | 90 | 90 |
| Lumber & Wood Products | 1,940 | 1,860 | 1,780 |
| Furniture & Fixtures | 150 | 150 | 150 |
| Stone, Clay & Glass | 1,260 | 1,300 | 1,350 |
| Primary Metals | 630 | 790 | 940 |
| Fabricated Metals | 2,100 | 2,210 | 2,310 |
| Nonelectric Machinery | 3,060 | 3,650 | 4,250 |
| Electric Machinery | 2,830 | 3,400 | 3,980 |
| Trans. Equipment | 920 | 1,340 | 1,770 |
| Instruments | 120 | 140 | 160 |
| Miscellaneous Manufacturing | 1,720 | 1,960 | 2,210 |
| Nondurable Goods | 18,890 | 19,940 | 20,990 |
| Food & Kindred Products | 2,020 | 2,040 | 2,060 |
| Tobacco | 0 | 0 | 0 |
| Textile Mill Products | 7,370 | 7,710 | 8,040 |
| Apparel & Textile Products | 3,570 | 3,600 | 3,620 |
| Paper & Allied Products | 720 | 830 | 940 |
| Printing & Publishing | 2,280 | 2,600 | 2,930 |
| Chemicals & Allied Products | 2,740 | 2,960 | 3,190 |
| Petroleum & Coal | 40 | 60 | 80 |
| Rubber & Plastic Products | 150 | 140 | 120 |
| Leather Products | 0 | 0 | 0 |
| Commercial and Institutional | 136,700 | 156,520 | 176,350 |

[1] Interpolated from 1974-1985 employment projections for Planning District IV provided by DES. These data include employees in Fairfield and Newberry Counties.

[2] Extrapolated from the 1974-1985 DES employment projections Fairfield and Newberry Counties are included.

TABLE II-3

EMPLOYMENT PROJECTION FACTORS BERKELEY AND CHARLESTON COUNTIES

| EMPLOYMENT CLASSIFICATION | EMPLOYEES 1977[1] | 1982[1] | 1987[2] |
|---|---|---|---|
| TOTAL ALL INDUSTRIES | 142,380 | 161,170 | 179,960 |
| Construction | 12,730 | 15,000 | 17,280 |
| Manufacturing | 26,020 | 28,510 | 31,000 |
| Durable Goods | 17,620 | 19,190 | 20,760 |
| Ordnance | 870 | 900 | 930 |
| Lumber & Wood Products | 1,720 | 1,700 | 1,670 |
| Furniture & Fixtures | 370 | 440 | 520 |
| Stone, Clay & Glass | 1,900 | 2,220 | 2,540 |
| Primary Metals | 380 | 440 | 500 |
| Fabricated Metals | 940 | 1,230 | 1,520 |
| Nonelectric Machinery | 1,770 | 2,250 | 2,730 |
| Electric Machinery | 340 | 420 | 500 |
| Trans. Equipment | 9,190 | 9,440 | 9,680 |
| Instruments | 90 | 100 | 100 |
| Miscellaneous Manufacturing | 50 | 60 | 60 |
| Nondurable Goods | 8,400 | 9,320 | 10,240 |
| Food & Kindred Products | 880 | 870 | 870 |
| Tobacco | 0 | 0 | 0 |
| Textile Mill Products | 1,740 | 1,980 | 2,220 |
| Apparel & Textile Products | 1,480 | 1,590 | 1,690 |
| Paper & Allied Products | 1,720 | 1,730 | 1,730 |
| Printing & Publishing | 780 | 860 | 930 |
| Chemicals & Allied Products | 1,270 | 1,680 | 2,080 |
| Petroleum & Coal | 210 | 230 | 250 |
| Rubber & Plastic Products | 320 | 400 | 470 |
| Leather Products | 0 | 0 | 0 |
| Commercial and Institutional | 101,860 | 115,880 | 129,910 |

[1] Interpolated from 1974-1985 employment projections for Planning Distric IX provided by DES. These data include employees in Dorchester County.

[2] Extrapolated from the 1974-1985 DES employment projections. Dorchester County is included.

TABLE II-2

POPULATION PROJECTION FACTORS

| COUNTY | PROJECTION FACTORS 1977 | 1982 | 1987 |
|---|---|---|---|
| Berkeley | 1.000 | 1.1447 | 1.2855 |
| Charleston | 1.000 | 1.0671 | 1.1277 |
| Lexington | 1.000 | 1.2090 | 1.4071 |
| Richland | 1.000 | 1.0635 | 1.1300 |
| York | 1.000 | 1.1036 | 1.228 |

TABLE II-1

COMPARISON OF COUNTY POPULATION PROJECTIONS

| COUNTY | PLANNING AGENCY | POPULATION PROJECTIONS[1] 1977 | 1982 | 1987 |
|---|---|---|---|---|
| Berkeley | BCDCOG | 78,100 | 89,400 | 100,400 |
| | DRSS | 67,700 | 72,700 | 79,400 |
| Charleston | BCDCOG | 277,200 | 295,800 | 312,600 |
| | DRSS | 267,200 | 281,340 | 291,600 |
| Lexington | CMRPC | 124,800 | 147,800 | 169,000 |
| | DRSS | 129,200 | 156,200 | 181,800 |
| Richland | CMRPC | 256,100 | 276,700 | 304,400 |
| | DRSS | 255,300 | 271,500 | 288,500 |
| York | YCPBD | 96,300 | 104,000 | 111,500 |
| | DRSS | 96,500 | 106,500 | 118,000 |

[1] The planning agencies gave projections for 1980, 1985 and 1990. Projections for 1977, 1982, and 1987 were obtained by linear interpolation.

# CHAPTER II

## PROJECTION DATA

In order to project an emission inventory, one must obtain growth projections for surrogate parameters. The most commonly used surrogate parameters are population and employment. Employment growth data should be obtained for specific industrial classes. Depending upon the specific point source or area source category, population or employment data can be used to project emissions.

### POPULATION PROJECTIONS

Population projections were obtained from the South Carolina Division of Research and Statistical Services (DRSS), Berkeley-Charleston-Dorchester Council of Governments (BCDCOG), Central Midlands Regional Planning Council (CMRPC), and the York County Planning and Building Department (YCPBD). These data are shown in Table II-1. In general, DRSS projections were slightly more conservative than those obtained from local planning agencies. It was decided that the more conservative DRSS projections would be used for Lexington, Richland, and York Counties but that the BCDCOG projections would be used for Berkeley and Charleston Counties. The population projection factors selected are shown in Table II-2.

### EMPLOYMENT PROJECTIONS

The Department of Employment Security (DES) provided employment projections for 1976-1985 by two-digit Standard Industrial Classification (SIC) for each Planning District in the State. Berkeley and Charleston Counties and Lexington and Richland Counties dominate their respective Planning District but York County is only one of four counties in Planning District III. Yet, the Planning Districts were designed to include counties with comparable socio-economic characteristics. It seems reasonable to assume that growth in each county will not be too dissimilar to growth in the appropriate Planning District, as a whole. Tables II-2 through II-5 show the employment projections for the appropriate Planning Districts. The data for 1977 and 1982 were obtained by inter polation from the 1974 and 1985 data. The employees in each two-digit SIC were rounded to the nearest 10 employees.

Chapter IV. Finally, the inventories are summarized in Chapter V. The baseline and projected area source carbon monoxide emission inventories for the cities of Rock Hill and Columbia are given in Appendix A. The mobile source emission inventory is presented in a separate report.

# CHAPTER I

## INTRODUCTION

In response to the requirements of the Clean Air Act Amendments (CAAA) of 1977, three areas of South Carolina were designated as non-attainment areas for photochemical oxidants: Charleston, Columbia, and Rock Hill, Included in these three areas are the counties of Berkeley, Charleston, Lexington, Richland, and York. In addition, the cities of Columbia and Rock Hill were designated as non-attainment areas for carbon monoxide. The South Carolina Department of Health and Environmental Control (DHEC) must submit a revision to the State Implementation Plan (SIP) by January 1, 1979 to the U. S. Environmental Protection Agency (EPA). The SIP revision must demonstrate attainment of the primary National Ambient Air Quality Standards (NAAQSs) by 1982. If the primary NAAQS for photochemical oxidants cannot be attained by 1982, an extension to 1987 can be obtained.

The first step in any SIP revision is the development of a comprehensive emission inventory of point sources, mobile sources, and area sources. The CAAA clearly mandates the compilation of such an inventory for a baseline year of 1977. Because of the two attainment dates specified in the CAAA, the baseline inventories must be projected to 1982 and 1987.

Engineering-Science was retained by EPA to assist DHEC in compiling all three emission inventories and projecting them. DHEC personnel inventoried point sources using procedures and forms developed by ES. ES calculated emissions from the point source forms and provided DHEC the inventory. ES used data obtained from the South Carolina Department of Highways and Public Transportation and the Mobile I emission factor program development by EPA's Office of Transportation and Land Use Policy to calculate baseline and projected mobile source emissions. Area source emissions were determined from Air Quality Maintenance Area (AQMA) Analyses for York and Berkeley and Charleston Counties. Area source emissions in Lexington and Richland Counties were calculated using procedures developed in the AQMA analyses for the other areas.

This report presents the baseline and projected point and area source inventories for all five counties. In Chapter II, the demographic and economic projection data are presented. In Chapter III, the baseline and projected point source inventories are given. The area source inventories are presented in

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TABLE 4

ASSUMED VEHICLE DISTRIBUTION, SPEED AND

OPERATING CONDITIONS BY GENERAL ROAD CLASSIFICATION

| ROAD CLASSIFICATION | % DISTRIBUTION BY VEHICLE CLASS | | | | | | AVERAGE | TYPE OF OPERATION | |
|---|---|---|---|---|---|---|---|---|---|
| | LDV | $LDT_1$ | $LDT_2$ | HDG | HDD | MC | SPEED | % COLD | % HOT |
| Urban - Freeways | 71.6 | 7.7 | 3.7 | 3.5 | 13.4 | 0.1 | 50[1] | 10 | 10 |
| Major Arterials | 77.9 | 13.4 | 3.2 | 1.1 | 4.3 | 0.1 | 32.5[2] | 15 | 20 |
| Collectors | 79.1 | 15.4 | 2.8 | 0.6 | 2.0 | 0.1 | 29.5[3] | 20 | 20 |
| Local | 76.8 | 16.9 | 3.3 | 1.1 | 1.8 | 0.1 | 21[4] | 40 | 30 |
| Rural - Freeways | 67.6 | 7.7 | 3.7 | 3.5 | 17.4 | 0.1 | 59 | 10 | 10 |
| Arterials | 77.9 | 13.4 | 3.2 | 1.1 | 4.3 | 0.1 | 55 | 20 | 20 |
| Collectors | 79.1 | 15.4 | 2.8 | 0.6 | 2.0 | 0.1 | 48 | 20 | 20 |
| Local | 76.8 | 16.9 | 3.3 | 1.1 | 1.8 | 0.1 | 40 | 40 | 20 |

[1] 48 in Charleston County

[2] 34 in Berkeley, 32 in Charleston, 33 in Lexington and York, and 31 in Richland County

[3] 31 in Berkeley, 28 in Charleston, 30 in Lexington and York, and 29 in Richland County

[4] 23 in Berkeley, 18 in Charleston, 23 in Lexington and York, and 20 in Richland County

TABLE 5

COMPOSITE NMHC EMISSION FACTORS* IN 1977, 1982 AND 1987 WITHOUT INSPECTION/MAINTENANCE

| COUNTY | ROAD CLASSIFICATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | FREEWAY | | ARTERIAL | | COLLECTOR | | LOCAL | |
| | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural |
| | | | | 1977 | | | | |
| Berkeley | 4.33 | 4.08 | 5.38 | 4.67 | 5.84 | 4.85 | 7.90 | 5.74 |
| Charleston | 4.47 | 4.08 | 5.57 | 4.67 | 6.18 | 4.85 | 9.09 | 5.74 |
| Lexington | 4.43 | 4.08 | 5.47 | 4.67 | 5.95 | 4.85 | 7.90 | 5.74 |
| Richland | 4.23 | 4.08 | 5.67 | 4.67 | 6.06 | 4.85 | 8.55 | 5.74 |
| York | 4.43 | 4.08 | 5.47 | 4.67 | 5.95 | 4.85 | 7.90 | 5.74 |
| | | | | 1982 | | | | |
| Berkeley | 2.38 | 2.17 | 2.93 | 2.46 | 3.21 | 2.57 | 4.65 | 3.20 |
| Charleston | 2.40 | 2.17 | 3.05 | 2.46 | 3.44 | 2.57 | 5.43 | 3.20 |
| Lexington | 2.38 | 2.17 | 2.99 | 2.46 | 3.28 | 2.57 | 4.65 | 3.20 |
| Richland | 2.38 | 2.17 | 3.12 | 2.46 | 3.36 | 2.57 | 5.08 | 3.20 |
| York | 2.38 | 2.17 | 2.99 | 2.46 | 3.28 | 2.57 | 4.65 | 3.20 |
| | | | | 1987 | | | | |
| Berkeley | 1.17 | 1.05 | 1.53 | 1.25 | 1.73 | 1.33 | 2.76 | 1.77 |
| Charleston | 1.19 | 1.05 | 1.61 | 1.25 | 1.88 | 1.33 | 3.28 | 1.77 |
| Lexington | 1.17 | 1.05 | 1.57 | 1.25 | 1.78 | 1.33 | 2.76 | 1.77 |
| Richland | 1.17 | 1.05 | 1.66 | 1.25 | 1.82 | 1.33 | 3.05 | 1.77 |
| York | 1.17 | 1.05 | 1.57 | 1.25 | 1.78 | 1.33 | 2.76 | 1.77 |

*Emission factors are given in g/mile and include estimated evaporative and crankcase emissions. These factors are applicable only for the travel scenarios described in Table 4.

TABLE 6

COMPOSITE NMHC EMISSION FACTORS* IN 1982 AND 1987

IF INSPECTION/MAINTENANCE** IS INTRODUCED IN 1981

| COUNTY | ROAD CLASSIFICATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | FREEWAY | | ARTERIAL | | COLLECTOR | | LOCAL | |
| | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural |
| | | | | 1982 | | | | |
| Berkeley | 2.27 | 2.08 | 2.75 | 2.33 | 3.01 | 2.42 | 4.33 | 3.00 |
| Charleston | 2.29 | 2.08 | 2.87 | 2.33 | 3.21 | 2.42 | 5.04 | 3.00 |
| Lexington | 2.27 | 2.08 | 2.81 | 2.33 | 3.07 | 2.42 | 4.33 | 3.00 |
| Richland | 2.27 | 2.08 | 2.93 | 2.33 | 3.14 | 2.42 | 4.72 | 3.00 |
| York | 2.27 | 2.08 | 2.81 | 2.33 | 3.07 | 2.42 | 4.33 | 3.00 |
| | | | | 1987 | | | | |
| Berkeley | 0.95 | 0.88 | 1.16 | 0.96 | 1.27 | 1.00 | 1.98 | 1.31 |
| Charleston | 0.96 | 0.88 | 1.22 | 0.96 | 1.37 | 1.00 | 2.34 | 1.31 |
| Lexington | 0.95 | 0.88 | 1.19 | 0.96 | 1.31 | 1.00 | 1.98 | 1.31 |
| Richland | 0.95 | 0.88 | 1.25 | 0.96 | 1.34 | 1.00 | 2.18 | 1.31 |
| York | 0.95 | 0.88 | 1.19 | 0.96 | 1.31 | 1.00 | 1.98 | 1.31 |

* Emission factors are given in g/mile and include estimated evaporative and crankcase emissions. These factors are applicable only for the travel scenarios described in Table 4.

** A stringency of 30% and mechanics training are assumed.

TABLE 7

COMPOSITE CO EMISSION FACTORS* IN 1977,

1982 AND 1987 WITHOUT INSPECTION/MAINTENANCE

| COUNTY | ROAD CLASSIFICATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | FREEWAY | | ARTERIAL | | COLLECTOR | | LOCAL | |
| | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural |
| | | | | 1977 | | | | |
| Berkeley | 30.69 | 27.18 | 40.67 | 31.88 | 46.95 | 33.85 | 74.50 | 46.26 |
| Charleston | 30.97 | 27.18 | 43.17 | 31.88 | 51.72 | 33.85 | 90.56 | 46.26 |
| Lexington | 30.69 | 27.18 | 41.88 | 31.88 | 48.45 | 33.85 | 74.50 | 46.26 |
| Richland | 27.63 | 27.18 | 44.54 | 31.88 | 50.04 | 33.85 | 83.26 | 46.26 |
| York | 30.69 | 27.18 | 41.88 | 31.88 | 48.45 | 33.85 | 74.50 | 46.26 |
| | | | | 1982 | | | | |
| Berkeley | 23.14 | 19.72 | 28.21 | 22.62 | 32.50 | 23.87 | 51.15 | 33.06 |
| Charleston | 23.27 | 19.72 | 29.99 | 22.62 | 35.94 | 23.87 | 64.02 | 33.06 |
| Lexington | 23.14 | 19.72 | 29.07 | 22.62 | 33.59 | 23.87 | 53.15 | 33.06 |
| Richland | 23.14 | 19.72 | 30.98 | 22.62 | 34.73 | 23.87 | 59.15 | 33.06 |
| York | 23.14 | 19.72 | 29.07 | 22.62 | 33.59 | 23.87 | 53.15 | 33.06 |
| | | | | 1987 | | | | |
| Berkeley | 13.64 | 11.55 | 16.52 | 13.57 | 19.28 | 14.33 | 33.10 | 20.63 |
| Charleston | 13.70 | 11.55 | 17.56 | 13.57 | 21.32 | 14.33 | 39.66 | 20.63 |
| Lexington | 13.64 | 11.55 | 17.02 | 13.57 | 19.93 | 14.33 | 33.10 | 20.63 |
| Richland | 13.64 | 11.55 | 18.15 | 13.57 | 20.61 | 14.33 | 36.74 | 20.63 |
| York | 13.64 | 11.55 | 17.02 | 13.57 | 19.93 | 14.33 | 33.10 | 20.63 |

These factors, given in g/mile, are applicable only for the travel scenarios described in Table 4.

TABLE 8

COMPOSITE CO EMISSION FACTORS* IN 1982 AND 1987

IF INSPECTION/MAINTENANCE** IS INTRODUCED IN 1981

| COUNTY | ROAD CLASSIFICATION | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | FREEWAY | | ARTERIAL | | COLLECTOR | | LOCAL | |
| | Urban | Rural | Urban | Rural | Urban | Rural | Urban | Rural |
| | | | | 1982 | | | | |
| Berkeley | 19.92 | 17.46 | 23.47 | 18.86 | 26.87 | 19.75 | 44.38 | 27.65 |
| Charleston | 20.03 | 17.46 | 24.94 | 18.86 | 29.70 | 19.75 | 53.48 | 27.65 |
| Lexington | 19.92 | 17.46 | 24.18 | 18.86 | 27.76 | 19.75 | 44.38 | 27.65 |
| Richland | 19.92 | 17.46 | 25.76 | 18.86 | 28.71 | 19.75 | 49.40 | 27.65 |
| York | 19.92 | 17.46 | 24.18 | 18.86 | 27.76 | 19.75 | 44.38 | 27.65 |
| | | | | 1987 | | | | |
| Berkeley | 9.77 | 8.89 | 10.68 | 8.75 | 12.17 | 9.05 | 21.17 | 13.25 |
| Charleston | 9.82 | 8.89 | 11.35 | 8.75 | 13.46 | 9.05 | 25.38 | 13.28 |
| Lexington | 9.77 | 8.89 | 11.00 | 8.75 | 12.58 | 9.05 | 21.17 | 13.28 |
| Richland | 9.77 | 8.89 | 11.72 | 8.75 | 13.01 | 9.05 | 23.51 | 13.28 |
| York | 9.77 | 8.89 | 11.00 | 8.75 | 12.58 | 9.05 | 21.17 | 13.28 |

These factors, given in g/mile, are applicable only for the travel scenarios described in Table 4.

## VMT ESTIMATES

The average number of vehicle miles traveled in 1977 and the expected travel in 1982 and 1987 is presented in Table 9 in the form provided by the South Carolina Department of Highways and Public Transportation. These figures, as mentioned previously, have been reviewed by the Charleston and Columbia municipal planning organizations.

Data for York County were not provided. Engineering-Science interpolated and extended, assuming a growth rate of 7.5% per year, the data presented in its area emission inventory for York County submitted previously. These estimates for 1977, 1982 and 1987 are presented in Table 10.

## HIGHWAY EMISSIONS

Highway NMHC emissions are simply the product of the emission factors and the vehicle miles traveled. They are presented in Table 11 for the base year and 1982 and 1987 under the assumption that inspection/maintenance was not implemented. Table 12 shows the effect of implementing a strong inspection/maintenance program in 1981.

Carbon monoxide emissions from highway vehicles without and with inspection/maintenance are given in Tables 13 and 14.

# TABLE 9

## VMT

## ESTIMATED VEHICLE MILES OF TRAVEL PER DAY

| FUNCTIONAL CLASS | 1977 URBAN | 1977 RURAL | 1977 TOTAL | 1982 URBAN | 1982 RURAL | 1982 TOTAL | 1987 URBAN | 1987 RURAL | 1987 TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| LEXINGTON COUNTY | | | | | | | | | |
| Freeway | 528,900 | 439,100 | 968,000 | 794,640 | 548,460 | 1,343,100 | 1,124,000 | 660,000 | 1,784,000 |
| Arterial | 641,800 | 561,200 | 1,203,000 | 797,700 | 581,700 | 1,379,400 | 865,000 | 588,000 | 1,453.000 |
| Collector | 141,300 | 323,500 | 464,800 | 212,100 | 332,400 | 544,500 | 201,000 | 339,000 | 540,000 |
| Local | 124,300 | 201,500 | 325,800 | 163,560 | 199,440 | 363,000 | 178,000 | 196,000 | 374,000 |
| Total | 1,436,300 | 1,525,300 | 2,961,600 | 1,968,000 | 1,662,000 | 3,630,000 | 2,368,000 | 1,783,000 | 4,151,000 |
| RICHLAND COUNTY | | | | | | | | | |
| Freeway | 525,300 | 293,600 | 818,900 | 743,540 | 409,920 | 1,153,460 | 1,087,000 | 586,000 | 1,673,000 |
| Arterial | 1,740,200 | 847,000 | 2,587,200 | 1,795,530 | 878,400 | 2,673,930 | 1,832,000 | 879,000 | 2,711,000 |
| Collector | 473,100 | 380,600 | 853,700 | 481,390 | 409,920 | 691,310 | 467,000 | 398,000 | 865,000 |
| Local | 287,600 | 238,900 | 526,500 | 270,540 | 253,760 | 524,300 | 289,000 | 230,000 | 519,000 |
| Total | 3,026,200 | 1,760,100 | 4,786,300 | 3,291,000 | 1,952,000 | 5,243,000 | 3,675,000 | 2,093,000 | 5,768,000 |
| Grand Total | 4,462,500 | 3,285,400 | 7,747,900 | 5,259,000 | 3,614,000 | 8,873,000 | 6,043,000 | 3,876,000 | 9,919,000 |
| BERKELEY COUNTY | | | | | | | | | |
| Freeway | -0- | 115,200 | 115,200 | 18,500 | 119,000 | 137,500 | 58,890 | 127,160 | 186,000 |
| Arterial | 237,900 | 453,300 | 691,200 | 364,000 | 433,500 | 797,500 | 522,000 | 374,000 | 896,000 |
| Collector | 40,400 | 217,600 | 258,000 | 93,250 | 195,500 | 288,750 | 144,440 | 164,560 | 309,000 |
| Local | 30,600 | 107,700 | 138,300 | 49,250 | 102,000 | 151,250 | 72,720 | 82,280 | 155,000 |
| Total | 308,900 | 893,800 | 1,202,700 | 525,000 | 850,000 | 1,375,000 | 798,000 | 748,000 | 1,546,000 |
| CHARLESTON | | | | | | | | | |
| Freeway | 694,100 | -0- | 694,100 | 888,000 | -0- | 888,000 | 1,080,000 | -0- | 1,080,000 |
| Arterial | 1,608,100 | 651,100 | 2,259,200 | 1,608,800 | 700,000 | 2,308,800 | 1,552,280 | 885,720 | 2,438,000 |
| Collector | 401,000 | 321,500 | 722,500 | 404,800 | 350,000 | 754,800 | 325,480 | 377,520 | 703,000 |
| Local | 297,400 | 180,200 | 477,600 | 288,400 | 200,000 | 488,400 | 279,240 | 188,760 | 468,000 |
| Total | 3,000,600 | 1,152,800 | 4,153,400 | 3,190,000 | 1,250,000 | 4,440,000 | 3,237,000 | 1,452,000 | 4,689,000 |
| Grand Total | 3,309,500 | 2,046,600 | 5,356,100 | 3,715,000 | 2,100,000 | 5,815,000 | 4,035,000 | 2,200,000 | 6,235,000 |

Provided by South Carolina Department of Highways and Public Transportation.

TABLE 10

YORK COUNTY VMT ESTIMATES*

| | 1977 | 1982 | 1987 |
|---|---|---|---|
| URBAN | | | |
| Freeways | 86,806 | 117,837 | 148,868 |
| Arterials | 337,893 | 458,681 | 579,469 |
| Collectors | 82,218 | 111,609 | 141,000 |
| Local | 41,655 | 56,546 | 71,436 |
| RURAL | | | |
| Freeways | 130,209 | 176,756 | 223,302 |
| Arterials | 397,777 | 539,971 | 682,166 |
| Collectors | 99,442 | 134,993 | 170,542 |
| Local | 553,234 | 751,002 | 948,769 |

*Vehicle miles traveled per day estimates are derived from data presented in AREA SOURCE EMISSION INVENTORY FOR YORK COUNTY, SOUTH CAROLINA, BOA Contract 68-02-1380, Task Order No. 12 by Engineering-Science.

TABLE 11

ANNUAL NMHC EMISSIONS FOR 1977, 1982 AND 1987*

(TONS/YEAR)

| | 1977 | | | 1982* | | | 1987* | | |
|---|---|---|---|---|---|---|---|---|---|
| COUNTY | URBAN | RURAL | TOTAL | URBAN | RURAL | TOTAL | URBAN | RURAL | TOTAL |
| Berkeley | 707 | 1,714 | 2,421 | 660 | 867 | 1,527 | 530 | 389 | 919 |
| Charleston | 6,938 | 2,267 | 9,205 | 4,023 | 1,312 | 5,335 | 2,138 | 782 | 2,920 |
| Lexington | 3,089 | 2,872 | 5,961 | 2,307 | 1,655 | 3,962 | 1,417 | 896 | 2,313 |
| Richland | 7,008 | 3,368 | 10,376 | 4,170 | 1,978 | 6,148 | 2,432 | 1,067 | 3,499 |
| York | 1,228 | 2,433 | 3,661 | 918 | 1,796 | 2,714 | 617 | 1,205 | 1,821 |

*Without an inspection and maintenance program.

TABLE 12

PROJECTED ANNUAL NMHC EMISSIONS FOR 1982 AND 1987

IF INSPECTION/MAINTENANCE IS INTRODUCED IN 1981*

(TONS/YEAR)

| COUNTY | 1982 URBAN | 1982 RURAL | 1982 TOTAL | 1987 URBAN | 1987 RURAL | 1987 TOTAL | |
|---|---|---|---|---|---|---|---|
| Berkeley | 618 | 816 | 1,434 | 398 | 299 | 697 | 24.16% |
| Charleston | 3,789 | 1,239 | 5,028 | 1,622 | 594 | 2,216 | 24.17% |
| Lexington | 2,175 | 1,573 | 3,748 | 1,092 | 701 | 1,793 | 22.48% |
| Richland | 3,918 | 1,872 | 5,790 | 1,842 | 828 | 2,670 | 23.70% |
| York | 863 | 1,692 | 2,555 | 467 | 911 | 1,378 | 24.33% |

*Program assumed to have a stringency of 30% and mechanics training.

TABLE 13

ANNUAL CO EMISSIONS FOR 1977, 1982 and 1987*

(TONS/YEAR)

| | 1977 | | | 1982* | | | 1987* | | |
|---|---|---|---|---|---|---|---|---|---|
| COUNTY | URBAN | RURAL | TOTAL | URBAN | RURAL | TOTAL | URBAN | RURAL | TOTAL |
| Berkeley | 5,548 | 12,033 | 17,581 | 6,567 | 8,117 | 14,684 | 5,874 | 4,242 | 10,116 |
| Charleston | 55,721 | 16,072 | 71,793 | 40,955 | 12,401 | 53,356 | 24,149 | 8,566 | 32,715 |
| Lexington | 23,822 | 20,151 | 43,973 | 23,088 | 15,460 | 38,548 | 16,072 | 9,831 | 25,903 |
| Richland | 56,129 | 23,700 | 79,829 | 42,423 | 18,560 | 60,983 | 27,453 | 11,707 | 39,160 |
| York | 9,586 | 18,152 | 27,738 | 9,178 | 17,581 | 26,759 | 6,853 | 12,645 | 19,498 |

*Without an inspection and maintenance program.

TABLE 14

PROJECTED ANNUAL CO EMISSIONS FOR 1982 AND 1987

IF INSPECTION/MAINTENANCE IS INTRODUCED IN 1981*

(TONS/YEAR)

| | 1982 | | | 1987 | | | |
|---|---|---|---|---|---|---|---|
| COUNTY | URBAN | RURAL | TOTAL | URBAN | RURAL | TOTAL | |
| Berkeley | 5,466 | 6,812 | 12,278 | 3,794 | 2,815 | 6,609 | 34.67% |
| Charleston | 34,306 | 10,320 | 44,626 | 15,949 | 5,507 | 21,456 | 34.42% |
| Lexington | 19,417 | 13,135 | 32,552 | 10,769 | 6,690 | 17,459 | 32.60 |
| Richland | 35,489 | 15,623 | 51,112 | 18,071 | 7,873 | 25,944 | 33.75% |
| York | 7,669 | 14,767 | 22,436 | 4,487 | 8,893 | 13,380 | 31.38% |

*Program assumed to have a stringency of 30% and mechanics training.

# APPENDIX A

## MOBILE EMISSION FACTORS

The output of the Mobile I emission factor program is reproduced here for completeness. The four urban road classes can be identified by average speed, refer to Table 4, which varies from county to county. The four rural road classes are common to each county. The emission factors are given in grams/mile for 1977 and for 1982 and 1987 with and without inspection/maintenance (I/M).

# MOBILE EMISSION FACTORS

## BERKELEY COUNTY, 1977 NO I/M

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 0.716/0.077/0.037/0.035/0.134/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 10.0/ 10.0/ 10.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.37 | 4.75 | 6.50 | 10.75 | 2.35 | 6.28 | 4.43 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 28.51 | 30.31 | 32.22 | 138.15 | 14.14 | 18.01 | 30.69 |
| EXHAUST NO : | 4.22 | 4.20 | 6.82 | 13.46 | 23.87 | 0.16 | 7.26 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 34.0:34.0/34.0/34.0 MPH (34.0) 0.779/0.134/0.032/0.011/0.043/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 15.0/ 20.0/ 15.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.25 | 5.68 | 7.57 | 14.37 | 2.93 | 7.65 | 5.38 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 39.97 | 41.96 | 44.73 | 153.88 | 17.77 | 23.16 | 40.67 |
| EXHAUST NO : | 3.99 | 3.98 | 6.34 | 12.00 | 18.55 | 0.15 | 4.78 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 31.0:31.0/31.0/31.0 MPH (31.0) 0.791/0.154/0.028/0.006/0.020/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 20.0/ 20.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.69 | 6.15 | 8.10 | 15.87 | 3.13 | 8.29 | 5.84 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 46.31 | 48.44 | 51.52 | 166.47 | 19.44 | 25.75 | 46.95 |
| EXHAUST NO : | 3.94 | 3.93 | 6.17 | 11.72 | 18.51 | 0.15 | 4.34 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0) 0.768/0.169/0.033/0.011/0.018/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 40.0/ 30.0/ 40.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 7.61 | 8.19 | 10.44 | 22.39 | 3.92 | 11.01 | 7.90 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 73.01 | 75.73 | 80.27 | 224.17 | 26.51 | 36.55 | 74.50 |
| EXHAUST NO : | 3.88 | 3.86 | 5.79 | 11.00 | 19.70 | 0.15 | 4.30 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## BERKELEY COUNTY, 1982, NO I/M

CAL. YEAR: 1982 TEMP: 75.0(F)
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.716 | 0.077 | 0.037 | 0.035 | 0.134 | 0.001 |
| | 10.0/ 10.0/ 10.0 | | | | | |

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.14 | 2.77 | 3.86 | 5.94 | 2.07 | 2.40 | 2.38 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 18.40 | 26.36 | 27.03 | 151.79 | 11.73 | 8.88 | 23.14 |
| EXHAUST NO : | 3.11 | 3.36 | 4.53 | 12.75 | 25.77 | 0.49 | 6.56 |

CAL. YEAR: 1982 TEMP: 75.0(F)
REGION: 49-STATE 34.0:34.0/34.0/34.0 MPH (34.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.779 | 0.134 | 0.032 | 0.011 | 0.043 | 0.001 |
| | 15.0/ 20.0/ 15.0 | | | | | |

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.68 | 3.52 | 4.68 | 8.48 | 2.73 | 3.36 | 2.93 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 25.20 | 36.21 | 36.99 | 168.39 | 15.69 | 12.38 | 28.21 |
| EXHAUST NO : | 2.89 | 3.15 | 4.21 | 11.15 | 17.97 | 0.47 | 3.71 |

CAL. YEAR: 1982 TEMP: 75.0(F)
REGION: 49-STATE 31.0:31.0/31.0/31.0 MPH (31.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.791 | 0.154 | 0.028 | 0.006 | 0.020 | 0.001 |
| | 20.0/ 20.0/ 20.0 | | | | | |

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.96 | 3.92 | 5.10 | 9.53 | 2.96 | 3.81 | 3.21 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 29.54 | 42.23 | 42.69 | 178.15 | 17.34 | 14.28 | 32.50 |
| EXHAUST NO : | 2.85 | 3.12 | 4.12 | 10.85 | 17.82 | 0.46 | 3.28 |

CAL. YEAR: 1982 TEMP: 75.0(F)
REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.768 | 0.169 | 0.033 | 0.011 | 0.018 | 0.001 |
| | 40.0/ 30.0/ 40.0 | | | | | |

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.22 | 5.64 | 6.96 | 14.05 | 3.88 | 5.80 | 4.65 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 47.74 | 67.29 | 67.76 | 219.79 | 24.27 | 22.29 | 53.15 |
| EXHAUST NO : | 2.77 | 3.08 | 3.91 | 10.04 | 19.04 | 0.46 | 3.23 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## BERKELEY COUNTY, 1987, NO I/M

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE     50.0:50.0/50.0/50.0 MPH (50.0)       10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:    0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
NON-METH HC:    0.98     1.59     1.93     2.25     1.48     0.51      1.17
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    9.85    18.93    18.03    85.97    10.82     2.69     13.64
EXHAUST NO :    2.43     2.67     2.89     9.99    18.11     0.30      4.83
-----------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     34.0:34.0/34.0/34.0 MPH (34.0)       15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:    0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
NON-METH HC:    1.34     2.12     2.46     4.01     2.01     0.74      1.53
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:   13.68    25.32    24.26    95.19    14.86     3.84     16.52
EXHAUST NO :    2.24     2.51     2.69     8.64    12.21     0.28      2.79
-----------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     31.0:31.0/31.0/31.0 MPH (31.0)       20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:    0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
NON-METH HC:    1.53     2.40     2.73     4.71     2.21     0.86      1.73
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:   16.42    29.66    28.23   100.02    16.51     4.48     19.28
EXHAUST NO :    2.21     2.48     2.65     8.38    12.08     0.28      2.50
-----------------------------------------------------------------------------
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)       40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:    0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC     ALL MODES
NON-METH HC:    2.45     3.64     3.96     7.68     2.97     1.36      2.76
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:   28.44    47.54    44.75   119.95    23.43     7.18     33.10
EXHAUST NO :    2.14     2.47     2.57     7.71    12.96     0.28      2.46
-----------------------------------------------------------------------------
```

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## CHARLESTON COUNTY, 1977, NO I/M

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 0.716/0.077/0.037/0.035/0.134/0.001
AC: 0.66 XLOAD: 48.0:48.0/48.0/48.0 MPH (48.0) 10.0/ 10.0/ 10.0
0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.40 | 4.78 | 6.53 | 10.92 | 2.38 | 6.33 | 4.47 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 28.94 | 30.73 | 32.61 | 135.92 | 14.21 | 18.21 | 30.97 |
| EXHAUST NO : | 4.14 | 4.12 | 6.71 | 13.27 | 22.61 | 0.16 | 7.03 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 0.779/0.134/0.032/0.011/0.043/0.001
AC: 0.66 XLOAD: 32.0:32.0/32.0/32.0 MPH (32.0) 15.0/ 20.0/ 15.0
0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.42 | 5.87 | 7.78 | 15.32 | 3.06 | 7.94 | 5.57 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 42.45 | 44.51 | 47.37 | 161.84 | 18.83 | 24.29 | 43.17 |
| EXHAUST NO : | 3.92 | 3.91 | 6.20 | 11.82 | 18.50 | 0.15 | 4.70 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 0.791/0.154/0.028/0.006/0.020/0.001
AC: 0.66 XLOAD: 28.0:28.0/28.0/28.0 MPH (28.0) 20.0/ 20.0/ 20.0
0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 6.01 | 6.50 | 8.50 | 17.80 | 3.38 | 8.81 | 6.18 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 51.04 | 53.29 | 56.52 | 183.36 | 21.57 | 27.85 | 51.72 |
| EXHAUST NO : | 3.81 | 3.80 | 5.92 | 11.45 | 18.73 | 0.15 | 4.21 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 0.768/0.169/0.033/0.011/0.018/0.001
AC: 0.66 XLOAD: 18.0:18.0/18.0/18.0 MPH (18.0) 40.0/ 30.0/ 40.0
0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 8.72 | 9.38 | 11.79 | 29.66 | 4.64 | 12.79 | 9.09 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 88.59 | 91.65 | 97.44 | 288.15 | 33.91 | 43.57 | 90.56 |
| EXHAUST NO : | 3.62 | 3.61 | 5.34 | 10.54 | 21.52 | 0.14 | 4.07 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## CHARLESTON COUNTY, 1982, NO I/M

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                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1982      TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE     48.0:48.0/48.0/48.0 MPH (48.0)      10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    2.16     2.80     3.89     6.07     2.11     2.44      2.40
   *EVAP HC:    0.94     1.01     1.56     1.74     0.0      0.27      ----
EXHAUST  CO:   18.56    27.07    27.28   150.99    11.89     9.01     23.27
EXHAUST NO :    3.06     3.30     4.45    12.55    23.92     0.48      6.25
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1982      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     32.0:32.0/32.0/32.0 MPH (32.0)      15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    2.79     3.68     4.84     9.15     2.88     3.55      3.05
   *EVAP HC:    0.94     1.01     1.56     1.74     0.0      0.27      ----
EXHAUST  CO:   26.85    38.54    39.25   174.60    16.75    13.14     29.99
EXHAUST NO :    2.84     3.09     4.12    10.95    17.83     0.46      3.64
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1982      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     28.0:28.0/28.0/28.0 MPH (28.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    3.17     4.20     5.40    10.88     3.25     4.17      3.44
   *EVAP HC:    0.94     1.01     1.56     1.74     0.0      0.27      ----
EXHAUST  CO:   32.71    46.70    47.21   190.76    19.44    15.75     35.94
EXHAUST NO :    2.75     3.00     3.95    10.54    17.99     0.45      3.17
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV   LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1982      TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     18.0:18.0/18.0/18.0 MPH (18.0)      40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    4.89     6.58     7.99    18.95     4.77     6.98      5.43
   *EVAP HC:    0.94     1.01     1.56     1.74     0.0      0.27      ----
EXHAUST  CO:   57.51    80.36    81.84   262.66    31.51    27.08     54.02
EXHAUST NO :    2.56     2.84     3.59     9.54    21.21     0.43      3.05
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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSIONS FACTORS

## CHARLESTON COUNTY, 1987, NO I/M

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE 48.0:48.0/48.0/48.0 MPH (48.0) 10.0/ 10.0/ 10.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 0.99 | 1.61 | 1.94 | 2.35 | 1.51 | 0.52 | 1.19 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 9.90 | 19.04 | 18.15 | 85.79 | 11.01 | 2.73 | 13.70 |
| EXHAUST NO : | 2.39 | 2.62 | 2.84 | 9.82 | 16.70 | 0.29 | 4.60 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE 32.0:32.0/32.0/32.0 MPH (32.0) 15.0/ 20.0/ 15.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.40 | 2.23 | 2.56 | 4.45 | 2.14 | 0.79 | 1.61 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 14.57 | 27.02 | 25.80 | 98.28 | 15.92 | 4.10 | 17.56 |
| EXHAUST NO : | 2.20 | 2.46 | 2.64 | 8.47 | 12.10 | 0.28 | 2.74 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE 28.0:28.0/28.0/28.0 MPH (28.0) 20.0/ 20.0/ 20.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.65 | 2.61 | 2.94 | 5.60 | 2.44 | 0.95 | 1.88 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 18.16 | 32.91 | 31.17 | 106.16 | 18.60 | 4.97 | 21.32 |
| EXHAUST NO : | 2.12 | 2.39 | 2.54 | 8.13 | 12.20 | 0.27 | 2.41 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001
REGION: 49-STATE 18.0:18.0/18.0/18.0 MPH (18.0) 40.0/ 30.0/ 40.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.88 | 4.30 | 4.62 | 10.79 | 3.71 | 1.65 | 3.28 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 34.04 | 57.04 | 53.82 | 139.72 | 30.72 | 8.77 | 39.66 |
| EXHAUST NO : | 1.96 | 2.28 | 2.37 | 7.29 | 14.55 | 0.26 | 2.31 |

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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## LEXINGTON AND YORK COUNTIES, 1977, NO I/M

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 0.716/0.077/0.037/0.035/0.134/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 10.0/ 10.0/ 10.0
0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.37 | 4.75 | 6.50 | 10.75 | 2.35 | 6.28 | 4.43 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 28.51 | 30.31 | 32.22 | 138.15 | 14.14 | 18.01 | 30.69 |
| EXHAUST NO : | 4.22 | 4.20 | 6.82 | 13.46 | 23.87 | 0.16 | 7.26 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 33.0:33.0/33.0/33.0 MPH (33.0) 0.779/0.134/0.032/0.011/0.043/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 15.0/ 20.0/ 15.0
0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.33 | 5.77 | 7.67 | 14.83 | 2.99 | 7.79 | 5.47 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 41.17 | 43.19 | 46.01 | 157.65 | 18.28 | 23.71 | 41.88 |
| EXHAUST NO : | 3.96 | 3.94 | 6.27 | 11.91 | 18.51 | 0.15 | 4.74 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 30.0:30.0/30.0/30.0 MPH (30.0) 0.791/0.154/0.028/0.006/0.020/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 20.0/ 20.0/ 20.0
0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.79 | 6.26 | 8.23 | 16.46 | 3.21 | 8.46 | 5.95 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 47.80 | 49.97 | 53.10 | 171.58 | 20.09 | 26.42 | 48.45 |
| EXHAUST NO : | 3.90 | 3.89 | 6.09 | 11.63 | 18.56 | 0.15 | 4.30 |

CAL. YEAR: 1977 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0) 0.768/0.169/0.033/0.011/0.018/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 40.0/ 30.0/ 40.0
0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 7.61 | 8.19 | 10.44 | 22.39 | 3.92 | 11.01 | 7.90 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 73.01 | 75.73 | 80.27 | 224.17 | 26.51 | 36.55 | 74.50 |
| EXHAUST NO : | 3.88 | 3.86 | 5.79 | 11.00 | 19.70 | 0.15 | 4.30 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## LEXINGTON AND YORK COUNTIES, 1982, NO I/M

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 10.0/ 10.0/ 10.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.14 | 2.77 | 3.86 | 5.94 | 2.07 | 2.40 | 2.38 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 18.40 | 26.86 | 27.03 | 151.79 | 11.73 | 8.88 | 23.14 |
| EXHAUST NO : | 3.11 | 3.36 | 4.53 | 12.75 | 25.77 | 0.49 | 6.56 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE 33.0:33.0/33.0/33.0 MPH (33.0) 15.0/ 20.0/ 15.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.73 | 3.60 | 4.76 | 8.80 | 2.80 | 3.45 | 2.99 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 26.00 | 37.33 | 38.08 | 171.35 | 16.20 | 12.75 | 29.07 |
| EXHAUST NO : | 2.87 | 3.13 | 4.17 | 11.05 | 17.88 | 0.46 | 3.68 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE 30.0:30.0/30.0/30.0 MPH (30.0) 20.0/ 20.0/ 20.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 3.03 | 4.01 | 5.20 | 9.94 | 3.05 | 3.93 | 3.28 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 30.54 | 43.64 | 44.26 | 182.01 | 17.99 | 14.74 | 33.59 |
| EXHAUST NO : | 2.82 | 3.08 | 4.06 | 10.75 | 17.84 | 0.46 | 3.24 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001
REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0) 40.0/ 30.0/ 40.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.22 | 5.64 | 6.96 | 14.05 | 3.88 | 5.80 | 4.65 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 47.74 | 67.29 | 67.76 | 219.79 | 24.27 | 22.29 | 53.15 |
| EXHAUST NO : | 2.77 | 3.08 | 3.91 | 10.04 | 19.04 | 0.46 | 3.23 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## LEXINGTON AND YORK COUNTIES, 1987, NO I/M

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001

REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 10.0/ 10.0/ 10.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 0.98 | 1.59 | 1.93 | 2.25 | 1.48 | 0.51 | 1.17 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 9.85 | 18.93 | 18.03 | 85.97 | 10.82 | 2.69 | 13.64 |
| EXHAUST NO : | 2.43 | 2.67 | 2.89 | 9.99 | 18.11 | 0.30 | 4.83 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001

REGION: 49-STATE 33.0:33.0/33.0/33.0 MPH (33.0) 15.0/ 20.0/ 15.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.37 | 2.18 | 2.51 | 4.22 | 2.07 | 0.77 | 1.57 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 14.11 | 26.14 | 25.00 | 96.67 | 15.37 | 3.96 | 17.02 |
| EXHAUST NO : | 2.22 | 2.48 | 2.67 | 8.55 | 12.14 | 0.28 | 2.76 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001

REGION: 49-STATE 30.0:30.0/30.0/30.0 MPH (30.0) 20.0/ 20.0/ 20.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.57 | 2.47 | 2.80 | 4.98 | 2.28 | 0.89 | 1.78 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 16.97 | 30.69 | 29.16 | 101.91 | 17.15 | 4.64 | 19.93 |
| EXHAUST NO : | 2.18 | 2.45 | 2.62 | 8.30 | 12.10 | 0.28 | 2.47 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1987 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001

REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0) 40.0/ 30.0/ 40.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.45 | 3.64 | 3.96 | 7.68 | 2.97 | 1.36 | 2.76 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | ---- |
| EXHAUST CO: | 28.44 | 47.54 | 44.75 | 119.95 | 23.43 | 7.18 | 33.10 |
| EXHAUST NO : | 2.14 | 2.47 | 2.57 | 7.71 | 12.96 | 0.28 | 2.46 |

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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## RICHLAND COUNTY, 1977, NO I/M

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 10.0/ 10.0/ 0.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.13 | 4.51 | 6.19 | 10.75 | 2.35 | 6.21 | 4.23 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 24.84 | 26.82 | 27.90 | 138.15 | 14.14 | 17.91 | 27.63 |
| EXHAUST NO : | 4.09 | 4.06 | 6.73 | 13.46 | 23.87 | 0.16 | 7.16 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE 31.0:31.0/31.0/31.0 MPH (31.0) 15.0/ 20.0/ 15.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.52 | 5.97 | 7.90 | 15.87 | 3.13 | 8.09 | 5.67 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 43.82 | 45.91 | 48.81 | 166.47 | 19.44 | 24.90 | 44.54 |
| EXHAUST NO : | 3.89 | 3.87 | 6.12 | 11.72 | 18.51 | 0.15 | 4.67 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE 29.0:29.0/29.0/29.0 MPH (29.0) 20.0/ 20.0/ 20.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.90 | 6.38 | 8.36 | 17.10 | 3.29 | 8.63 | 6.06 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 49.38 | 51.59 | 54.76 | 177.20 | 20.80 | 27.12 | 50.04 |
| EXHAUST NO : | 3.86 | 3.84 | 6.01 | 11.54 | 18.63 | 0.15 | 4.25 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1977 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001
REGION: 49-STATE 20.0:20.0/20.0/20.0 MPH (20.0) 40.0/ 30.0/ 40.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 8.21 | 8.84 | 11.17 | 26.33 | 4.32 | 11.97 | 8.55 |
| *EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 81.51 | 84.42 | 89.57 | 259.04 | 30.58 | 40.36 | 83.26 |
| EXHAUST NO : | 3.72 | 3.70 | 5.50 | 10.72 | 20.67 | 0.14 | 4.15 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## RICHLAND COUNTY, 1982, NO I/M

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001

REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 10.0/ 10.0/ 10.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.14 | 2.77 | 3.86 | 5.94 | 2.07 | 2.40 | 2.38 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 18.40 | 26.86 | 27.03 | 151.79 | 11.73 | 8.88 | 23.14 |
| EXHAUST NO : | 3.11 | 3.36 | 4.53 | 12.75 | 25.77 | 0.49 | 6.56 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001

REGION: 49-STATE 31.0:31.0/31.0/31.0 MPH (31.0) 15.0/ 20.0/ 15.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.85 | 3.76 | 4.53 | 9.53 | 2.96 | 3.65 | 3.12 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 27.76 | 39.83 | 40.50 | 178.15 | 17.34 | 13.57 | 30.98 |
| EXHAUST NO : | 2.81 | 3.06 | 4.07 | 10.85 | 17.82 | 0.46 | 3.61 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001

REGION: 49-STATE 29.0:29.0/29.0/29.0 MPH (29.0) 20.0/ 20.0/ 20.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 3.10 | 4.10 | 5.30 | 10.39 | 3.15 | 4.05 | 3.36 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 31.60 | 45.14 | 45.70 | 186.21 | 18.68 | 15.23 | 34.73 |
| EXHAUST NO : | 2.78 | 3.04 | 4.01 | 10.65 | 17.90 | 0.45 | 3.21 |

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VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1982 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001

REGION: 49-STATE 20.0:20.0/20.0/20.0 MPH (20.0) 40.0/ 30.0/ 40.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.59 | 6.16 | 7.52 | 16.73 | 4.38 | 6.44 | 5.08 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 53.13 | 74.79 | 75.45 | 243.48 | 28.25 | 24.90 | 59.15 |
| EXHAUST NO : | 2.64 | 2.93 | 3.71 | 9.74 | 20.19 | 0.44 | 3.11 |

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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## RICHLAND COUNTY, 1987, NO I/M

CAL. YEAR: 1987 TEMP: 75.0(F)
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.716 | 0.077 | 0.037 | 0.035 | 0.134 | 0.001 |

10.0/ 10.0/ 10.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 0.98 | 1.59 | 1.93 | 2.25 | 1.48 | 0.51 | 1.17 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | --- |
| EXHAUST CO: | 9.85 | 18.93 | 18.03 | 85.97 | 10.82 | 2.69 | 13.64 |
| EXHAUST NO : | 2.43 | 2.67 | 2.89 | 9.99 | 18.11 | 0.30 | 4.83 |

CAL. YEAR: 1987 TEMP: 75.0(F)
REGION: 49-STATE 31.0:31.0/31.0/31.0 MPH (31.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.779 | 0.134 | 0.032 | 0.011 | 0.043 | 0.001 |

15.0/ 20.0/ 15.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.44 | 2.29 | 2.62 | 4.71 | 2.21 | 0.82 | 1.66 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | --- |
| EXHAUST CO: | 15.06 | 27.96 | 26.65 | 100.02 | 16.51 | 4.24 | 18.15 |
| EXHAUST NO : | 2.17 | 2.43 | 2.60 | 8.38 | 12.08 | 0.28 | 2.71 |

CAL. YEAR: 1987 TEMP: 75.0(F)
REGION: 49-STATE 29.0:29.0/29.0/29.0 MPH (29.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.791 | 0.154 | 0.028 | 0.006 | 0.020 | 0.001 |

20.0/ 20.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.61 | 2.54 | 2.87 | 5.28 | 2.36 | 0.92 | 1.82 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | --- |
| EXHAUST CO: | 17.55 | 31.77 | 30.14 | 103.96 | 17.85 | 4.80 | 20.61 |
| EXHAUST NO : | 2.15 | 2.42 | 2.58 | 8.21 | 12.14 | 0.28 | 2.44 |

CAL. YEAR: 1987 TEMP: 75.0(F)
REGION: 49-STATE 20.0:20.0/20.0/20.0 MPH (20.0)
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

| VEH. TYPE: | LDV | LDT1 | LDT2 | HDG | HDD | MC |
|---|---|---|---|---|---|---|
| | 0.768 | 0.169 | 0.033 | 0.011 | 0.018 | 0.001 |

40.0/ 30.0/ 40.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.69 | 4.00 | 4.32 | 9.39 | 3.38 | 1.52 | 3.05 |
| *EVAP HC: | 0.33 | 0.42 | 0.57 | 0.66 | 0.0 | 0.03 | --- |
| EXHAUST CO: | 31.55 | 52.82 | 49.75 | 130.95 | 27.43 | 8.05 | 36.74 |
| EXHAUST NO : | 2.03 | 2.35 | 2.44 | 7.45 | 13.80 | 0.27 | 2.36 |

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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## ALL RURAL, 1977, NO I/M

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 0.676/0.077/0.037/0.035/0.174/0.001

REGION: 49-STATE 59.0:59.0/59.0/59.0 MPH (59.0) 10.0/ 10.0/ 10.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.03 | 4.39 | 6.13 | 10.81 | 2.32 | 5.85 | 4.08 |
| =EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 23.27 | 24.79 | 28.76 | 166.63 | 15.12 | 15.78 | 27.18 |
| EXHAUST NO : | 4.93 | 4.92 | 8.09 | 14.28 | 33.08 | 0.19 | 10.26 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001

REGION: 49-STATE 55.0:55.0/55.0/55.0 MPH (55.0) 20.0/ 20.0/ 20.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.58 | 4.97 | 6.77 | 10.62 | 2.31 | 6.51 | 4.67 |
| =EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 30.92 | 32.68 | 35.48 | 149.70 | 14.41 | 18.62 | 31.88 |
| EXHAUST NO : | 4.79 | 4.78 | 7.64 | 13.91 | 28.13 | 0.18 | 5.98 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001

REGION: 49-STATE 48.0:48.0/48.0/48.0 MPH (48.0) 20.0/ 20.0/ 20.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 4.73 | 5.13 | 6.93 | 10.92 | 2.38 | 6.72 | 4.85 |
| =EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 33.24 | 35.07 | 37.23 | 135.92 | 14.21 | 19.61 | 33.85 |
| EXHAUST NO : | 4.40 | 4.39 | 7.00 | 13.27 | 22.61 | 0.17 | 4.88 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC

CAL. YEAR: 1977 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.018/0.001

REGION: 49-STATE 40.0:40.0/40.0/40.0 MPH (40.0) 40.0/ 20.0/ 40.0

AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 5.57 | 6.01 | 7.53 | 12.31 | 2.62 | 7.83 | 5.74 |
| =EVAP HC: | 2.06 | 2.22 | 3.23 | 2.56 | 0.0 | 1.60 | ---- |
| EXHAUST CO: | 45.29 | 47.27 | 50.40 | 138.83 | 15.51 | 24.10 | 46.26 |
| EXHAUST NO : | 4.45 | 4.44 | 6.88 | 12.54 | 19.44 | 0.17 | 4.88 |

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## ALL RURAL, 1982, NO I/M

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 59.0:59.0/59.0/59.0 MPH (59.0) 0.676/0.077/0.037/0.035/0.174/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 10.0/ 10.0/ 10.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.91 | 2.45 | 3.55 | 5.86 | 2.01 | 2.05 | 2.17 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 13.91 | 20.26 | 22.67 | 166.59 | 11.97 | 7.29 | 19.72 |
| EXHAUST NO : | 3.69 | 3.97 | 5.38 | 13.66 | 40.17 | 0.56 | 10.47 |

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 55.0:55.0/55.0/55.0 MPH (55.0) 0.779/0.134/0.032/0.011/0.043/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 20.0/ 20.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.29 | 2.97 | 4.09 | 5.80 | 2.02 | 2.60 | 2.46 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 19.99 | 28.82 | 29.59 | 157.53 | 11.66 | 9.56 | 22.62 |
| EXHAUST NO : | 3.53 | 3.85 | 5.11 | 13.26 | 32.26 | 0.56 | 4.96 |

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 48.0:48.0/48.0/48.0 MPH (48.0) 0.791/0.154/0.028/0.006/0.020/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 20.0/ 20.0/ 20.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.39 | 3.11 | 4.22 | 6.07 | 2.11 | 2.78 | 2.57 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 21.56 | 31.06 | 31.31 | 150.99 | 11.89 | 10.26 | 23.87 |
| EXHAUST NO : | 3.22 | 3.52 | 4.67 | 12.55 | 23.92 | 0.51 | 3.78 |

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 40.0:40.0/40.0/40.0 MPH (40.0) 0.769/0.169/0.033/0.011/0.018/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 40.0/ 20.0/ 40.0

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.93 | 3.86 | 5.02 | 7.05 | 2.38 | 3.64 | 3.20 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 29.44 | 41.71 | 42.38 | 155.81 | 13.41 | 13.80 | 33.06 |
| EXHAUST NO : | 3.27 | 3.61 | 4.65 | 11.75 | 19.32 | 0.52 | 3.76 |

Total HC emission factors include evaporative HC emission factors.

MOBILE EMISSION FACTORS

ALL RURAL, 1987, NO I/M

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                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1987        TEMP: 75.0(F)          0.676/0.077/0.037/0.035/0.174/0.001
 REGION: 49-STATE       59.0:59.0/59.0/59.0 MPH (59.0)      10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:     0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:      0.84     1.33     1.70     2.05     1.41     0.41       1.05
   *EVAP HC:      0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:      7.20    13.72    14.21    91.62    10.85     2.15      11.55
EXHAUST NO :      2.89     3.17     3.44    10.75    29.22     0.34       7.79
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1987        TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE       55.0:55.0/55.0/55.0 MPH (55.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:     0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:      1.12     1.73     2.07     2.09     1.42     0.56       1.25
   *EVAP HC:      0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:     11.31    20.21    19.48    88.07    10.66     2.93      13.57
EXHAUST NO :      2.75     3.08     3.30    10.41    23.08     0.34       3.77
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1987        TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE       48.0:48.0/48.0/48.0 MPH (48.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:     0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:      1.19     1.83     2.16     2.35     1.51     0.60       1.33
   *EVAP HC:      0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:     12.19    21.86    20.78    85.79    11.01     3.16      14.33
EXHAUST NO :      2.51     2.81     3.01     9.82    16.70     0.31       2.89
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
 CAL. YEAR: 1987        TEMP: 75.0(F)          0.769/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE       40.0:40.0/40.0/40.0 MPH (40.0)      40.0/ 20.0/ 40.0
  AC:  0.66  XLOAD:     0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:      1.58     2.36     2.68     3.04     1.73     0.82       1.77
   *EVAP HC:      0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:     17.63    29.26    27.84    88.76    12.58     4.37      20.63
EXHAUST NO :      2.56     2.92     3.06     9.14    13.23     0.32       2.90
-----------------------------------------------------------------------------
```

Total HC emission factors include Evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## BERKELEY COUNTY, 1982, WITH I/M

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                                        VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1982        TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE       50.0:50.0/50.0/50.0 MPH (50.0)      10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
NON-METH HC:      1.99      2.77      3.86      5.94      2.07      2.40       2.27
   *EVAP HC:      0.94      1.01      1.56      1.74      0.0       0.27       ----
EXHAUST  CO:     13.91     26.86     27.03    151.79     11.73     8.88      19.92
EXHAUST NO :      3.11      3.36      4.53     12.75     25.77     0.49       6.56
-----------------------------------------------------------------------------------------
                                        VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1982        TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE       34.0:34.0/34.0/34.0 MPH (34.0)      15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
NON-METH HC:      2.46      3.52      4.68      8.48      2.73      3.36       2.75
   *EVAP HC:      0.94      1.01      1.56      1.74      0.0       0.27       ----
EXHAUST  CO:     19.12     36.21     36.99    168.39     15.69    12.38      23.47
EXHAUST NO :      2.89      3.15      4.21     11.15     17.97     0.47       3.71
-----------------------------------------------------------------------------------------
                                        VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1982        TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE       31.0:31.0/31.0/31.0 MPH (31.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
NON-METH HC:      2.70      3.92      5.10      9.53      2.96      3.81       3.01
   *EVAP HC:      0.94      1.01      1.56      1.74      0.0       0.27       ----
EXHAUST  CO:     22.43     42.23     42.89    178.15     17.34    14.28      26.87
EXHAUST NO :      2.85      3.12      4.12     10.85     17.82     0.46       3.28
-----------------------------------------------------------------------------------------
                                        VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1982        TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE       23.0:23.0/23.0/23.0 MPH (23.0)      40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                   LDV      LDT1      LDT2      HDG       HDD       MC      ALL MODES
NON-METH HC:      3.80      5.64      6.96     14.05      3.88      5.80       4.33
   *EVAP HC:      0.94      1.01      1.56      1.74      0.0       0.27       ----
EXHAUST  CO:     36.32     67.29     67.76    219.79     24.27    22.29      44.38
EXHAUST NO :      2.77      3.08      3.91     10.04     19.04     0.46       3.23
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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## BERKELEY COUNTY, 1987, WITH I/M

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                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1987      TEMP: 75.0(F)            0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE     50.0:50.0/50.0/50.0 MPH (50.0)      10.0/ 10.0/ 10.0
 AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
 LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
 I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.67     1.59     1.93     2.25     1.48     0.51      0.95
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    4.44    18.93    18.03    85.97    10.82     2.69      9.77
EXHAUST NO :    2.43     2.67     2.89     9.99    18.11     0.30      4.83
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1987      TEMP: 75.0(F)            0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE     34.0:34.0/34.0/34.0 MPH (34.0)      15.0/ 20.0/ 15.0
 AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
 LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
 I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.85     2.12     2.46     4.01     2.01     0.74      1.16
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    6.19    25.32    24.26    95.19    14.86     3.84     10.68
EXHAUST NO :    2.24     2.51     2.69     8.64    12.21     0.28      2.79
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1987      TEMP: 75.0(F)            0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE     31.0:31.0/31.0/31.0 MPH (31.0)      20.0/ 20.0/ 20.0
 AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
 LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
 I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.95     2.40     2.73     4.71     2.21     0.86      1.27
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    7.44    29.66    28.23   100.02    16.51     4.48     12.17
EXHAUST NO :    2.21     2.49     2.65     8.38    12.06     0.28      2.50
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG   HDD   MC
CAL. YEAR: 1987      TEMP: 75.0(F)            0.768/0.169/0.033/0.011/0.018/0.001
REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)      40.0/ 30.0/ 40.0
 AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
 LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
 I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.43     3.64     3.96     7.68     2.97     1.36      1.98
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:   12.91    47.54    44.75   119.95    23.43     7.18     21.17
EXHAUST NO :    2.14     2.47     2.57     7.71    12.96     0.28      2.46
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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTOR

## CHARLESTON COUNTY, 1982, WITH I/M

```
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE       48.0:48.0/48.0/48.0 MPH (48.0)      10.0/ 10.0/ 10.0
AC:  0.66  XLOAD:  0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    2.00    2.80    3.89    5.07    2.11    2.44     2.29
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   14.04   27.07   27.28  150.99   11.89    9.01    20.03
EXHAUST NO :    3.06    3.30    4.45   12.55   23.92    0.48     5.25
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE       32.0:32.0/32.0/32.0 MPH (32.0)      15.0/ 20.0/ 15.0
AC:  0.66  XLOAD:  0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    2.55    3.68    4.84    9.15    2.88    3.55     2.87
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   20.37   38.54   39.25  174.60   16.75   13.14    24.94
EXHAUST NO :    2.84    3.09    4.12   10.95   17.83    0.46     3.64
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE       28.0:28.0/28.0/28.0 MPH (28.0)      20.0/ 20.0/ 20.0
AC:  0.66  XLOAD:  0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    2.88    4.20    5.40   10.88    3.25    4.17     3.21
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   24.82   46.70   47.21  190.76   19.44   15.75    29.70
EXHAUST NO :    2.75    3.00    3.95   10.54   17.99    0.45     3.17
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
REGION: 49-STATE       18.0:18.0/18.0/18.0 MPH (18.0)      40.0/ 30.0/ 40.0
AC:  0.66  XLOAD:  0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    4.38    6.58    7.99   18.95    4.77    6.98     5.04
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   43.78   80.86   81.84  262.66   31.51   27.08    53.48
EXHAUST NO :    2.56    2.84    3.59    9.54   21.21    0.43     3.05
-----------------------------------------------------------------------------
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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## CHARLESTON COUNTY, 1987, WITH I/M

```
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE     48.0:48.0/48.0/48.0 MPH (48.0)       10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.67     1.61     1.94     2.35     1.51     0.52       0.96

   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    4.47    19.04    18.15    85.79    11.01     2.73       9.82
EXHAUST NO :    2.39     2.62     2.84     9.82    16.70     0.29       4.60
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     32.0:32.0/32.0/32.0 MPH (32.0)       15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:   0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.89     2.23     2.56     4.45     2.14     0.79       1.22
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    6.59    27.02    25.80    98.28    15.92     4.10      11.35
EXHAUST NO :    2.20     2.46     2.64     8.47    12.10     0.28       2.74
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     28.0:28.0/28.0/28.0 MPH (28.0)       20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.02     2.61     2.94     5.60     2.44     0.95       1.37
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    8.22    32.91    31.17   106.16    18.60     4.97      13.46
EXHAUST NO :    2.12     2.39     2.54     8.13    12.20     0.27       2.41
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     18.0:18.0/18.0/18.0 MPH (18.0)       40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:   0.04    0.20    0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                        COMPOSITE EMISSION FACTORS (GM/MILE)
                  LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.65     4.30     4.62    10.79     3.71     1.65       2.34
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:   15.46    57.04    53.82   139.72    30.72     8.77      25.38
EXHAUST NO :    1.96     2.28     2.37     7.29    14.55     0.26       2.31
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Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## LEXINGTON AND YORK COUNTIES, 1982, WITH I/M

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1982 TEMP: 75.0(F) 0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE 50.0:50.0/50.0/50.0 MPH (50.0) 10.0/ 10.0/ 10.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.99 | 2.77 | 3.86 | 5.94 | 2.07 | 2.40 | 2.27 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 13.91 | 26.86 | 27.03 | 151.79 | 11.73 | 8.88 | 19.92 |
| EXHAUST NO : | 3.11 | 3.36 | 4.53 | 12.75 | 25.77 | 0.49 | 6.56 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1982 TEMP: 75.0(F) 0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE 33.0:33.0/33.0/33.0 MPH (33.0) 15.0/ 20.0/ 15.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.50 | 3.60 | 4.76 | 8.80 | 2.80 | 3.45 | 2.81 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 19.72 | 37.33 | 38.08 | 171.35 | 16.20 | 12.75 | 24.18 |
| EXHAUST NO : | 2.87 | 3.13 | 4.17 | 11.05 | 17.88 | 0.46 | 3.68 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1982 TEMP: 75.0(F) 0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE 30.0:30.0/30.0/30.0 MPH (30.0) 20.0/ 20.0/ 20.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.76 | 4.01 | 5.20 | 9.94 | 3.05 | 3.93 | 3.07 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 23.18 | 43.64 | 44.26 | 182.01 | 17.99 | 14.74 | 27.76 |
| EXHAUST NO : | 2.82 | 3.08 | 4.05 | 10.75 | 17.84 | 0.46 | 3.24 |

VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
CAL. YEAR: 1982 TEMP: 75.0(F) 0.768/0.169/0.033/0.011/0.013/0.001
REGION: 49-STATE 23.0:23.0/23.0/23.0 MPH (23.0) 40.0/ 30.0/ 40.0
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 3.80 | 5.64 | 6.96 | 14.05 | 3.88 | 5.80 | 4.33 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 36.32 | 67.29 | 67.76 | 219.79 | 24.27 | 22.29 | 44.38 |
| EXHAUST NO : | 2.77 | 3.08 | 3.91 | 10.04 | 19.04 | 0.46 | 3.23 |

Total HC emission factors include evaporative HC emission factors.

## MOBILE EMISSION FACTORS

## LEXINGTON AND YORK COUNTIES, 1987, WITH I/M

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE     50.0:50.0/50.0/50.0 MPH (50.0)      10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.67     1.59     1.93     2.25     1.48     0.51       0.95
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    4.44    18.93    18.03    85.97    10.82     2.69       9.77
EXHAUST NO :    2.43     2.67     2.89     9.99    18.11     0.30       4.83
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     33.0:33.0/33.0/33.0 MPH (33.0)      15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.87     2.18     2.51     4.22     2.07     0.77       1.19
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    6.38    26.14    25.00    96.67    15.37     3.96      11.00
EXHAUST NO :    2.22     2.48     2.67     8.55    12.14     0.28       2.76
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     30.0:30.0/30.0/30.0 MPH (30.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.98     2.47     2.80     4.98     2.28     0.89       1.31
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    7.69    30.69    29.16   101.91    17.15     4.64      12.58
EXHAUST NO :    2.18     2.45     2.62     8.30    12.10     0.28       2.47
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     23.0:23.0/23.0/23.0 MPH (23.0)      40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.43     3.64     3.96     7.68     2.97     1.36       1.98
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:   12.91    47.54    44.75   119.95    23.43     7.18      21.17
EXHAUST NO :    2.14     2.47     2.57     7.71    12.96     0.28       2.46
```

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## RICHLAND COUNTY, 1982, WITH I/M

```
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
REGION: 49-STATE       50.0:50.0/50.0/50.0 MPH (50.0)      10.0/ 10.0/ 10.0
AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    1.99    2.77    3.86    5.94    2.07    2.40     2.27
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   13.91   26.86   27.03  151.79   11.73    8.88    19.92
EXHAUST NO :    3.11    3.36    4.53   12.75   25.77    0.49     6.56
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
REGION: 49-STATE       31.0:31.0/31.0/31.0 MPH (31.0)      15.0/ 20.0/ 15.0
AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    2.61    3.76    4.93    9.53    2.96    3.65     2.93
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   21.06   39.83   40.50  178.15   17.34   13.57    25.76
EXHAUST NO :    2.81    3.06    4.07   10.85   17.82    0.46     3.61
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
REGION: 49-STATE       29.0:29.0/29.0/29.0 MPH (29.0)      20.0/ 20.0/ 20.0
AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    2.82    4.10    5.30   10.39    3.15    4.05     3.14
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   23.98   45.14   45.70  186.21   18.68   15.23    28.71
EXHAUST NO :    2.78    3.04    4.01   10.65   17.90    0.45     3.21
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
CAL. YEAR: 1982        TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.015/0.001
REGION: 49-STATE       20.0:20.0/20.0/20.0 MPH (20.0)      40.0/ 30.0/ 40.0
AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                    COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV     LDT1    LDT2    HDG     HDD     MC     ALL MODES
NON-METH HC:    4.12    6.16    7.52   16.73    4.38    6.44     4.72
  *EVAP HC:     0.94    1.01    1.56    1.74    0.0     0.27     ----
EXHAUST  CO:   40.44   74.79   75.45  243.48   28.25   24.90    49.40
EXHAUST NO :    2.64    2.93    3.71    9.74   20.19    0.44     3.11
-----------------------------------------------------------------------------
```

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## RICHLAND COUNTY, 1987, WITH I/M

```
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.716/0.077/0.037/0.035/0.134/0.001
 REGION: 49-STATE     50.0:50.0/50.0/50.0 MPH (50.0)       10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.67     1.59     1.93     2.25     1.48     0.51      0.95
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    4.44    18.93    18.03    85.97    10.82     2.69      9.77
EXHAUST NO :    2.43     2.67     2.89     9.99    18.11     0.30      4.83
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     31.0:31.0/31.0/31.0 MPH (31.0)       15.0/ 20.0/ 15.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.91     2.29     2.62     4.71     2.21     0.82      1.25
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    6.81    27.96    26.65   100.02    16.51     4.24     11.72
EXHAUST NO :    2.17     2.43     2.60     8.38    12.08     0.28      2.71
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     29.0:29.0/29.0/29.0 MPH (29.0)       20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.00     2.54     2.87     5.28     2.36     0.92      1.34
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:    7.95    31.77    30.14   103.96    17.85     4.80     13.01
EXHAUST NO :    2.15     2.42     2.58     8.21    12.14     0.28      2.44
-----------------------------------------------------------------------------
                                   VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.768/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     20.0:20.0/20.0/20.0 MPH (20.0)       40.0/ 30.0/ 40.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                     COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    1.55     4.00     4.32     9.39     3.38     1.52      2.18
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03      ----
EXHAUST  CO:   14.32    52.82    49.75   130.95    27.43     8.05     23.51
EXHAUST NO :    2.03     2.35     2.44     7.45    13.80     0.27      2.36
```

Total HC emission factors include evaporative HC emission factors.

# MOBILE EMISSION FACTORS

## ALL RURAL, 1982, WITH I/M

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CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 59.0:59.0/59.0/59.0 MPH (59.0) 0.676/0.077/0.037/0.035/0.174/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 10.0/ 10.0/ 10.0
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 1.78 | 2.45 | 3.55 | 5.86 | 2.01 | 2.05 | 2.08 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 10.57 | 20.26 | 22.67 | 166.59 | 11.97 | 7.29 | 17.46 |
| EXHAUST NO : | 3.69 | 3.97 | 5.38 | 13.66 | 40.17 | 0.56 | 10.47 |

---

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 55.0:55.0/55.0/55.0 MPH (55.0) 0.779/0.134/0.032/0.011/0.043/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 20.0/ 20.0/ 20.0
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.12 | 2.97 | 4.09 | 5.80 | 2.02 | 2.60 | 2.33 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 15.16 | 28.92 | 29.59 | 157.53 | 11.66 | 9.56 | 18.86 |
| EXHAUST NO : | 3.53 | 3.85 | 5.11 | 13.25 | 32.26 | 0.56 | 4.96 |

---

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 48.0:48.0/48.0/48.0 MPH (48.0) 0.791/0.154/0.028/0.006/0.020/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 20.0/ 20.0/ 20.0
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.21 | 3.11 | 4.22 | 6.07 | 2.11 | 2.78 | 2.42 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 16.35 | 31.06 | 31.31 | 150.99 | 11.89 | 10.26 | 19.75 |
| EXHAUST NO : | 3.22 | 3.52 | 4.67 | 12.55 | 23.92 | 0.51 | 3.78 |

---

CAL. YEAR: 1982 TEMP: 75.0(F) VEH. TYPE: LDV LDT1 LDT2 HDG HDD MC
REGION: 49-STATE 40.0:40.0/40.0/40.0 MPH (40.0) 0.769/0.169/0.033/0.011/0.018/0.001
AC: 0.66 XLOAD: 0.04 0.20 0.25 TRAILR: 0.02 ABSHUM: 75.00 40.0/ 20.0/ 40.0
LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

COMPOSITE EMISSION FACTORS (GM/MILE)

| | LDV | LDT1 | LDT2 | HDG | HDD | MC | ALL MODES |
|---|---|---|---|---|---|---|---|
| NON-METH HC: | 2.68 | 3.36 | 5.02 | 7.05 | 2.38 | 3.64 | 3.00 |
| *EVAP HC: | 0.94 | 1.01 | 1.56 | 1.74 | 0.0 | 0.27 | ---- |
| EXHAUST CO: | 22.40 | 41.71 | 42.38 | 155.81 | 13.41 | 13.80 | 27.65 |
| EXHAUST NO : | 3.27 | 3.61 | 4.65 | 11.75 | 19.32 | 0.52 | 3.76 |

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Total HC emission factors include evaporative HC emission factors.

## MOBILE EMISSION FACTORS

## ALL RURAL, 1987, WITH I/M

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                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.676/0.077/0.037/0.035/0.174/0.001
 REGION: 49-STATE     59.0:59.0/59.0/59.0 MPH (59.0)      10.0/ 10.0/ 10.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.59     1.33     1.70     2.05     1.41     0.41       0.88
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    3.26    13.72    14.21    91.62    10.85     2.15       8.89
EXHAUST NO :    2.89     3.17     3.44    10.75    29.22     0.34       7.79
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.779/0.134/0.032/0.011/0.043/0.001
 REGION: 49-STATE     55.0:55.0/55.0/55.0 MPH (55.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.74     1.73     2.07     2.09     1.42     0.56       0.96
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    5.12    20.21    19.48    88.07    10.66     2.93       8.75
EXHAUST NO :    2.75     3.08     3.30    10.41    23.08     0.34       3.77
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.791/0.154/0.028/0.006/0.020/0.001
 REGION: 49-STATE     48.0:48.0/48.0/48.0 MPH (48.0)      20.0/ 20.0/ 20.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.78     1.83     2.16     2.35     1.51     0.60       1.00
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    5.51    21.86    20.78    85.79    11.01     3.16       9.05
EXHAUST NO :    2.51     2.81     3.01     9.82    16.70     0.31       2.89
```

```
                                  VEH. TYPE:  LDV    LDT1  LDT2  HDG    HDD    MC
 CAL. YEAR: 1987      TEMP: 75.0(F)          0.769/0.169/0.033/0.011/0.018/0.001
 REGION: 49-STATE     40.0:40.0/40.0/40.0 MPH (40.0)      40.0/ 20.0/ 40.0
  AC:  0.66  XLOAD:   0.04   0.20   0.25  TRAILR:   0.02  ABSHUM:  75.00
  LDV I/M PROGRAM STARTING IN 1981, STRINGENCY LEVEL 30%, MECH. TRAINING: YES
  I/M PROG. BENEFITS APPLY ONLY TO MODEL YEARS 1951 THROUGH 1999

                      COMPOSITE EMISSION FACTORS (GM/MILE)
                 LDV      LDT1     LDT2     HDG      HDD      MC      ALL MODES
NON-METH HC:    0.98     2.36     2.68     3.04     1.73     0.82       1.31
   *EVAP HC:    0.33     0.42     0.57     0.66     0.0      0.03       ----
EXHAUST  CO:    8.00    29.26    27.84    88.76    12.58     4.37      13.23
EXHAUST NO :    2.56     2.92     3.06     9.14    13.23     0.32       2.90
```

Total HC emission factors include evaporative HC emission factors.

## Appendix E - ITEM 5

List of Statewide Sources With Potential Emissions
Greater than 100 TPY

Abney Mills - Anderson Plant No. 1
Anderson, S. C.

Abney Mills - Toxaway Plant
Anderson, S. C.

Blair Mills Inc.
Belton, S. C. (Anderson)

Chicopee Mfg. Co. - Johnson & Johnson
Walhalla, S. C. (Oconee)

Jackson Mills - Plant No. 1
Iva, S. C. (Anderson)

Kendall Co. - Colgate Palmolive
Pelzer, S. C. (Anderson)

M. Lowenstein & Sons - Chiquola Mills
Honea Path, S. C. (Anderson)

M. Lowenstein & Sons - Orr-Lyons Mill
Anderson, S. C.

Mount Vernon Mills - Williamston Div.
Williamston, S. C. (Anderson)

Riegal Textile Corp. - LaFrance Ind. Div.
LaFrance, S. C. (Anderson)

J. P. Stevens & Co. - Seneca Plant
Seneca, S. C. (Oconee)

J. P. Stevens & Co. - Appleton Plant
Anderson, S. C.

Chesney Brothers - Southern Inc. - Gerli & Co.
Pendleton, S. C. (Anderson)

Clark-Schwebel Fiber Glass Co.
Anderson, S. C.

Dan River Mills - Haynesworth Plant
Anderson, S. C.

Gemini Textile Corp. - Baxter, Kelly & Faust Inc.
Anderson, S. C.

M. Lowenstein & Sons - Wamsutta Mill
Anderson, S. C.

Milliken & Co. - Cushman Mill
Williamston, S. C. (Anderson)

Milliken & Co. - Gerrish Mill
Pendleton, S. C. (Anderson)

Milliken & Co. - Honea Path Mill
Honea Path, S. C. (Anderson)

Milliken & Co. - Peerless Mill
Belton, S. C. (Anderson)

Phillips Fibers Corp. - Phillips Petro
leum Co.
Senaca, S. C. (Oconee)

Starr Textile Mills Corp. - First
Republic Corp.
Starr, S. C. (Anderson)

Wellington & Equiknox Plants - West
Point Pepperel
Anderson, S. C.

Milliken & Co. - Pendleton Finishing
Plant
Pendleton, S. C. (Anderson)

Independant Publishing Co. - Harte-
Hanks Newspaper Inc.
Anderson, S. C.

Dow Badische Co.
Anderson, S. C.

Stauffer Chemical Co. - Plastics Div.
Anderson, S. C.

Parks, Davis & Co.
Honea Path, S. C. (Anderson)

Coats & Clark, Inc.
Seneca, S. C. (Oconee)

Singer Co. - Sewing Products Div.
Anderson, S. C.

Global Natural Resources Corp.
Williamston, S. C. (Anderson)

Torrington Co.
Honea Path, S. C. (Anderson)

Essex International Inc.
Belton, S. C. (Anderson)

Sangamo-Weston Inc. - Oconee Plant
West Union, S. C. (Oconee)

Dunlop Tire & Rubber Co.
Westminster, S. C. (Oconee)

True Temper Corp.
Anderson, S. C.

Torrington Co.
Walhalla, S. C. (Oconee)

Alice Mfg. - Arial Plant
Easley, S. C. (Pickens)

Alice Mfg. - Ellison Plant
Easley, S. C. (Pickens)

Alice Mfg. - Elljean Plant
Easley, S. C. (Pickens)

Alice Mfg. - Foster Plant
Easley, S. C. (Pickens)

Cannon Mills - Plant No. 12
Central, S. C. (Pickens)

Dan River Inc. - Beattie Plant
Fountain Inn, S. C. (Greenville)

Dan River, Inc. - Iselin Jefferson - Woodside Div.
Greenville, S. C.

Dan River Inc. - Woodside Div.
Easley, S. C. (Pickens)

Dan River Inc. - Woodside Div. - Norris Plant
Cateechee, S. C. (Pickens)

Dan River Inc. - Woodside Div. (No. 1 Mill St.)
Liberty, S. C. (Pickens)

Dan River Inc. - Woodside Div. (Maple St.)
Liberty, S. C. (Pickens)

EMC Industries, Inc. - Nonwovens
Easley, S. C. (Pickens)

Mayfair Mills - Pickens Div.
Pickens, S. C.

Mayfair Mills - Glenwood Div.
Easley, S. C. (Pickens

Milliken & Co. - Gayley Mill
Marietta, S. C. (Greenville)

Piedmont Plush Mills Inc.
Greenville, S. C.

J. P. Stevens & Co. - Estes Plant
Piedmont, S. C. (Greenville)

J. P. Stevens & Co. - Taylors Plant No. 1
Taylors, S. C. (Greenville)

J. P. Stevens & Co. - White Horse Plant No. 1
Greenville, S. C.

J. P. Stevens & Co. - White Horse Plants
Greenville, S. C.

Woodside Div. Furman Plant - Dan River Inc.
Fountain Inn, S. C. (Greenville)

Abney Mills - Poinsett Plant
Greenville, S. C.

Alice Mfg. Co. - Alice Plant
Easley, S. C. (Pickens)

Cone Mills Corp. - American Spinning Plant
Greenville, S. C.

Milliken & Co. - Judson Mills
Greenville, S. C.

Reeves Brothers - Mills Mill 1 Div.
Greenville, S. C.

J. P. Stevens & Co. - Monaghan Plant
Greenville, S. C.

J. P. Stevens & Co. - Dunean Plant
Greenville, S. C.

J. P. Stevens & Co. - Slater Plant
Slater, S. C. (Greenville)

Woodside Div. - Dan River Inc.
Simpsonville, S. C. (Greenville)

Abney Mills - Sally Plant
Greenville, S. C.

Southern Worsted Mills, Inc. - Stillwater Inc.
Greenville, S. C.

Southern Weaving Co.
Greenville, S. C.

Southern Weaving Co. - Greenville Plant
Easley, S. C. (Pickens)

J. P. Stevens & Co. - Greer Plant
Greer, S. C. (Greenville)

Abney Mills - Renfrew Bleachery
Travelers Rest, S. C. (Greenville)

Cone Mills Corp. - Union Bleachery
Greenville, S. C.

J. P. Stevens & Co. - Delta Finishing Plant 1
Clemson, S. C. (Pickens)

Franklin Dyed Yarns - Carisbrook Ind. Inc.
Greenville, S. C.

Brookline Carpets Inc. - Commercial Affiliates Inc.
Greenville, S. C.

Dan River Inc. - Floor Covering Div.
Greenville, S. C.

Libco Mills - Mohasco Corp.
Liberty, S. C. (Pickens)

Commercial Broadlooms Inc. - Div. Commercial Affiliates
Greenville, S. C.

J. P. Stevens & Co. - Taylors Plant 2
Taylors, S. C. (Greenville)

American Enka Co. - Arzona Inc.
Central, S. C. (Pickens)

Brunswick Worsted Mills, Inc. - Fairhaven Mill
Pickens, S. C.

Kent Mfg. Co. - Runnymede Plant
Pickens, S. C.

Emb Tex Corp.
Liberty, S. C. (Pickens)

Milliken & Co. - DeFore Plant
Clemson, S. C. (Pickens)

Milliken & Co. - Enterprise Plant
Marietta, S. C. (Greenville)

Woven Electronics Div. - Southern Weaving Co.
Mauldin, S. C. (Greenville)

Southeastern Kusan Inc.
Greenville, S. C.

Engineered Custom Plastics Cord
Easley, S. C. (Pickens)

Jet Rest Furniture - Outlaw Ind.
Greer, S. C. (Greenville)

Carotell Paper Board Corp.
Taylors, S. C. (Greenville)

3M Packaging Systems Div. - Minnesota Mining & Mfg. Co.
Greenville, S. C.

W. R. Grace & Co. - Cryovac Div.
Simpsonville, S. C. (Greenville)

Crown Zellerbach Corp. - Gaycord Container Div.
Greenville, S. C.

Star Paper Tube Inc.
Taylors, S. C. (Greenville)

Greenville News-Piedmont - Multimedia Inc.
Greenville, S. C.

Keys Printing Co.
Greenville, S. C.

Celanese Plastics Co. - Celanese Corp.
Greer, S. C. (Greenville)

Charles S. Tanner - Ciba - Geigy Corp.
Greenville, S. C.

3M Film & Allied Products Div. - Donaldson Center
Greenville, S. C.

Fiber Industries - Celanese Corp.
Greenville, S. C.

Bell Pharmacal Corp. - The Kroger Co.
Greenville, S. C.

Norwich Pharmacal Co.
Greenville, S. C.

Intex Products Inc.
Greenville, S. C.

Texize Chemicals Co. - Morton-Norwich Products, Inc.
Greenville, S. C.

Union Carbide Corp. - Carbon Products Div.
Greenville, S. C.

Polymer Ind. - Adhesive & LiquidCoatings Div.
Greenville, S. C.

Covil Corp. - Berea Industrial Park
Greenville, S. C.

Engineered Custom Plastics Corp.
Easley, S. C. (Pickens)

Southeastern Kusan Inc.
Greenville, S. C.

Universal Services of S. C.
Greenville, S. C.

Edgecomb Metals Co. - Williams Co.
Greenville, S. C.

Greenville Steel Co. - Carolina Steel Corp.
Greenville, S. C.

Metal Products Corp. - Gower Mfg. Co.
Greenville, S. C.

General Electric Co.
Greenville, S. C.

Thermo-Kinetics Ind. Inc.
Greenville, S. C.

Bond Textile Machinery Inc.
Greenville, S. C.

American Monorail - Fischer Ind.
Simpsonville, S. C. (Greenville)

Jacobs Mfg. Co. - Chicago Pneumatic Corp.
Clemson, S. C. (Pickens)

TRW Inc.
Clemson, S. C. (Pickens)

Detroit Broach & Machine Co. - Babcox & Wilcox
Greer, S. C. (Greenville)

Homelite - Textron Inc.
Greer, S. C. (Greenville)

Singer Co. - Motor Products Div.
Pickens, S. C.

Ashworth Brothers, Inc.
Greenville, S. C.

Bahan Textile Machinery Co.
Greenville, S. C.

Crompton & Knowles Corp.
Mauldin, S. C. (Greenville)

John D. Hollingsworth On Wheels Inc.
Greenville, S. C.

Platt Saco Lowell Corp.
Easley, S. C. (Pickens)

Steel Heddle Mfg. Co.
Greenville, S. C.

Ohio Gear Div. - Wallace Murray Corp.
Liberty, S. C. (Pickens)

Reliance Electric Co. - Gear Products Plant
Greenville, S. C.

Sangamo Weston Inc. - Capacitor Div.
Pickens, S. C.

Union Carbide Corp. - Carbon Products Div.
Greenville, S. C.

Union Carbide Corp. - Components Div.
Greenville, S. C.

General Battery Corp.
Greer, S. C. (Greenville)

Conn Organ Corp.
Greer, S. C. (Greenville)

Pratt - Read Co.
Central, S. C. (Pickens)

Gladding Corp.
Greenville, S. C.

Wilson Sporting Goods Co. - Pepsci Co.
Fountain Inn, S. C. (Greenville)

J. P. Stevens & Co. - Monaghan Plant
Greenville, S. C.

J. P. Stevens & Co. - Dunean Plant
Greenville, S. C.

Abney Mills - Woodruff Plant
Woodruff, S. C. (S'Burg)

Arkwright Mills
Spartanburg, S. C.

Arkwright Mills - Cateswood Plant
Spartanburg, S. C.

Hamrick Mills
Gaffney, S. C. (Cherokee)

Inman Mills - Riverdale Mill
Enoree, S. C. (Spartanburg)

Jackson Mills
Wellford, S. C. (Spartanburg)

M. Lowenstein & Sons - Limestone Mfg. Co.
Gaffney, S. C. (Cherokee)

M. Lowenstein & Sons - Lyman Printing & Finishing
Lyman, S. C. (Spartanburg)

Mayfair Mills
Arcadia, S. C. (Spartanburg)

Milliken & Co. - Drayton Mill
Spartanburg, S. C.

Milliken & Co. - Monarch Mill
Union, S. C.

Milliken & Co. - Pacolet Mill
Pacolet, S. C. (Spartanburg)

Musgrove Mills
Gaffney, S. C. (Cherokee)

Reeves Bros. Inc. - Woodruff Div.
Woodruff, S. C. (Spartanburg)

Spartan Mills - Beaumont Div.
Spartanburg, S. C.

Spartan Mills - John H. Montgomery Div.
Chesnee, S. C. (Spartanburg)

Spartan Mills - Spartan Div.
Spartanburg, S. C.

Spartan Mills - Startex Div.
Spartanburg, S. C.

J. P. Stevens & Co. - Jonesville Plant
Jonesville, S. C. (Union)

J. P. Stevens & Co. - Apalache Plant
Greer, S. C. (Spartanburg)

United Merchants & Mfg., Inc. - Buffalo Plant
Buffalo, S. C. (Union)

Inman Mills - Inman Plant
Inman, S. C. (Spartanburg)

Inman Mills - Ramey Plant
Enoree, S. C. (Spartanburg)

Inman Mills - Saybrook Plant
Inman, S. C. (Spartanburg)

M. Lowenstein & Sons - Wambel Div.
Union, S. C.

Reeves Brothers Inc. - Chesnee Div.
Chesnee, S. C. (Spartanburg)

J. P. Stevens & Co. - Victor Plant
Greer, S. C. (Spartanburg)

Wendall Fabrics Corp.
Blacksburg, S. C. (Cherokee)

Conso Products Co. - Consolidated Foods Corp.
Union, S. C.

Rhode Island Textile Co.
Landrum, S. C. (Spartanburg)

Collins & Aikman Corp. - Bangor Div.
Cowpens, S. C. (Spartanburg)

Edmos Corp. - Edmos Co.
Spartanburg, S. C.

Milliken & Co. - Cherokee Knitting
Gaffney, S. C. (Cherokee)

Milliken & Co. - Excelsior Mill
Union, S. C.

Olympia Knitting Mills Monsanto
Spartanburg, S. C.

Spartan Mills - Powell Knitting Co.
Spartanburg, S. C.

American Fast Print
Spartanburg, S. C.

Cone Mills Corp. - Carlisle Finishing Co.
Carlisle, S. C. (Union)

Milliken & Co. - Magnolia Finishing Plant
Blacksburg, S. C. (Cherokee)

Spartan Mills - Cherokee Finishing Co.
Gaffney, S. C. (Cherokee)

Milliken & Co. - Midway Finishing Plant
Union, S. C.

Pealer Rug & Printing Co. Inc.
Gaffney, S. C. (Cherokee)

Bigelow-Sanford Inc. - The Sperry & Hutchinson Co.
Landrum, S. C. (Spartanburg)

A. P. McAuley Mills - Gaffney Mills Inc.
Gaffney, S. C. (Cherokee)

INS Mills Inc. - Blacksburg Div. - Div. Tsuzuki Spinning Co.
Blacksburg, S. C. (Cherokee)

Tuscarora Yarns - Tuscarora Yarns Inc.
Clifton, S. C. (Spartanburg)

Burton Dixie Corp.
Blacksburg, S. C. (Cherokee)

Tietex Corp.
Spartanburg, S. C.

Southern Wood Piedmont - ITT Rayonier Inc.
Spartanburg, S. C.

Harley Corp. - Camp Croft
Spartanburg, S. C.

White Bag Co. - Harley Corp.
Spartanburg, S. C.

Mead Containers - Mead Corp.
Spartanburg, S. C.

Union Camp Corp. - Container Div.
Spartanburg, S. C.

Spartanburg Herald Journal
Spartanburg, S. C.

Hoechst Fibers Inc.
Spartanburg, S. C.

Monsanto Textiles Co.
Blacksburg, S. C. (Cherokee)

Moreland Chemical Co.
Spartanburg, S. C.

Blackman Uhler Chemical Div. - Synalloy Corp.
Spartanburg, S. C.

Milliken & Co. - Milliken Chemical Div.
Inman, S. C. (Spartanburg)

Long Mile Rubber Co. - Aegis Corp.
Spartanburg, S. C.

Kohler Co.
Spartanburg, S. C.

W. R. Grace Co. - Cryovac Div.
Duncan, S. C. (Spartanburg)

Crown Cork & Seal Co., Inc.
Spartanburg, S. C.

Bommer Ind. Inc.
Landrum, S. C. (Spartanburg)

Jeffrey Mfg. Div. - Dresser Ind. Inc.
Woodruff, S. C. (Spartanburg)

Litton Ind. Union - Butterfield Div.
Gaffney, S. C. (Cherokee)

Rockwell-Draper Div.
Spartanburg, S. C.

Andrews Bearing Corp.
Spartanburg, S. C.

The Timken Co.
Gaffney, S. C. (Cherokee)

Torrington Co. - Tyger River Plant
Union, S. C.

Toledo Scales
Spartanburg, S. C.

Beverage-Air-Tannetics Inc.
Spartanburg, S. C.

Gould, Inc.
Spartanburg, S. C.

Arrow Automotive Ind.
Spartanburg, S. C.

Hersey Products, Inc.
Spartanburg, S. C.

Abbott Laboratories
Spartanburg, S. C.

Sewing Notion Div. - Scovill Mfg. Co.
Spartanburg, S. C.

Spartan Mills - Whitney Yarn Mill Div.
Spartanburg, S. C.

Springs Mills Inc. - Eureka Plant
Chester, S. C.

Springs Mills Inc. - Lancaster Plant
Lancaster, S. C.

Springs Mills Inc. - Grace Sewing Plant
Lancaster, S. C.

Springs Mills Inc. - Kershaw Plant
Lancaster, S. C.

Springs Mills Inc. - Leroy Plant
Fort Lawn, S. C. (Chester)

Springs Mills Inc. - Springsteen Plant
Chester, S. C.

Springs Mills Inc. - Oxford Plant
Lancaster, S. C.

J. P. Stevens & Co. - Republic 2 Plant
Great Falls, S. C. (Chester)

J. P. Stevens & Co. - Republic 1 Plant
Great Falls, S. C. (Chester)

J. P. Stevens & Co. - Republic 3 Plant
Great Falls, S. C. (Chester)

Manetta Mills
Lando, S. C. (Chester)

Springs Mills Inc. - Grace Finishing Plant
Lancaster, S. C.

Springs Mills Inc. - Grace Screen Printing Plant
Lancaster, S. C.

Sun Chemical Corp. - Chemical Corp.
Chester, S. C.

Lehigh - Lancaster Inc.
Lancaster, S. C.

Morrison Textile Machine Co.
Fort Lawn, S. C. (Chester)

Springs Mills Inc. - Foundry & Machine Shop
Lancaster, S. C.

Clark Control Inc.
Lancaster, S. C.

Mallory Battery Co.
Lancaster, S. C.

Dardenelle Co. - R. Dakin & Co.
Lancaster, S. C.

Springs Mills - Gayle Plant
Chester, S. C.

Springs Mills - Katherine Plant
Chester, S. C.

Springs Mills - Elliott Plant
Fort Lawn, S. C. (Chester)

Springs Mills - Frances Plant
Fort Lawn, S. C. (Chester)

Kendall Co. - Oakland Plant
Newberry, S. C.

Newberry Mills
Newberry, S. C.

J. P. Stevens & Co. - Whitmire Plant
Whitmire, S. C. - (Newberry)

Uniroyal Textile - Uniroyal Inc.
Winnsboro, S. C. (Fairfield)

Champion Building Products - Champion International
Newberry, S. C.

Georgia-Pacific Corp.
Prosperity, S. C. (Newberry)

Forest Products Corp. - Owens-Illinois
Newberry, S. C.

Shakespear Co.
Newberry, S. C.

J. P. Stevens & Co. - Walterboro Plant
Walterboro, S. C. (Colleton)

Asten Group Inc.
Walterboro, S. C. (Colleton)

Westinghouse Electric Corp.
Hampton, S. C.

LeCreuset of America Inc.
Yemassee, S. C. (Beaufort)

Teledyne Waterboro
Walterboro, S. C. (Colleton)

National Water Lift Co.
Beaufort, S. C.

Graves Construction Co. Inc.
Hilton Head, S. C. (Beaufort)

Bamberg Textile Mills - Rockland Ind.
Bamberg, S. C.

Graniteville Co. - Granite Mill
Graniteville, S. C. (Aiken)

Graniteville Co. - Hickman Mill
Graniteville, S. C. (Aiken)

Graniteville Co. - Swint Mill
Graniteville, S. C. (Aiken)

Graniteville Co. - Townsend Mill
Graniteville, S. C. (Aiken)

Graniteville Co. - Vaucluse Mill
Graniteville, S. C. (Aiken)

Graniteville Co. - Warren Mill
Warrenville, S. C. (Aiken)

United Merchants & Mfg. Inc. - Bath Mill
Bath, S. C. (Aiken)

Graniteville Co. - Williston Div.
Williston, S. C. (Barnwell)

United Merchants & Mfg. - Seminole Mill
Clearwater, S. C. (Aiken)

Milliken & Co. - Barnwell Mill
Barnwell, S. C.

Greenwood Mills - Edisto Plant
Orangeburg, S. C.

Graniteville Co. - Gregg Plant
Graniteville, S. C. (Aiken)

United Merchants & Mfg. - Clearwater Finishing Plant
Clearwater, S. C. (Aiken)

Allendale Yarns, Inc. - Wadsworth Greenwood Inc.
Ulmers, S. C. (Allendale)

Barwick Corp. - Barnwell Spinning Div.
Barnwell, S. C.

Orange Cotton Mills
Orangeburg, S. C.

Dow Badische Co.
Allendale, S. C.

Champion Building Products - Champion International
Orangeburg, S. C.

Holly Hill Lumber Co.
Holly Hill, S. C. (Orangeburg)

Convenience Products Div. - Riegal Textile Corp.
Aiken, S. C.

Kimberly-Clark Corp.
Beech Island, S. C. (Aiken)

DuPont Co. - Savannah River Plant
Aiken, S. C.

Carolina Eastman
St. Matthews, S. C. (Calhoun)

Beecham Inc. - Products Div.
Aiken, S. C.

Sandoz Ins.
Martin, S. C. (Allendale)

United Merchants & Mfg. - Valchem Chemical Plant
Langley, S. C. (Aiken)

Ethyl Corp. - Orangeburg Chemical Div.
Orangeburg, S. C.

Amoco Plastic Products
Beech Island, S. C. (Aiken)

Utica Tool Co. - Triangle Corp.
Orangeburg, S. C.

Delavan Inc. - Delavan Corp.
Bamberg, S. C.

Universal Mfg. & Supply Co.
Aiken, S. C.

Applied Engineering Co. - Daniel International Corp.
Orangeburg, S. C.

Wilbur B. Driver Co.
Orangeburg, S. C.

Roper Outdoor Products - Roper Corp.
Orangeburg, S. C.

Mayer & Rothkopf
Orangeburg, S. C.

American Koyo Bearing Mfg. Corp.
Orangeburg, S. C.

Roller Bearing Corp. of S. C.
Aiken, S. C.

Ducane Heating Corp.
Blackville, S. C. (Barnwell)

Revco, Inc. - Consumer Products Div.
Williston, S. C. (Barnwell)

Therm-O-Disc Inc.
Aiken, S. C.

Sunbeam Appliance Co.
Denmark, S. C. (Bamberg)

Essex Group Inc.
St. Matthews, S. C. (Calhoun)

Hamburg Industries - Trailer Train Co.
N. Augusta, S. C. (Aiken)

Textron Inc. - Shuron Div.
Barnwell, S. C.

Blumenthal Mills - Blumenthal Print Works
Marion, S. C.

Raytex Corp.
Marion, S. C.

Carpostan Ind.
Lake View, S. C. (Dillon)

Milliken & Co. - Hartsville Mill
Hartsville, S. C. (Darlington)

Talon Division of Textron
Bennettsville, S. C. (Marlboro)

Burlington Industries - Society Hill Plant
Society Hill, S. C. (Darlington)

A-Q Industries Inc. - Timmonsville Plant
Timmonsville, S. C. (Florence)

Springs Mills
Mullins, S. C. (Marion)

Textiles, Inc. - Caro-Knit Inc.
Jefferson, S. C. (Chesterfield)

Comfy Div. - Reeves Brothers
Pageland, S. C. (Chesterfield)

Cheraw Dyeing & Finishing Co. - Cone Mills
Cheraw, S. C. (Chesterfield)

J. P. Stevens & Co. - Delta Finishing Plant 3
Wallace, S. C. (Marlboro)

James Fabrics - Burlington Ind.
Cheraw, S. C. (Chesterfield)

J. P. Stevens & Co. - Delta Finishing Plant 2
Wallace, S. C. (Marlboro)

Dubois Dyeing Co. Inc. - Stem Ind. Inc.
Johnsonville, S. C. (Florence)

Mohasco Corp. - Dixiana Mill
Dillon, S. C.

Bulkspun Mills, Inc.
Olanta, S. C. (Florence)

Duplan Corp.
Dillon, S. C.

Hamer Spinning Mills - Macanal Textile Corp
Hamer, S. C. (Dillon)

J. P. Stevens & Co. - Cypress Plant
Pamplico, S. C. (Florence)

J. P. Stevens & Co. - McColl Plant
McColl, S. C. (Marlboro)

Mafco Textured Fibers - Div. Macandrews & Forbes Co.
McBee, S. C. (Chesterfield)

Baronet Div. - Buck Creek Ind. Inc.
Dillon, S. C.

Firestone Textiles Co. - Firestone Tire & Rubber Co.
Bennettsville, S. C. (Marlboro)

Wellman Ind. Inc.
Johnsonville, S. C. (Florence)

Darlington Veneer Co. Inc.
Darlington, S. C.

Rownd & Sons
Dillon, S. C.

Koppers Co. Inc. - Forest Products Div.
Florence, S. C.

Celotex Corp. - Jim Walter Corp.
Sellers, S. C. (Marion)

Schoolfield Furniture Ind. Inc.
Mullins, S. C. (Marion)

Boro Wood Products Co. Inc.
Bennettsville, S. C. (Marlboro)

La-Z-Boy East - La-Z-Boy Chair Co.
Florence, S. C.

AVM of South Carolina
Marion, S. C.

S. C. Industries Inc.
Florence, S. C.

Sonoco Products Co.
Hartsville, S. C. (Darlington)

Packaging Corp. of America
Latta, S. C. (Dillon)

American Can Co.
Darlington, S. C.

DuPont Co.
Florence, S. C.

Wellman Industries
Johnsonville, S. C. (Florence)

Fiber Industries - Palmetto Plant
Darlington, S. C.

Crown Cork & Seal Co. Inc.
Cheraw, S. C. (Chesterfield)

Cooper Ind. Inc. - Weller Div.
Cheraw, S. C. (Chesterfield)

Stanley Works
Cheraw, S. C. (Chesterfield)

Hannaco, Inc. - Klingelnberg
Florence, S. C.

Nucor Corp. - Vulcraft Div.
Florence, S. C.

Socar, Inc.
Florence, S. C.

Conbraco Ind. Inc. - Apollo Div.
Pageland, S. C. (Chesterfield)

Essex Group - Wire Assembly Div.
Bennettsville, S. C. (Marlboro)

AVM of S. C.
Marion, S. C.

Powell Mfg. Co. Inc. - Rowe Corp.
Bennettsville, S. C. (Marlboro)

Rockwell International - Draper Div.
Marion, S. C.

A. B. Dick Co.
Lake City, S. C. (Florence)

Ina Bearing Co. Inc.
Cheraw, S. C. (Chesterfield)

Roller Bearing Corp. of S. C.
Hartsville, S. C. (Darlington)

Wix Corp.
Dillon, S. C.

Union Carbide Corp.
Florence, S. C.

Nytronics Components Group
Darlington, S. C.

Emerson Electric Co.
Bennettsville, S. C.

Marvel Lighting Corp.
Mullins, S. C. (Marion)

Electro Motive Corp.
Florence, S. C.

Perfection American Co. - Marmon Group
Darlington, S. C.

J. P. Stevens & Co. - Pamplico Plant
Pamplico, S. C. (Florence)

Exxon Chemical Co. - USA
Summerville, S. C. (Dorchester)

Burlington Ind. - Calhoun Falls Plant
Calhoun Falls, S. C. (Abbeville)

Clinton Mills, Inc.
Clinton, S. C. (Laurens)

Greenwood Mills - Adams Plant
Ninety-Six, S. C. (Greenwood)

Greenwood Mills - Joanna Plant #14
Joanna, S. C. (Greenwood)

Greenwood Mills - Joanna Plant #15
Joanna, S. C. (Greenwood)

Greenwood Mills - Joanna Plant #16
Joanna, S. C. (Greenwood)

Greenwood Mills - Ninety-Six Plant #7
Ninety Six, S. C. (Greenwood)

Greenwood Mills - Sloan Plant #9
Ninety Six, S. C. (Greenwood)

Greenwood Mills - Durst Plant
Greenwood, S. C.

Greenwood Mills - Greenwood Plant #4
Greenwood, S. C.

Greenwood Mills - Greenwood Plant #5
Greenwood, S. C.

Greenwood Mills - Matthews Plant 3
Greenwood, S. C.

Greenwood Mills - Matthews Plant #1
Greenwood, S. C.

Kendall Co. - Addison Plant
Edgefield, S. C.

Riegal Textile Corp. - Ware Shoals Div.
Ware Shoals, S. C. (Greenwood)

Abney Mills - Grendel Plant
Greenwood, S. C.

Bloomsburg Mills Inc.
Abbeville, S. C.

Greenwood Mills - Ninety Six Plant #
Ninety Six, S. C. (Greenwood)

Greenwood Mills - Chalmers Plant
Greenwood, S. C.

Greenwood Mills - Harris Plant
Greenwood, S. C.

Greenwood Mills - Matthews Plant #2
Greenwood, S. C.

Milliken & Co. - Abbeville Mill
Abbeville, S. C.

Milliken & Co. - Laurens Mill
Laurens, S. C.

J. P. Stevens & Co. - Watts Plant
Laurens, S. C.

Ascoe Felts Inc. - Asten-Hill Mfg. Co.
Clinton, S. C. (Laurens)

E. L. Mansure Div. - Joanna Western Mill Co.
Clinton, S. C. (Laurens)

Milliken & Co. - Johnston Mill
Johnston, S. C. (Edgefield)

Palmetto Spinning Corp.
Laurens, S. C.

Rocky River Mills - Div. Bigelow-Sanford Inc.
Calhoun Falls, S. C. (Abbeville)

Star Fibers, Inc. - Star Textile & Resea Inc.
Edgefield, S. C.

Greenwood Mills - Joanna Plant #13
Joanna, S. C. (Laurens)

Milliken & Co. - Saluda Mill
Saluda, S. C.

Gilliland Industrial Corp. - Milliken &
Laurens, S. C.

Kaywood Southern Div. - Joanna Western Mills Co.
Joanna, S. C. (Laurens)

Standard Plywood Inc.
Clinton, S. C. (Laurens)

St. Joe Paper Co.
Laurens, S. C.

Moore Business Forms
Greenwood, S. C.

Monsanto Textiles Co.
Ninety Six, S. C. (Greenwood)

Parke Davis & Co.
Greenwood, S. C.

Automation Industries Inc. - Flexible Tubing Div.
Abbeville, S. C.

Tranter Mfg. Co. Flexoplate Div.
Edgefield, S. C.

Benjamin F. Shaw Co. - Blount Inc.
Laurens, S. C.

Torrington Co.
Clinton, S. C. (Laurens)

Federal Pacific Electric Co.
Edgefield, S. C.

McGraw Edison Co.
Greenwood, S. C.

Neptune Measurement Co.
Greenwood, S. C.

United Merchants & Mfg.
Conway, S. C. (Horry)

Drexel Heritage Furnishings - Champion International
Kingstree, S. C. (Williamsburg)

Stilley Plywood Co. Inc.
Conway, S. C. (Horry)

International Paper Co.
Georgetown, S. C.

G. B. Fermentation Ind. Inc. - Gist Brocades N.V.
Kingstree, S. C. (Williamsburg)

Colonial Rubber Works
Kingstree, S. C. (Williamsburg)

Tupperware Co. - Dart Ind. Inc.
Hemingway, S. C. (Williamsburg)

Wolverine Brass Works - The Citation Companies Inc.
Conway, S. C. (Horry)

American Gear & Pinion Corp.
Conway, S. C. (Horry)

Hardee Mfg. Co. Inc.
Loris, S. C. (Horry)

Grove Mfg. Co.
Conway, S. C. (Horry)

AVX Ceramics
Myrtle Beach, S. C. (Horry)

Escod Ind. Inc.
N. Myrtle Beach, S. C. (Horry)

Dayton Flexible Products Div. - Travenol Labs.
Kingstree, S. C. (Williamsburg)

Kendall Co. - Wateree Plant
Camden, S. C. (Kershaw)

Wateree Textile Corp. - Marubeni America Corp.
Lugoff, S. C. (Kershaw)

A-Q Industries Inc. - Lynchburg Plant
Lynchburg, S. C. (Lee)

Lady Madison Inc. - Cover Mfg. Co. - Madison Ind.
Sumter, S. C.

Reeves Brothers Inc.
Bishopville, S. C. (Lee)

Kendall Co. - Colgate-Palmolive
Bethune, S. C. (Kershaw)

Santee Print Works
Sumter, S. C.

Bonte Ind. Inc. - Sumter Div.
Sumter, S. C.

Georgia Pacific Corp.
Sumter, S. C.

Korn Industries
Sumter, S. C.

Carolina Furniture Works
Sumter, S. C.

Georgia Pacific Corp. - Williams Furniture Div.
Sumter, S. C.

E. I. DuPont DeNemours & Co. - May Plant
Camden, S. C. (Kershaw)

Southern Coatings & Chemical Co.
Sumter, S. C.

Sunbeam Outdoor Co. - Sunbeam Corp.
Manning, S. C. (Clarendon)

Crescent-Cooper Ind. Inc.
Sumter, S. C.

B. L. Montague Co.Inc.
Sumter, S. C.

Exide Power Systems
Sumter, S. C.

Exide Power Systems - ESB Inc.
Sumter, S. C.

Becton-Dickinson
Sumter, S. C.

20th Century Glove Co. Inc. -
Racing Glove Co.
Manning, S. C. (Clarendon)

# APPENDIX F

## Air Quality Control Regions

# AIR QUALITY CONTROL REGIONS

Pursuant to the provisions of the Air Quality Act of 1967 concerning Air Quality Control Regions, the State of South Carolina requested that it be divided into ten Air Quality Control Regions; regional boundaries were designated and approved during 1970. Three of the ten regions are interstate and the remaining seven are intrastate. These ten regions are depicted in Figure F-1 and coincide with previously established regional planning and development districts.

This section of the plan contains a general discussion of major air pollution problems, air pollution sources and meteorology and topography which apply to all regions, and a more specific discussion of regional classifications and regional population and industry. A complete list of pollutant sources and pollutant emissions is available at the Columbia office of the South Carolina Department of Health and Environmental Control.

## CLASSIFICATION OF REGIONS

Consistent with guidelines set forth in the November 25, 1971, Federal Register, 40 CFR 51.3, as amended, each Air Quality Control Region (AQCR) has been classified as Priority 1, 2, or 3 for particulates, $SO_2$, CO, $NO_2$ and $O_X$. These classifications were based on existing air quality in each region, in 1970, as well as existing and potential pollutant emissions from all measurable sources within each region.

In simple terms, a Priority 1 classification was assigned to a region if pollutant concentrations were well above National Ambient Air Quality Standards; a Priority 2 classification was assigned to regions where pollutants equaled or slightly exceeded standards; and a Priority 3 classification was assigned to regions already below national standards. Region classifications

are designated as follows:

| Region | Pollutant | Priority |
|---|---|---|
| Augusta - Aiken Interstate Region | Particulate | 1 |
| | $SO_2$ | 2 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Metropolitan Charlotte Interstate Region | Particulate | 1 |
| | $SO_2$ | 2 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 1 |
| Camden - Sumter Intrastate Region | Particulate | 2 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Charleston Intrastate Region | Particulate | 1 |
| | $SO_2$ | 1 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Columbia Intrastate Region | Particulate | 2 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Florence Intrastate Region | Particulate | 3 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Georgetown Intrastate Region | Particulate | 2 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Greenville - Spartanburg Intrastate Region | Particulate | 1 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |

| Region | Pollutant | Priority |
|---|---|---|
| Greenwood Intrastate Region | Particulate | 3 |
| | $SO_2$ | 3 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |
| Savannah - Beaufort Interstate Region | Particulate | 1 |
| | $SO_2$ | 1 |
| | CO | 3 |
| | $NO_2$ | 3 |
| | $O_X$ | 3 |

MAJOR AIR POLLUTION PROBLEMS

Air pollution is the presence in the ambient atmosphere of contaminants put there by the activity of man in concentrations sufficient to interfere with his comfort, safety or health, or with the full use of his property and the enjoyment of life.

For air pollution to exist three factors must be present: (1) a source of pollutants; (2) a susceptible population or other receptor; (3) a means or transport between the two, a mechanism which is controlled by topography and weather.

A source of pollution may be any activity of man which releases to the atmosphere any dust, fumes, smoke, mist or gas. The receptors can be people, vegetation, domestic animals, homes, industrial plants or other properties. Severity of pollution is measured in terms of effects on health, economics and esthetics. Such factors as population, population distribution, industrial and commercial activity, fuel usage, motor vehicle population use, and waste disposal practices are important indicators of the extent of pollution. Meteorology, topography and other natural features influence dispersion of pollutants and, thus, are important factors in determining pollution levels which occur.

There are two general types of pollution problems. In the point source type, often only a small part of the community is affected by pollution from one or a few sources. This type of problem can occur in any size community and practically any meteorological or topographical situation. The other

type is the community - wide or area source problem in which cumulative effects of all sources of pollution become significant even though certain sources such as automobile exhausts may be unnoticed individually. Major sources of pollutants are described in the following paragraphs.

AIR POLLUTION SOURCES

1. Solid Waste Disposal

In the past, the open burning of rubbish and garbage in municipal, county and private dumps has been a significant source of air pollution in the State. At present, however, these dumps have been converted to sanitary landfills.

Most industries handle their solid waste disposal in a nuisance - free manner. There were two major exceptions — sawmills and junk yards. Many sawmills were burning sawdust and woodwaste in open piles or in waste burners not equipped to control pollutant emissions. Burning of this type is no longer approved and sawmills are required to either install pollution control devices or to dispose of the woodwaste through any of several commercial channels.

Most of the burning at junk yards has been that of junked automobiles. The development of commercial automobile shredders has virtually eliminated the need to burn junked automobiles. Two such shredders have been constructed in South Carolina.

The burning of waste from other commercial and institutional sources receives approval only in incinerators equipped to control pollutant emissions.

2. Fuel Burning

Industries, as a rule, operate boilers to produce steam and hot water. Coal, oil, gas and, to a limited degree, wood are burned in these operations. In some cases, antiquated equipment, poor firing procedure and improper or no maintenance of equipment have compounded the pollution pro-

blems associated with fuel burning. Existing State laws now require the control of visible and gaseous emissions from industrial sources, and modern technology and equipment can control the majority of emissions from fuel burning operations.

Fuel burning for home heating has a marked influence on the total atmospheric loading. The most significant reduction of pollutant emissions from home heating units in this State has been the result of a gradual conversion from coal burning to gas, oil and electricity. State regulations do not presently cover the control of fuel burning emissions from private homes.

3. Motor Vehicle Emissions

Pollution attributable to the use of motor vehicles includes emissions from the exhaust and from the crankcase breather pipe; evaporation from the fuel tank and carburetor; and vapor losses occurring during handling of fuel. Exhaust emissions are composed of unburned fuel, partial combustion products and complete combustion products. They vary in amount and composition depending on: (1) whether the vehicle is idling, cruising, accelerating, or decelerating; (2) fuel composition; (3) engine conditions; (4) driver habits; and (5) other factors.

Federal motor vehicle emission reduction programs and standards, by themselves, have failed to produce the needed reductions. Inspection of individual vehicles, with maintenance of those that fail to pass, is sorely needed, and is provided for.

4. Volatile Organic Compounds

In addition to automobiles many closely allied stationary sources in the gasoline marketing industry contribute to the growing photochemical oxidant problem. These include gasoline terminal facilities, bulk distribution plants, individual service stations and the tank trucks which supply them.

The above are joined by numerous other industrial users of organic solvents and compounds which evaporate or are discharged into the air. A growing body of regulations will control these emissions.

5. Iron and Steel

Electric arc production of steel has become established in several areas of South Carolina, as well as related plants producing ferro-alloys and reduction of iron ore. Whereas the emissions from the emissions points have all been subjected to controls, lingering problems of fugitive dust and emissions still remain in some instances.

6. Textile Manufacturing.

Textile manufacturing represents the largest manufacturing category in the State. The primary air pollution problem faced by the textile industry is emissions from fuel burning operations. Fuel burning problems were discussed in a previous paragraph. Additionally, pollution problems may arise from dyeing, sizing, printing and other related processes.

7. Kraft Paper Manufacturing

There are many sources of air pollutants in the kraft process but only the major sources will be discussed. Digester gases, both relief and blow gases, contain considerable quantities of odorous materials. These materials are detectable by smell in minute concentrations, and are responsible for the odor generally present in the vicinity of a kraft mill. In the black liquor recovery process which is integral to the kraft mill, gases, fumes and particulate matter are discharged. The gases contain methyl mercaptan, hydrogen sulfide, and dimethyl disulfide, constituting another odor source and may also contain sulfur dioxide. Burning of the liquor results in the discharge of sodium salt fumes, primarily the sulfate and carbonate. Generally equipment is installed to recover substantially all of these fumes, as dictated by the economics of operation. Other emissions include a relatively coarse dust from the lime kilns, entrained dust from the dissolver tank vent and combustion products from steam and power generation, turpentine odors from the turpentine recovery process, and smoke from the combus-

tion of wood scraps and waste. Control technology is available for all of the emissions except odor. Odor control is the subject of extensive study within the kraft industry and significant progress is being made.

8. Steam - Generating Plants

Electric generating plants are South Carolina's largest consumer of coal. Combustion products from fossil-fueled steam-electric generating plants include particulate matter consisting of ash and unburned carbon, and gaseous nitrogen oxides, sulfur oxides, carbon dioxide, carbon monoxide and water vapor. The majority of the particulates emitted are ash. Nitrogen oxides result from the fixation of atmospheric nitrogen at high temperatures. Sulfur dioxides and sulfur trioxide result from oxidation of sulfur which occurs as an impurity in coal and oil. Carbon dioxide and water vapor are products of complete combustion of carbon compounds and not normally considered pollutants. Carbon monoxide, which results from incomplete combustion, is not produced in large quantities by power stations as careful combustion control is exercised. The majority of the emissions can be controlled by existing technology and by the use of low sulfur fuel. Most power plants have or are scheduled to install electrostatic precipitators for control of particulates emissions. In addition, the rather large commitment to nuclear power will supplant to a large extent the increase in air pollutant discharge which would normally be expected.

9. Construction Industry

Concrete batching plants can be a source of particulate matter. Sand, source aggregate and cement are handled by conveyor belts, permitting dust to blow into the atmosphere. Dumping of materials into weighing hoppers and dumping into trucks gives rise to considerable quantities of dust. Newer plants have completely enclosed systems for handling cement and enclosed conveyors and loading system are also being installed.

Asphaltic paving material batching plants often cause dust problems. Rotary aggregate dryers are also a smoke source. Existing technology can control these emissions and all such sources within the State are presently controlled.

10. Miscellaneous Dust Sources

Airborne dust is solid particulate matter released into the air by natural forces or from fuel burning, process equipment, or construction and agricultural activities. Dust is generated by mechanical and industrial processes such as crushing, grinding, demolishing, transferring and the like. Several categories of operations which can cause dust problems are: construction, minerals, feed mills, planing mills, foundries, cotton gins, and many others. Some dusts, if present in sufficient concentrations, can cause injury to human health. However, in nearly all cases, concentrations in the ambient atmosphere are such that health effects, if any, occur only after prolonged exposure. Many of the activities listed above may cause severe nuisance conditions and yet the dust concentrations may be far below those which might cause injury to health.

RELATIONSHIP BETWEEN METEOROLOGY AND AIR POLLUTION PROBLEMS

South Carolina, with its growing industrialization and urbanization, has more and more airborne waste material being discharged into the atmosphere. The degree to which this material accumulates is largely dependent upon the weather. For instance, the measured concentrations of local air pollutants may vary markedly with changing weather even though the total discharge of pollutants remains relatively constant. In the evaluation of the role meteorology plays in the dispersion of airborne contaminants, large patterns can usually be determined from the climatological evaluation of existing weather records available from most National Weather Service Offices. Small-scale weather patterns, on the other hand,

are not always determinable as they are often dependent upon diversified influences of local topography.

The Piedmont section of South Carolina is on the eastern slope of the Appalachian Mountains. To some extent these mountains act as a barrier for the wind and tend to protect the area from the full force of the cold air masses during the winter months. This results in the loss of some natural ventilation. On the other hand, the relatively flat areas of the central and coastal regions allows free air movement and are conducive to effective dispersion of pollutants under normal circumstances.

Weather factors which largely determine the degree to which the atmosphere can disperse pollutants are: (1) wind speed, direction and turbulence; (2) stability or, more generally, the resistance to vertical motion of the lower layers of air; and (3) humidity, including condensation forms, particularly fog. Investigations of known occurrences of air pollution episodes have identified all three of these weather elements as contributing to the accumulation of abnormally high concentrations of air pollution. The simultaneous occurrence of light winds, stable conditions and fog for brief periods is not particularly a rare phenomenon, especially in the hilly portions of the State. Experience has suggested that conditions must persist for several days before abnormally high concentrations of air pollution occur. Such persistent periods are usually associated with the prolonged stagnation of a high pressure system. The western and central portions of South Carolina experience one of the highest frequencies of this phenomenon in the eastern part of the United States. For this reason, the Air Pollution Episode section of this plan is of particular importance.

POPULATION AND INDUSTRY

The following paragraphs contain a brief discussion of population and major industrial categories in each Air Quality Control Region.

1. Augusta - Aiken Interstate Region

The South Carolina portion of this region is composed of:

| | |
|---|---|
| Aiken County | Barnwell County |
| Allendale County | Calhoun County |
| Bamberg County | Orangeburg County |

Between 1970 and 1976, the population of this region grew by 5.4 percent to 225,910* one-third of which is classified as urban. The textile and chemical industries are the largest employers in this region; however, the lumber and wood products group have been a significant source of particulate matter as the result of the uncontrolled burning of wood waste. The Energy Research and Development Administration's Savannah River Plant is located in Barnwell and Aiken Counties, and Barnwell County is also the location of the Barnwell Nuclear Fuel Plant.

2. Camden - Sumter Intrastate Region

This region is composed of the following counties:

| | |
|---|---|
| Clarendon County | Lee County |
| Kershaw County | Sumter County |

The 1976 population of this region was 161,800, of which one-third was urban. Chemical and allied products, apparel, food processing and textiles are the largest employers, but as was the case with the previous region, particulate matter from the lumber and wood products group cannot be overlooked. Shaw Air Force Base, a major Federal installation, is located in Sumter County.

3. Charleston Intrastate Region

This region is composed of three counties:

| | |
|---|---|
| Berkeley County | Dorchester County |
| Charleston County | |

This is the third most populous region in the State, with a population

*All population figures are between-census estimates for 1976.

of 362,000. With 70 percent of the population classified as urban, this region is the most urbanized in South Carolina. Trade, industry, resort/recreational, and agricultural activities are concentrated in this region. Major naval and Air Force installations are located here and the Port of Charleston is a rapidly growing international seaport. Industrial activity is concentrated around the port with transportation equipment, apparel and chemical and allied products being the major employers. These are followed by lumber and wood products, food products, textiles, paper and allied products, and stone, clay and glass products. This population and industry concentration has led to it being classified Priority 1 for both particulate matter and sulfur dioxide ($SO_2$).

4. Columbia Intrastate Region

| | |
|---|---|
| Fairfield County | Newberry County |
| Lexington County | Richland County |

The population of 410,800 is 14 percent of the entire State's total and it is the second most populous region in the State. Almost 60 percent of the region's population is urban. The region includes textiles, apparel and chemicals as its primary industries, followed by food products, lumber and machinery. Uncontrolled wood waste burning was a problem in portions of this region but alternative disposal methods have been developed. Fort Jackson, a major Federal installation, is located in Richland County.

5. Florence Intrastate Region

The Florence Region is composed of:

| | |
|---|---|
| Chesterfield County | Florence County |
| Darlington County | Marion County |
| Dillon County | Marlboro County |

Although 70 percent of the region's population of 278,100 is considered rural, this region ranks third in the State in terms of industrial employment. Primary industries are textiles and apparel manufacture, followed by electrical machinery and equipment, lumber and wood products, and food products. This is a Priority 3 region for all pollutants.

6. Georgetown Intrastate Region

This region encompasses:

| | |
|---|---|
| Georgetown County | Williamsburg County |
| Horry County | |

This region has a stable population of 154,400 however, population is considerably increased in the summer by seasonal residents and visitors. Seventy-three percent of the population is classified as rural, and industrial activity is confined largely to the coastal area. Major industries include textiles, paper and allied products, primary metal, secondary metals and lumber and wood products.

7. Greenville - Spartanburg Intrastate Region

This region is composed of:

| | |
|---|---|
| Anderson County | Oconee County |
| Cherokee County | Pickens County |
| Greenville County | Spartanburg County |

With a population of 719,800, representing 26 percent of the State total, this is the most populous of the ten Air Quality Control Regions. Although the population is equally divided between the rural and urban classifications, most of the State's industrial categories are represented in this region. Heaviest concentrations are in the areas of textiles, machinery, apparel and food products. Heavy population and industrial concentrations resulted in a Priority 1 classification for this area. This area's pollution problems are frequently compounded by adverse meteorological conditions.

8. Greenwood Intrastate Region

The six counties in this region are:

| | |
|---|---|
| Abbeville County | Laurens County |
| Edgefield County | McCormick County |
| Greenwood County | Saluda County |

The 1976 population of this region was 162,300, over two-thirds of of which was classified rural. Industry is primarily textiles and apparel, followed by machinery and lumber and wood products. This is a Priority 3 region in all pollutant categories.

9. Metropolitan Charlotte Interstate Region

The South Carolina portion of this region is composed of:

| | |
|---|---|
| Chester County | Union County |
| Lancaster County | York County |

The 1976 regional population was 198,700, forty-five percent of which was classified as urban. The area is heavily textile and apparel oriented but the paper and allied products industry is significant as well. The area's Priority 1 classifications are largely due to the industrial and population concentrations in the North Carolina portion of this Air Quality Control Region;however, South Carolina's particulate contributions cannot be overlooked.

10. Savannah - Beaufort Interstate Region

The South Carolina portion of this region encompasses:

| | |
|---|---|
| Beaufort County | Hampton County |
| Colleton County | Jasper County |

From a population standpoint this is the smallest region, having a population of 110,900. Apparel and textiles are the major industrial employers, followed by lumber and wood products. There are two major Marine Corps installations in Beaufort County. This area's Priority 1 classifications are almost solely the result of the population and industrial concentration in the Georgia portion of this Air Quality Control Region.

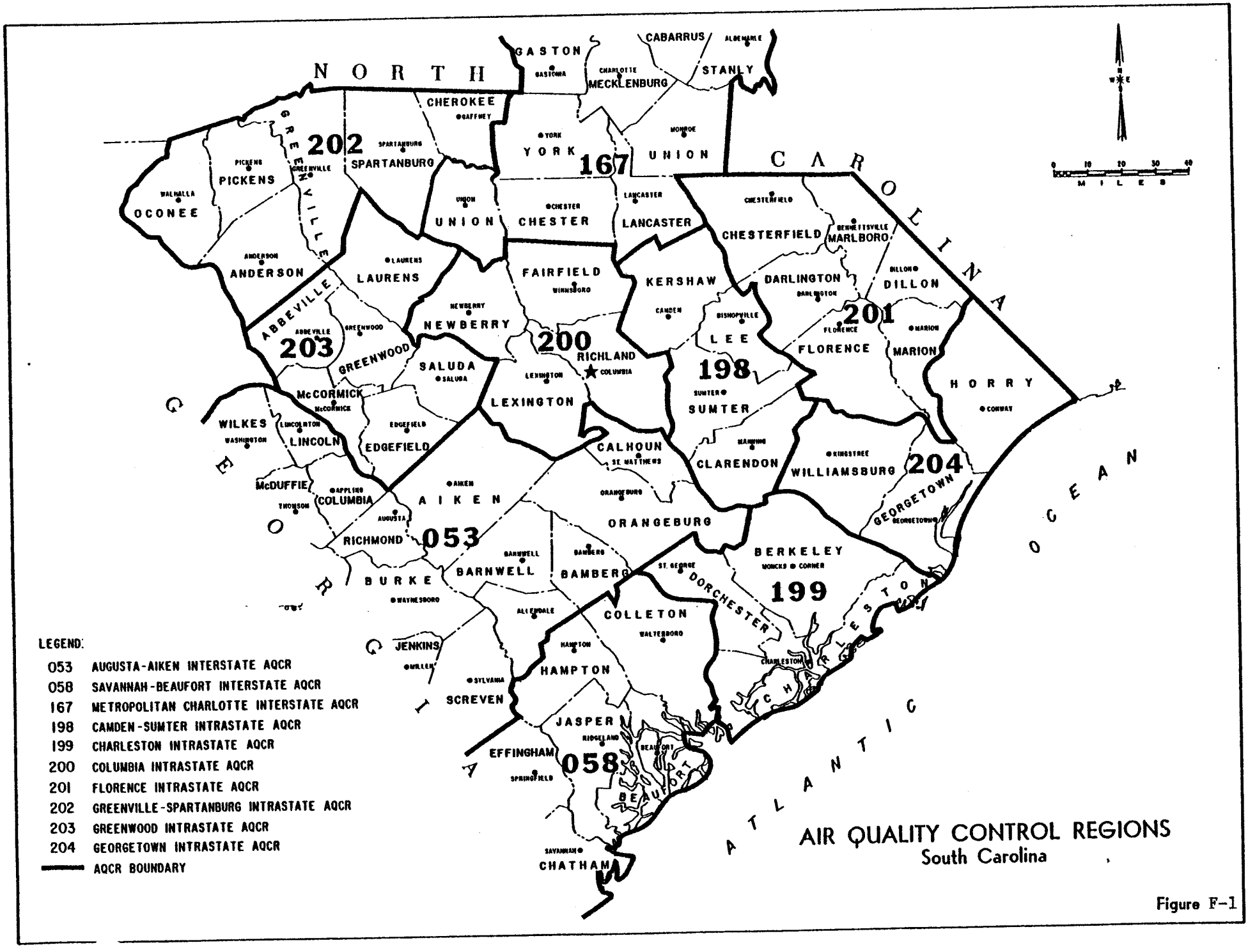
NORTH CAROLINA
GEORGIA
ATLANTIC OCEAN
GASTON
CABARRUS
STANLY
MECKLENBURG
CHEROKEE
YORK
UNION
OCONEE
PICKENS
GREENVILLE
202
SPARTANBURG
167
UNION
CHESTER
LANCASTER
CHESTERFIELD
MARLBORO
ANDERSON
LAURENS
FAIRFIELD
KERSHAW
DARLINGTON
DILLON
ABBEVILLE
203
GREENWOOD
NEWBERRY
200
RICHLAND
LEE
198
FLORENCE
201
MARION
HORRY
SALUDA
LEXINGTON
SUMTER
McCORMICK
WILKES
LINCOLN
EDGEFIELD
CALHOUN
CLARENDON
WILLIAMSBURG
204
GEORGETOWN
McDUFFIE
COLUMBIA
AIKEN
053
ORANGEBURG
RICHMOND
BARNWELL
BAMBERG
BERKELEY
199
DORCHESTER
BURKE
COLLETON
JENKINS
HAMPTON
SCREVEN
JASPER
EFFINGHAM
058
BEAUFORT
CHATHAM
LEGEND:
053 AUGUSTA-AIKEN INTERSTATE AQCR
058 SAVANNAH-BEAUFORT INTERSTATE AQCR
167 METROPOLITAN CHARLOTTE INTERSTATE AQCR
198 CAMDEN-SUMTER INTRASTATE AQCR
199 CHARLESTON INTRASTATE AQCR
200 COLUMBIA INTRASTATE AQCR
201 FLORENCE INTRASTATE AQCR
202 GREENVILLE-SPARTANBURG INTRASTATE AQCR
203 GREENWOOD INTRASTATE AQCR
204 GEORGETOWN INTRASTATE AQCR
AQCR BOUNDARY
AIR QUALITY CONTROL REGIONS
South Carolina

Figure F-1

# APPENDIX I

Laws, Regulations & Memoranda

## Appendix I - ITEM 1

Pollution Control Act

# ACT 1157 - THE POLLUTION CONTROL ACT OF SOUTH CAROLINA - 1970

As Amended by the 1971-1972 General Appropriations Act
For the Fiscal Year 1971-1972
And by Act No. 390 of the 1973 General Assembly
And by Act No. 446 of the 1973 General Assembly
And by Act No. 1094 of the 1974 General Assembly
And by Act No. 395 of the 1975 General Assembly

An Act To Provide For The Creation Of The Pollution Control Authority And To Repeal Chapter 3 Of Title 70 Of The 1962 Code And Act 383, Of 1965, Relating To Pollution Control.

Be it enacted by the General Assembly of the State of South Carolina:

SECTION 1. This act may be cited as the "Pollution Control Act" and, when used herein, unless the context otherwise requires:

(1) "Person" means any individual, public or private corporation, political subdivision, government agency, municipality, industry, copartnership, association, firm, trust, estate or any other legal entity whatsoever;

(2) "Waters" means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial limits of the State and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially within or bordering the State or within its jurisdiction;

(3) "Marine district" means the waters of the Atlantic Ocean within three nautical miles from the coast line and all other tidal waters within the State;

(4) "Sewage" means the water-carried human or animal wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration and surface water as may be present and the admixture with sewage of industrial wastes or other wastes shall also be considered "sewage";

(5) "Industrial waste" means any liquid, gaseous, solid or other waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business or from the development of any natural resources;

(6) "Other wastes" means garbage, refuse, decayed wood, sawdust, shavings, bark, sand, clay, lime, cinders, ashes, offal, oil, gasoline, other petroleum products or by-products, tar, dye stuffs, acids, chemicals, dead animals, heated substances, and all other products, by-products or substances not sewage or industrial waste;

(7) "Pollution" means, (1) the presence in the environment of any substance, including but not limited to, sewage, industrial waste, other waste, air contaminant, or any combination thereof in such quantity and of such characteristics and duration as may cause, or tend to cause the environment of the State to be contaminated, unclean, noxious, odorous, impure or degraded, or which is, or tends to be injurious to human health or welfare; or which damages property, plant, animal or marine life or use of property; or (2) the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

(8) "Standard" or "standards" means such measure of purity or quality for any waters in relation to their reasonable and necessary use as may after hearing be established;

(9) "Board" means the Board of Health and Environmental Control;

(10) "Sewage system" or "sewerage system" means pipelines and conductors, pumping stations, force mains and all other construction, devices and appliances appurtenant thereto used for conducting sewage, industrial waste or other wastes to a point of ultimate discharge;

(11) "Treatment works" means any plant, disposal field, lagoon, constructed drainage ditch or surface water intercepting ditch, incinerator, area devoted to sanitary landfills or other works not specifically mentioned herein, installed for the purpose of treating, neutralizing, stabilizing or disposing of sewage, industrial waste or other wastes;

(12) "Disposal system" means a system for disposing of sewage, industrial waste or other wastes, including sewerage systems and treatment works;

(13) "Outlet" means the terminus of a sewer system or the point of emergence of any water-borne sewage, industrial waste or other wastes, or the effluent therefrom, into the waters of the State;

(14) "Shellfish" means oysters, scallops, clams, mussels and other aquatic mollusks and lobsters, shrimp, crawfish, crabs and other aquatic crustaceans;

(15) "Ambient air" means the portion of the atmosphere outside of buildings and other enclosures, stacks, or ducts which surrounds human, plant or animal life, water or property;

(16) "Air contaminant" means particulate matter, dust, fumes, gas, mist, smoke, or vapor, or any combination thereof produced by processes other than natural;

(17) "Source" means any and all points of origin of air contaminants whether privately or publicly owned or operated;

(18) "Undesirable level" means the presence in the outdoor atmosphere of one or more air contaminants or any combination thereof in sufficient quantity and of such characteristics and duration as to be injurious to human health or welfare, or to damage plant, animal or marine life, to property or which unreasonably interfere with enjoyment of life or use of property;

(19) "Emission" means a release into the outdoor atmosphere of air contaminants; (as amended in 1973)

(20) "Environment" means the waters, ambient air, soil and/or land; (as amended in 1973)

(21) "Effluent" means the discharge from a waste disposal system; (as amended in 1973)

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(2) "Waters" means lakes, bays, sounds, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic Ocean within the territorial limits of the State and all other bodies of surface or underground water, natural or artificial, public or private, inland or coastal, fresh or salt, which are wholly or partially within or bordering the State or within its jurisdiction;

(3) "Marine district" means the waters of the Atlantic Ocean within three nautical miles from the coast line and all other tidal waters within the State;

(4) "Sewage" means the water-carried human or animal wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration and surface water as may be present and the admixture with sewage of industrial wastes or other wastes shall also be considered "sewage";

(5) "Industrial waste" means any liquid, gaseous, solid or other waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business or from the development of any natural resources;

(6) "Other wastes" means garbage, refuse, decayed wood, sawdust, shavings, bark, sand, clay, lime, cinders, ashes, offal, oil, gasoline, other petroleum products or by-products, tar, dye stuffs, acids, chemicals, dead animals, heated substances, and all other products, by-products or substances not sewage or industrial waste;

(7) "Pollution" means, (1) the presence in the environment of any substance, including but not limited to, sewage, industrial waste, other waste, air contaminant, or any combination thereof in such quantity and of such characteristics and duration as may cause, or tend to cause the environment of the State to be contaminated, unclean, noxious, odorous, impure or degraded, or which is, or tends to be injurious to human health or welfare; or which damages property, plant, animal or marine life or use of property; or (2) the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water.

(8) "Standard" or "standards" means such measure of purity or quality for any waters in relation to their reasonable and necessary use as may after hearing be established;

(9) "Board" means the Board of Health and Environmental Control;

(10) "Sewage system" or "sewerage system" means pipelines and conductors, pumping stations, force mains and all other construction, devices and appliances appurtenant thereto used for conducting sewage, industrial waste or other wastes to a point of ultimate discharge;

(11) "Treatment works" means any plant, disposal field, lagoon, constructed drainage ditch or surface water intercepting ditch, incinerator, area devoted to sanitary landfills or other works not specifically mentioned herein, installed for the purpose of treating, neutralizing, stabilizing or disposing of sewage, industrial waste or other wastes;

(12) "Disposal system" means a system for disposing of sewage, industrial waste or other wastes, including sewerage systems and treatment works;

(13) "Outlet" means the terminus of a sewer system or the point of emergence of any water-borne sewage, industrial waste or other wastes, or the effluent therefrom, into the waters of the State;

(14) "Shellfish" means oysters, scallops, clams, mussels and other aquatic mollusks and lobsters, shrimp, crawfish, crabs and other aquatic crustaceans;

(15) "Ambient air" means the portion of the atmosphere outside of buildings and other enclosures, stacks, or ducts which surrounds human, plant or animal life, water or property;

(16) "Air contaminant" means particulate matter, dust, fumes, gas, mist, smoke, or vapor, or any combination thereof produced by processes other than natural;

(17) "Source" means any and all points of origin of air contaminants whether privately or publicly owned or operated;

(18) "Undesirable level" means the presence in the outdoor atmosphere of one or more air contaminants or any combination thereof in sufficient quantity and of such characteristics and duration as to be injurious to human health or welfare, or to damage plant, animal or marine life, to property or which unreasonably interfere with enjoyment of life or use of property;

(19) "Emission" means a release into the outdoor atmosphere of air contaminants; (as amended in 1973)

(20) "Environment" means the waters, ambient air, soil and/or land; (as amended in 1973)

(21) "Effluent" means the discharge from a waste disposal system; (as amended in 1973)

(22) "Effluent limitations" means restrictions or prohibitions of chemical, physical, biological, and other constituents which are discharged from point sources into State waters, including schedules of compliance; (as amended in 1973)

(23) "Point source" means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel, or other floating craft, from which pollutants are or may be discharged.

SECTION 2. It is declared to be the public policy of the State to maintain reasonable standards of purity of the air and water resources of the State, consistent with the public health, safety and welfare of its citizens, maximum employment, the industrial development of the State, the propagation and protection of terrestrial and marine flora and fauna, and the protection of physical property and other resources. It is further declared that to secure these purposes and the enforcement of the provisions of this act, the Board of Health and Enviromental Control shall have authority to abate, control and prevent pollution.

SECTION 3 - No longer applicable - see Reorganization Plan 10

SECTION 4 - No longer applicable - see Reorganization Plan 10

SECTION 5 - No longer applicable - see Reorganization Plan 10

SECTION 6 - No longer applicable - see Reorganization Plan 10

SECTION 7. The Board shall promulgate rules and regulations to implement this act and to govern the procedure of the Board with respect to meetings, hearings, filing of reports, the issuance of permits and all other matters relating to procedure. The rules and regulations for preventing contamination of the air may not specify any particular method to be used to reduce undesirable levels, nor the type, design, or method of installation or type of construction of any manufacturing processes or other kinds of equipment.

SECTION 8. The Board, after public hearings as herein provided, shall adopt standards and determine what qualities and properties of water and air shall indicate a polluted condition and these standards shall be promulgated and made a part of the rules and regulations of the Board. The Board, in determining standards and designating the use of streams, shall be guided by the provisions of this act.

SECTION 9. The Board may:

(1) Hold public hearings, compel attendance of witnesses, make findings of fact and determinations and assess such penalties as herein prescribed;

(2) Hold hearings upon complaints or upon petitions in accordance with Section 17A or as otherwise provided in this act;

(3) Make, revoke or modify orders requiring the discontinuance of the discharge of sewage, industrial waste or other wastes into any waters of the State, or the discharge of air contaminants into the ambient air so as to create an undesirable level, resulting in pollution in excess of the applicable standards established. Such orders shall specify the conditions and time within which such discontinuance must be accomplished;

(4) Institute or cause to be instituted in a court of competent jurisdiction, legal proceedings, including an injunction, to compel compliance with the provisions of this Act, or the determinations, permits and permit conditions, and orders of the Board. An injunction granted by any court shall be issued without bond;

(5) Issue, deny, revoke, suspend or modify permits, under such conditions as it may prescribe for the discharge of sewage, industrial waste or other waste or air contaminants or for the installation or operation of disposal systems or sources or parts thereof; provided, however, that no permit shall be revoked without first providing an opportunity for a hearing;

(6) Conduct studies, investigations and research with respect to pollution abatement, control or prevention. Such studies shall include but not be limited to, air control, sources, disposal systems and treatment of sewage, industrial waste or other wastes, by all scientific methods and, if necessary, of the use of mobile laboratories;

(7) Settle or compromise any action or cause of action for the recovery of a penalty or damages under this act as it may deem advantageous to the State;

(8) Cooperate with the governments of the United States or other states or State agencies or organizations, official or unofficial, in respect to pollution control matters or for the formulation of interstate pollution control compacts or agreements;

(9) Prepare and develop a general comprehensive program for the abatement, control and prevention of air and water pollution;

(10) Require to be submitted to it and consider for approval plans for disposal systems or sources or any parts thereof and inspect the construction thereof for compliance with the approved plans;

(11) Administer penalties as otherwise provided herein for violations of this act, including any order, permit, regulation or standards;

(12) Accept, receive and administer grants or other funds or gifts for the purpose of carrying out any of the purposes of this act; accept, receive and receipt for federal money given by the federal government under any federal law to the State of South Carolina for air or water control activities, surveys or programs;

(13) Encourage voluntary cooperation by persons, or affected groups in restoration and preservation of a reasonable degree of purity of air and water;

(14) Collect and disseminate information on air or water control;

(15) Approve projects for which applications for loans or grants under the Federal Water Pollution Control Act or the Federal Air Quality Act are made by any municipality (including any city, town, district, or other public body created by or pursuant to the laws of this State and having jurisdiction over disposal of sewage, industrial wastes or other wastes) or agency of this State or by an interstate agency;

(16) Participate through its authorized representatives in proceedings under the Federal Water Pollution Control Act or the Federal Air Quality Act to recommend measures for abatement of water pollution originating in this State;

(17) Take all action necessary or appropriate to secure to this State the benefits of the Federal Water Pollution Control Act or the Federal Air Quality Act and any and all other Federal and State acts concerning air and water pollution control;

(18) Consent on behalf of the State to request by the Federal Security Administrator to the Attorney General of the United States for the bringing of suit for abatement of such pollution;

(19) Consent to the joinder as a defendant to such suit of any person who is alleged to be discharging matter contributing to the pollution, abatement of which is sought in such suit;

(20) Conduct investigations of conditions in the air or waters of the State to determine whether or not standards are being contravened and the origin of materials which are causing the polluted conditions;

(21) Establish the cause, extent and origin of damages from waste including damages to the fish, waterfowl, and other aquatic animals and public property which result from the discharge of wastes to the waters of the State;

(22) Require the owner or operator of any source or disposal system to establish and maintain such operational records; make reports; install, use, and maintain monitoring equipment or methods; sample and analyze emissions or discharges in accordance with prescribed methods, at locations, intervals, and procedures as the Board shall prescribe; and provide such other information as the Board reasonably may require; (as amended in 1973)

(23) Adopt emission and effluent control regulations, standards and limitations that are applicable to the entire State, that are applicable only within specified areas or zones of the State, or that are applicable only when a specified class of pollutant is present; (as amended in 1973)

(23.1) Enter at all times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to pollution or the possible pollution of the environment of the State. Its authorized agents may examine and copy any records or memoranda pertaining to the operation of a disposal system or source that may be necessary to determine that the operation thereof is in compliance with the performance as specified in the application for a permit to construct; provided, however, that if such entry or inspection is denied or not consented to, and no emergency exists, the Board is empowered to and shall obtain from the magistrate from the jurisdiction in which such property, premise or place is located, a warrant to enter and inspect any such property, premise or place prior to entry and inspection. The magistrate of such jurisdiction is empowered to issue such warrants upon a proper showing of the needs for such entry and inspection. The results of any such inspection and investigation conducted by the Board shall be reduced to writing and a copy shall be furnished to the owner or operator of the source or disposal system; and (as amended in 1973)

(24) Issue orders prohibiting any political entity having the authority to issue building permits from issuing such permits when the political entity has been ordered to correct a condition which has caused or is causing pollution. Provided, that no such order shall be issued until the State is capable of participating in Federal, State and local cost-sharing arrangements for municipal waste treatment facilities as set forth in the Clean Water Restoration Act of 1966.

SECTION 10. It is recognized that, due to variable factors, no single standard of quality and purity of the environment is applicable to all ambient air, land or waters of the State. In order to attain the objectives of this act, the Board, after proper study and after conducting a public hearing upon due notice, shall adopt rules and regulations and classification standards. The classification and the standards of quality and purity of the environment shall be adopted by the Board in relation to the public use or benefit to which such air, land or waters are or may, in the future, be put. Such classification and standards may from time to time be altered or modified by the Board.

The adoption of a classification of the waters and the standards of quality and purity of the environment shall be made by the Board only after public hearing on due notice as provided by this act.

SECTION 11. The standards for water adopted pursuant to this act may prescribe:

(1) The extent, if any, to which floating solids may be permitted in the water;

(2) The extent to which suspended solids, colloids or a combination of solids with other substances suspended in water may be permitted;

(3) The extent to which organisms of the coliform group (intestinal bacilli) or any other bacteriological organisms may be permitted in the water;

(4) The extent of the oxygen which may be required in receiving waters; and

(5) Such other physical, chemical or biological properties as may be necessary for the attainment of the objectives of this act.

SECTION 12. In adopting the classification of waters and the standards of purity and quality, consideration shall be given to:

(1) The size, depth, surface area covered, volume, direction, rate of flow, stream gradient and temperature of the water;

(2) The character of the district bordering such water and its peculiar suitability for the particular uses and with a view to conserving it and encouraging the most appropriate use of the lands bordering on such water for residential, agricultural, industrial or recreational purposes;

(3) The uses which have been made, are being made or may be made of such waters for transportation, domestic and industrial consumption, irrigation, bathing, fishing and fish culture, fire prevention, sewage disposal or otherwise; and

(4) The extent of present defilement or fouling of such waters which has already occurred or resulted from past discharges therein.

SECTION 13. (a) It shall be unlawful for any person, directly or indirectly, to throw, drain, run, allow to seep, or otherwise discharge into the environment of the State organic or inorganic matter, including sewage, industrial wastes, and other wastes, except as in compliance with a permit issued by the Department.

(b) Any person who discharges organic matter into the waters of this State as described in subsection (a) to the extent that the fish, shellfish, aquatic animals, wildlife or plant life indigenous to or dependent upon the receiving waters or any property are damaged or destroyed shall be liable to the State for such damages as may be proved. The action shall be brought by the State in its own name or in the name of the Board.

The amount of any judgment for damages recovered by the State, less cost, shall be remitted to the agency, commission, department or political subdivision of the State that has jurisdiction over the fish, shellfish, aquatic animals, wildlife or plant life damaged or destroyed.

The civil remedy herein provided shall not be exclusive, and any agency, commission, department or political subdivision of the State with appropriate authority may undertake in its own name an action to recover such damages as it may deem advisable independent of this subsection.

SECTION 14. Any person affected by the provisions of this act or the rules and regulations adopted by the Board desiring to make any new outlet or source, or to increase the quantity of discharge from existing outlets or sources, for the discharge of sewage, industrial waste or other wastes, or the effluent therefrom, or air contaminants, into the waters or ambient air of the State, shall first make an application to the Board for a permit to construct and a permit to discharge from such outlet or source. If, after hearing, the Board finds that the discharge from such proposed outlet or source will not be in contravention of provisions of this act, such permit to construct and such permit to discharge shall be issued to such applicant. The Board may, if sufficient hydrologic and environmental information is not available for it to make a determination of the effect of such a discharge, require the person proposing to make such discharge to conduct studies that will enable the Board to determine that its quality standards will not be violated. (as amended in 1973 - remainder of this section no longer applicable, see Reorganization Plan 10)

SECTION 15. It shall be unlawful for any person, until plans therefor have been submitted to and approved by the Board and a written permit therefor shall have been granted to:

(1) Construct or install a disposal system or source;

(2) Make any change in, addition to or extension of any existing disposal system or part thereof that would materially alter the method or the effect of treating or disposing of the sewage, industrial waste or other wastes;

(3) Operate such new disposal systems or new source, or any existing disposal system or source; or

(4) Increase the load through existing outlets of sewage, industrial waste or other wastes into the waters of the State.

It shall be unlawful for any person to operate an approved waste disposal facility in violation of the conditions of the permit to construct or the permit to discharge.

It shall be unlawful for any person, directly or indirectly, negligently or willfully, to discharge any air contaminant or other substance in the ambient air that shall cause an undesirable level.

SECTION 16. If the Board shall determine that an undesirable level exists, it shall take such action as necessary to control such condition.

The Board shall grant such time as is reasonable for the owner or operator of a source to correct the undesirable level, after taking all factors into consideration that are pertinent to the issue.

In making its order and determinations, the Board shall take into consideration all the facts and circumstances bearing upon the reasonableness of the emissions involved including, but not limited to:

(a) The character and degree of injury to, or interference with, the health and physical property of the people;

(b) The social and economic value of the source of the undesirable levels;

(c) The question of priority of location in the area involved; and

(d) The technical practicability and economic reasonableness of reducing or eliminating the emisssions resulting from such source.

If the undesirable level is not corrected within the required time, then the Board shall issue an order to cease and desist from causing such emissions.

SECTION 17. Any person discharging sewage, industrial waste or other waste or air contaminant into any of the waters or ambient air of the State, without regard to the time that such discharge began or whether such continued discharge has been by virtue of a permit issued by the Board, shall discontinue the discharge of such sewage, industrial waste or other wastes into, or in such manner or quantity as to cause pollution of, the waters of the State upon receipt of a final order of the Board issued pursuant to the provisions of this act. But in the case of such discharges, except those discharges causing an actual or potential hazard to public health, no final order or discontinuance of discharge shall be entered until a reasonable time after service of an order of the Board determining that such discharge constitutes pollution in contravention of the standards adopted by the Board and directing the alleged polluter to take such steps as may be necessary to abate the polluting content of such discharge to conform to the standards of the Board.

SECTION 17A. (a) The Board may, after notice and opportunity for a public hearing, revise or modify a National Pollutant Discharge Elimination System permit in accordance with the procedures and criteria set out in Sections 301(c), 302, and 316(a) of the Federal Water Pollution Control Act Amendments of 1972.

(b) The Board may, after notice and opportunity for a public hearing, revise or modify a final compliance date for any stationary source or class or sources of air pollution whether contained in regulations or a compliance order, if the Board determines that

(1) good faith efforts have been made to comply with such requirement before such date;

(2) such source (or class) is unable to comply with such requirement because the necessary technology or other alternative methods of control are not reasonably available or have not been available for a sufficient period of time;

(3) any available alternative operating procedures and interim control measures have reduced or will reduce the impact of such source on public health; and,

(4) the continued operation of such source is essential to national security or to the public health or welfare.

Provided, however, that such compliance date shall not be extended for more than one year beyond any compliance deadline prescribed in the State Implementation Plan relating to such source (or class). Provided, further, that where the compliance date is one prescribed in the State Implementation Plan, the findings and recommendations of the Board shall be submitted to the Governor for transmittal to the Administrator of the Federal Environmental Protection Agency or his designated representative for his concurrence or rejection. Rejection by the Administrator may constitute grounds for rejection of a request for modification or revisions of such compliance requirement.

(c) Any determination under items (a) or (b) shall (1) be made on the record after notice to interested persons and opportunity for hearing, (2) be based upon a fair evaluation of the entire record at such hearing, and (3) include a statement setting forth in detail the findings and conclusions upon which the determination is based.

SECTION 18. Public hearings shall be conducted by the Board prior to action by the Board in the classification of the waters of the adoption of standards of purity and quality thereof as provided by this act. The Board may conduct public hearings prior to action in the following cases, either of its own volition or upon the request of affected person, (a) an order of determination of the Board requiring the discontinuance of discharge of sewage, industrial waste or other wastes into the waters of the State or air contaminant into the ambient air, (b) an order issuing, denying, revoking, suspending or modifying a permit, (c) a determination that a discharge constitutes pollution of waters or a marine district, and (d) any other proceeding resulting in a finding of fact or determination that a discharge of air contaminants into the ambient air or sewage, industrial waste or other wastes into the waters of the State contravenes the standards established for such air and waters.

SECTION 19. The hearings herein provided for may be conducted by the Board at a regular or special meeting or it may delegate to any member, to the Commissioner or to any employee or agent of the Board, the authority to conduct such hearings in the name of the Board at any time and place. But the Board shall make all necessary decisions as to the matter under consideration. Such decisions may be based solely

upon the record of any hearing conducted by the Board or by its duly authorized representatives.

SECTION 20. In any hearing held by the Board in which a quasi-judicial decision is rendered, the Board shall make a report of the decision and secure its prompt publication. The decision shall include a statement of the facts in controversy, the decision of the Board, the law or regulation upon which the decision is based and any other information deemed necessary.

To serve as a guide and precedent of the policy of the Board, the decisions shall be chronologically numbered according to date and compiled in an annual report similar in style to the Reports of the Supreme Court. The reports of these decisions shall be made available to the public.

If any person concerned with such hearing requests it, a complete transcript of the testimony presented shall be made and filed.

SECTION 21. In any such hearing, any member of the Board, the Commissioner or any employee or agent thereof authorized by the Board may administer oaths, examine witnesses and issue in the name of the Board notices of hearings and subpoenas requiring the attendance and testimony of witnesses and the production of evidence relevant to any matter involved in any such hearing. Witnesses shall receive the same fees and mileage as in civil action.

SECTION 22. In case of refusal to obey a notice of hearing or subpoena, the Court of Common Pleas shall have jurisdiction, upon application of the Board, to issue an order requiring such person to appear and testify or produce evidence, as the case may require, and any failure to obey such order of the court may be punished by the court as a contempt thereof.

SECTION 23. Any person may appeal from any order of the Board within thirty days after the filing of the order, to the Court of Common Pleas of any county in which the pollution occurs. The Board shall thereupon certify to the court the record in the hearing. The court shall review the record and the regularity and the justification for the order, on the merits, and render judgment thereon as in ordinary appeals in equity. The court may order or permit further testimony on the merits of the case, in its discretion such testimony to be given either before the judge or referee by him appointed. From such judgment of the court an appeal may be taken as in other civil actions.

SECTION 24. The Attorney General shall be the legal adviser of the Board and shall upon request of the Board institute injunction proceedings or any other court action to accomplish the purpose of this act. In the prosecution of any criminal action by the Attorney General and in any proceeding before a grand jury in connection therewith the Attorney General may exercise all the powers and perform all the duties which the solicitor would otherwise be authorized or required to exercise or perform and in such a proceeding the solicitor shall exercise such powers and perform such duties as are requested of him by the Attorney General.

SECTION 25. Prosecutions for the violation of a final determination or order shall be instituted only by the Board or as otherwise provided for in this act.

SECTION 26. Any funds appropriated to or received by the Board shall be deposited

in the State Treasury as provided by law. Such funds shall be paid out on warrants issued by the State as prescribed by law, but only on order of the authorized representative of the Board and in accordance with an annual budget or amendments thereto approved by the Board at an official meeting, such order being the authority of the proper fiscal officials of the State for making payment.

SECTION 27. It is the purpose of this act to provide additional and cumulative remedies to abate the pollution of the air and waters of the State and nothing herein contained shall abridge or alter rights of action in the civil courts or remedies existing in equity or under the common law or statutory law, nor shall any provision in this act or any act done by virtue of this act be construed as estopping the State, persons or municipalities, as riparian owners or otherwise, in the exercise of their rights under the common law, statutory law or in equity to suppose nuisances or to abate any pollution.

SECTION 28. Causes of action resulting from the violation of the prohibitions contained in this act inure to and are for the benefit of any person or persons damaged as the result of any such violation. A determination by the Board that pollution exists or a violation of any of the prohibitions contained in this act, whether or not actionable by the state, create no presumption of law or fact inuring to or for the benefit of persons other than the State.

SECTION 29. Nothing contained in this act shall be deemed to grant to the Board any authority to make any rule, regulation or determination or to enter any order with respect to air conditions existing solely within the industrial boundaries of commercial and industrial plants, works or shops or to affect the relations between employers and employees with respect to or arising out of any air pollution within such boundaries.

SECTION 30. Any records, reports or information obtained under any provision of this Act shall be available to the public. Upon a showing satisfactory to the Department by any person that records, reports or information, or particular parts thereof, other than effluent or emission data, if made public would divulge methods or processes entitled to protection as trade secrets of such person, the Department shall consider such record, report or information or particular portion thereof confidential in the administration of this act.

SECTION 31. Nothing herein contained shall be construed to postpone, stay or abrogate the enforcement of the provisions of the public health laws of this State and rules and regulations promulgated hereunder in respect to discharges causing actual or potential hazards to public health nor to prevent the Board from exercising its right to prevent or abate nuisances.

SECTION 32. Whenever the Board finds that an emergency exists requiring immediate action to protect the public health or property, the Board, with concurrent notice to the Governor, may without notice or hearing issue an order reciting the existence of such an emergency and requiring that such action be taken as the Board deems necessary to meet the emergency. Such order shall be effective immediately. Any person to whom such order is directed shall comply therewith immediately, but on application to the Board or by direction of the Governor shall be afforded a hearing within 48 hours. On the basis of such hearing, the Board shall continue such order in effect, revoke it, or modify it. Regardless of whether a hearing is held, the Board shall revoke all emergency orders as soon as conditions or operations change to the extent that an emergency no longer exists.

SECTION 33. The civil and criminal liabilities herein imposed upon persons violating the provisions hereof shall not be construed to include any violation which was caused by an act of God, war, strike, riot or other catastrophe as to which negligence on the part of such person was not the proximate cause.

SECTION 34. The governing body of any county is hereby authorized to establish, administer and enforce a local air pollution control program, subject to the approval of the Board. Such programs shall be formulated in accordance with standards and procedures adopted by the Board, and shall be subject to periodic review by the Board, which shall have the power to invalidate such programs if found to be unsatisfactory. County pollution control authorities, when constituted under this section, are hereby authorized to exercise in the geographic area involved all of the powers specified in this act, including the authority to adopt rules, regulations and procedures for the control of air pollution.

SECTION 35. Any person who willfully or negligently violates any of the provisions of this Act, or any rule or regulation, permit or permit condition, final determination or order of the Board, shall be deemed guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than five hundred dollars nor more than twenty-five thousand dollars for each day's violation or be imprisoned for not more than two years, or both.

SECTION 35.1 Any person violating any of the provisions of this act, or any rule or regulation, permit or permit condition, final determination or order of the Board, shall be subject to a civil penalty not to exceed ten thousand dollars per day of such violation.

SECTION 35.2. Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this act or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this act, shall be subject to the civil or criminal provisions contained in this act. For the purposes of this section, the term "person" shall mean, in addition to the definition contained in Section 1 of this act, any responsible corporate officer.

SECTION 36. All penalties assessed under this act shall be held as a debt payable to the State by the person against whom they have been charged and shall constitute a lien against the property of such person. One-half of the penalties so collected shall inure to the benefit of the county.

SECTION 37. Chapter 3 of Title 70 of the 1962 Code and Act 383 of 1965 and all other acts or parts of acts inconsistent herewith are repealed.

## Appendix I - ITEM 2

Air Pollution Control Regulations and Standards

SOUTH CAROLINA

DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Regulation 61-62

AIR POLLUTION CONTROL REGULATIONS AND STANDARDS

Statutory Authority; Section 48-1-40 (23) of the 1976 Code.

Final adoption by the Board of Health and Environmental Control on January 10, 1978. These regulations were submitted for approval to the Speaker of the House of Representatives and the President of the Senate on February 28, 1978. The regulations became effective on May 29, 1978.

This regulation supercedes previous Regulation 61-62 filed on July 26, 1972; with amendments filed on August 15, 1973; January 15, 1974; March 26, 1975; and December 21, 1976.

## GENERAL

In the promulgation of these regulations, the Board finds the standards and procedures herein prescribed are necessary to maintain reasonable standards of purity of the air resources of the State consistent with the public health, safety, and welfare of its citizens, maximum employment, the industrial development of the State, the propagation and protection of terrestrial and marine flora and fauna, and the protection of physical property and other resources.

# AIR POLLUTION CONTROL REGULATIONS

## REGULATION NO. 62.1

## DEFINITIONS AND PERMIT REQUIREMENTS

### SECTION I - DEFINITIONS

The following words and phrases when used in the Regulations and Standards shall for the purpose of these regulations have the meanings respectively ascribed to them in this section, unless a different meaning is clearly indicated. This section augments Section 1 of the South Carolina Pollution Control Act.

1. Acid Mist - Mist or droplets of sulfuric or other strong acids.

2. Add - Additions to a process which will increase size, scope or emissions from such process.

3. Alter - Alter means modification or change in a process or processes which would affect emissions to the atmosphere.

4. Ambient Air Quality Standards - That standard for the quality of ambient air at or beyond a property line on which a source of pollution is emitting.

5. Application - Means a form provided by the Department which is prescribed to provide the information required to grant approval to construct and operate a source or an incinerator; or to report an existing incinerator.

6. Board - Board means Board of Health and Environmental Control.

7. Commissioner - Commissioner means the Commissioner of the Department of Health and Environmental Control.

8. Department - Department means the Department of Health and Environmental Control.

9. Environmental Location - Location of human, plant, or animal life or property.

10. Fuel Burning Operation - Use of furnace, boiler, device or mechanism used principally but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion.

11. Fugitive Dust - Solid airborne particulate matter emitted at or near ground level from any source other than a flue.

12. Garbage - Animal and vegetable waste resulting from the handling, preparation, cooking and serving of foods.

13. Hazardous Air Pollutant - Those pollutants which are the subject of National Emission Standards for Hazardous Air Pollutants promulgated by the United States Environmental Protection Agency by publication in the Federal Register.

14. Incinerator - Means an engineered apparatus and all appurtenances thereto, designed to reduce combustible solid, semi-solid, liquid, or gaseous waste by high temperature burning.

15. Mass Emission Rate - The weight discharged per unit of time.

16. Opacity - The degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

17. Open Burning - Any fire or smoke-producing process which is not conducted in any boiler plant, furnace, high-temperature processing unit, incinerator or flare, or in any other such equipment primarily designed for the combustion of fuel or waste material.

18. Particulate Matter - Any materials, except uncombined water, that exists in a finely divided form as a liquid or solid at standard conditions.

19. Process Industry - Any source engaged in the manufacture, processing, handling, treatment, forming, storing or any other action upon materials except fuel-burning operations.

20. Process Weight - The total weight of all materials introduced into a source operation, including air and water where these materials become an integral part of the product, and solids used as fuels but excluding liquids and gases used solely as fuels.

21. Process Weight Rate - A rate established as follows:

(a) For continuous or long-run steady-state source operations, the total process weight for the entire period of continuous operation or for a typical portion thereof, divided by the number of hours of such period or portion thereof.

(b) For cyclical or batch unit operations, or unit processes, the total process weight for a period that covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such a period.

Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this definition, the interpretation that results in the minimum value for allowable emission shall apply.

22. Refuse - Garbage, rubbish and/or trade waste.

23. Ringelmann Chart - The chart published and described in the U.S. Bureau of Mines Information Circular 7718, on which is illustrated graduated shades of gray to black for use in estimating the light obscuring capacity of smoke.

24. Rubbish - Solid wastes from residences and dwellings, commercial establishments, and institutions.

25. Salvage Operations - Any operation of a business, trade, or industry engaged in whole or in part in salvaging or reclaiming any product or material including, but not limited to, metals, chemicals, shipping containers, drums or automobiles.

26. Smoke - Small gas-borne and airborne particles arising from a process of combustion in sufficient number to be observable by a person of normal vision under normal conditions.

27. Solid Fuel - A fuel which is fired as a solid such as coal, lignite and wood.

28. Stack - Any flue, conduit, duct, chimney, or opening arranged to conduct an effluent into the open air.

29. Stack Height - The vertical distance measured in feet between the point of discharge from the stack or chimney into the outdoor atmosphere and the elevation of the land thereunder.

30. Standard Conditions - 760 millimeters of mercury at $25^{o}$ Centigrade.

31. Trade Waste - All solid, liquid or gaseous material or rubbish resulting from construction, building operations, or the prosecution of any business, trade or industry including, but not limited to, plastic products, cartons, paint, grease, oil and other petroleum products, chemicals and cinders.

SECTION II - PERMIT REQUIREMENTS

A. Construction Permit

Any person who plans to construct, alter or add to a source of air contaminants, including the installation of any device for the control of air contaminant discharges, shall first obtain a construction permit from the Department. The Department may grant permission to proceed with minor alterations or additions without issuance of a permit when the Department determines that the alteration or addition will not affect the quantity or character of the source emission.

B. Operating Permit

Any person who plans to place into operation a new source of air contaminants, including any device for the control of air contaminant discharges, shall first obtain an operating permit from the Department. Any person who plans to continue operation of any existing source for which he possesses a valid operating permit shall renew such permit prior to expiration. Operating permits will be issued for a specified period of time, but in no case to exceed five (5) years. The Department may issue temporary permits to newly constructed, enlarged or altered sources to provide additional time for adequate evaluation of such sources and to existing sources not presently in compliance with these regulations and standards if acceptable compliance schedules are placed as conditions of the permit.

C. Permit Application

1. Construction permit applications shall be prepared and submitted by a professional engineer registered to practice in the State of South Carolina and shall provide, as a minimum, the following information:

   a. The name and location of the facility and its planned operating schedules;

b. Sufficient description, including physical and chemical properties, of materials and processes necessary for the Department to determine actual and potential emissions;

c. Identification of all emission points;

d. A description, including physical and chemical properties of all emissions;

e. A complete description including engineering design and operating characteristics of any air pollution control device or system that is to be installed; and

f. Other information as may be necessary for proper evaluation of the proposed source as determined by the Department.

2. Operating permit applications shall be submitted to the Department no later than fifteen (15) days prior to placing any new, increased or altered source into operation and no later than sixty (60) days prior to the expiration date for a source already possessing a valid operating permit.

D. Special Permit Conditions

All permits shall contain, in addition to such special conditions as the Department finds appropriate, the following standard conditions:

1. No applicable law, regulation or standard will be contravened;

2. All official correspondence, plans, permit application forms and written statements are an integral part of the permit; and

3. Any malfunction of air pollution control equipment or system, process upset or other equipment failure which results in greater discharges of air contaminants than were described for normal operation in the permit application shall be reported to the Department within twenty-four hours after the beginning of the occurrence and a written report submitted to the Department within 30 days. The written report shall include, as a minimum, the following:

a. The identity of the stack and/or other emission point where the excess emissions occurred;

b. The magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;

c. The time and duration of the excess emissions;

d. The identity of the equipment causing the excess emission;

e. The nature and cause of such excess emissions;

f. The steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunction;

g. The steps taken to limit the excess emissions; and

h. Documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions.

E. Exemptions

1. No permits shall be required for the following sources constructed prior to February 11, 1971:

a. Natural gas boilers;

b. Oil fired boilers of 50,000,000 BTU/HR rated capacity or smaller; and

c. Coal fired boilers of 20,000,000 BTU/HR rated capacity or smaller.

2. No permits shall be required for the following sources:

a. Boilers and space heating systems of less than 1,500,000 BTU/HR rated capacity;

b. Comfort air conditioning or ventilation systems;

c. Motor vehicles;

d. Laboratory hoods;

e. Emergency power generators of less than 150 KW rated capacity; and

f. Sources emitting only steam, air, nitrogen, oxygen, carbon dioxide, or any physical combination of these. When such sources are found to be in violation of the visible emission standards, the Department may require operating permits to assure compliance with the standards.

3. Package-type incinerators of 750 pounds per hour rated capacity or smaller which burn types 0 and 1 wastes as defined by the Incinerator Institute of America and package-type boilers of 100,000,000 BTU/HR rated capacity or smaller which burn natural gas or oil as fuel are exempt from the requirement that the construction permit applications be prepared and submitted by a registered professional engineer provided the proposed unit is identical to a proto-type model which has been previously designed or otherwise certified by a professional engineer.

## REGULATION NO. 62.2

## PROHIBITION OF OPEN BURNING

Open burning may be conducted in certain situations if no undesirable levels are or will be created. The authority to conduct open burning under this Regulation does not exempt or excuse the person responsible for the burning from the consequences of or the damages or injuries resulting from the burning and does not exempt or excuse anyone from complying with other applicable laws and with ordinances, regulations, and orders of governmental entities having jurisdiction, even though the burning is otherwise conducted in compliance with this Regulation. The Department reserves the right to impose other or different restrictions and exemptions on open burning in addition to those enumerated below, whenever in the judgement of the Department such is necessary to realize the purpose of this Regulation. Open burning is prohibited except as provided below:

A. Open burning of leaves, tree branches or yard trimmings originating on the premises of private residences or dwellings of four families or less, and burned on those premises.

B. Open burning in connection with the preparation of food for immediate consumption.

C. Campfires and fires used solely for recreational purposes or for ceremonial occasions.

D. Fires purposely set to forest lands for specific management practices in accordance with guidelines acceptable to the Department. Such practices shall include:

   1. Prescribed burning under existing standards for various management objectives and

   2. Site preparation burning for purposes of clearing an area for regeneration.

E. Fires purposely set for agricultural control of diseases, weeds, pests, and for other specific agricultural purposes in accordance with practices acceptable to the Department of Health and Environmental Control.

F. Open burning of trees, brush, grass and other vegetable matter for game management purposes in accordance with practices acceptable to the Department of Health and Environmental Control.

G. Open burning in other than predominantly residential area for the purpose of land clearing or right-of-way maintenance. This will be exempt only if the following conditions are met:

1. Prevailing winds at the time of the burning are away from any city or town, the ambient air of which may be significantly affected by smoke from the burning;

2. The location of the burning is at least one thousand (1,000) feet from all residential, commercial and industrial facilities other than a dwelling or structure located on the property on which the burning is conducted;

3. The amount of dirt on the material being burned is minimized;

4. Heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any materials other than plant growth which produces smoke in excess of forty (40) percent opacity are not a part of the material burned;

5. The initial burning may be commenced only between the hours of 9:00 a.m. and 3:00 p.m.; no combustible material is added to the fire between 3:00 p.m. of one day and 9:00 a.m. the following day;

6. No more than one pile 60' x 60' or equivalent will be burned within a six-acre area at one time;

7. In the case of land clearing, all salvageable timber and pulpwood must be removed; and

8. A written report or warning to a person of a violation at one site shall be considered adequate notice of the Regulation and subsequent observed violations at the same or different site will result in immediate appropriate legal action by the Board.

H. Fires set for the purposes of training public fire-fighting personnel when authorized by the appropriate governmental entity, and fires set by a private industry as a part of an organized program of drills for the training of industrial fire-fighting personnel. These will be exempt only if the drills are solely for the purpose of fire-fighting training and the duration of the burning held to the minimum required for such purposes.

I. Open burning of rubbish and garbage on the premises of and originating from private residences or dwellings of four families or less where services for the disposal of such materials are not available; and open burning on the property where it occurs of trade waste from building and construction operations will be exempt only if the following conditions are met:

1. The location of the burning is at least five hundred (500) feet from any dwelling located in a predominantly residential area other than a dwelling or structure located on the property on which the burning is conducted;

2. Heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any other trade waste which produce amounts of smoke in excess of forty (40) percent opacity are not burned; and

3. The initial burning is commenced only between the hours of 9:00 a.m. and 3:00 p.m.; no additional fuel shall be added before 9:00 a.m. of the following day.

J. Open burning, in remote or specified areas:

1. Of such trade waste as constitutes rubbish as defined in this Regulation provided smoke in excess of forty (40) percent opacity is not emitted except for a reasonable period to get the fire started, and the burning is conducted in accordance with Paragraph G of this regulation.

2. Of highly explosive or other dangerous material for which there is no other feasible method of disposal.

3. For non-recurring unusual circumstances.

4. For experimental burning for purposes of data gathering and research.

However, a written permit for these types of burning (in sub-paragraph J above) must be obtained in advance from the Department.

REGULATION NO. 62.3

AIR POLLUTION EPISODES

SECTION I - EPISODE CRITERIA

Conditions justifying the proclamation of any stage of an air pollution episode shall be deemed to exist whenever the Commissioner determines that the accumulation of air pollutants in any place is attaining or has attained levels which could, if such levels are sustained or exceeded, lead to substantial threat to the health of persons. The appropriate episode stage will be declared on a regional basis, as dictated by air quality monitoring. Adverse air quality need not be regionwide to trigger control actions; the appropriate episode stage will be declared for an entire Air Quality Control Region when any monitoring site within the region records ambient air quality in excess of that designated in the criteria. In making this determination, the Commissioner will be guided by the criteria listed below:

1. FORECAST - This level will normally be activated when an Air Stagnation Advisory (ASA) is issued for any part of South Carolina by the Columbia Forecast Office of the National Weather Service. If continuous air monitoring equipment indicates an upward trend in pollutant concentrations, the Commissioner may request that the National Weather Service issue an ASA, even though meteorological factors do not appear critical. In the absence of an ASA, the Commissioner may, at his discretion, declare this level when it is in the best interest of public health and welfare.

2. WATCH - This level will be activated when continuous air quality monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 400 ug/$m^3$ (0.15 p.p.m.), 24-hour average;
   Particulate - 375 ug/$m^3$, 24-hour average;
   $SO_2$ and particulate combined - Product of $SO_2$ ug/$m^3$, 24-hour average, and particulate ug/$m^3$, 24-hour average equal to 49 x $10^3$;
   $O_3$ (Oxidant) - 200 ug/$m^3$ (0.1 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

   and meteorological conditions are such that the pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

3. ALERT - This level indicates that air quality is continuing to deteriorate and that additional control actions are necessary. An alert will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 800 ug/$m^3$ (0.3 p.p.m.), 24-hour average;
   Particulate - 500 ug/$m^3$, 24-hour average;
   $SO_2$ and particulate combined - product of $SO_2$ ug/$m^3$, 24-hour average and particulate ug/$m^3$, 24-hour average equal to 229 x $10^3$;
   $O_3$ (Oxidant) - 800 ug/$m^3$ (0.4 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

and meteorological conditions are such that pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

4. EMERGENCY - The primary objective of this plan is to prevent this level from ever being reached; however, should this level be reached the most stringent control actions are necessary. An emergency will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 1600 ug/$m^3$ (0.6 p.p.m.), 24-hour average;
   Particulate - 750 ug/$m^3$, 24-hour average;
   $SO_2$ and particulate combined - product of $SO_2$ ug/$m^3$, 24-hour average and particulate ug/$m^3$, 24-hour average equal to 425 x $10^3$;
   $O_3$ (Oxidant) - 1000 ug/$m^3$ (0.5 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

   and meteorological conditions are such that this condition can be expected to continue for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

5. TERMINATION - Once delcared, any level reached by application of these criteria will remain in effect until the criteria for that level are no longer met. At such time, the next lower level will be assumed.

SECTION II - EMISSION REDUCTION REQUIREMENTS

Persons responsible for the operation of a source of air pollutants as listed in Tables 1, 2 and 3 below are required to plan for and may be required to implement emission reduction as indicated.

TABLE 1 - EMISSION REDUCTION PLANS
WATCH LEVEL

PART A. GENERAL

When a Watch Level is declared, the following voluntary actions will be requested:

1. There should be no open burning by any persons of tree waste, vegetation, refuse, or debris in any form.

2. The use of incinerators for the disposal of any form of solid waste should be limited to the hours between 12 noon and 4 p.m.

3. Persons operating fuel-burning equipment which requires boiler lancing or soot blowing should perform such operations between the hours of 12 noon and 4 p.m.

4. Persons operating motor vehicles should eliminate all unnecessary operations.

## PART B. SOURCE CURTAILMENT

Persons responsible for the operation of a source of air pollutants listed below shall be advised of existing conditions and be advised to review their emission reduction plans:

1. Coal or oil-fired electric power generating facilities.

2. Coal or oil-fired process steam generating facilities.

3. Manufacturing industries of the following classifications:

| | |
|---|---|
| Primary Metals Industry | Mineral Processing Industries |
| Petroleum Refining Operations | Paper and Allied Products |
| Chemical Industries | Grain Industry |

## TABLE 2 - EMISSION REDUCTION PLANS
## ALERT LEVEL

### PART A. GENERAL

Upon declaration of an Alert Level the following will apply:

1. There shall be no open burning by any persons of tree waste, vegetation, refuse, or debris in any form.

2. The use of incinerators for the disposal of any form of solid waste or liquid waste shall be prohibited.

3. Persons operating fuel-burning equipment which requires boiler lancing or soot blowing shall perform such operations only between the hours of 12 noon and 4 p.m.

4. Persons operating motor vehicles are requested to reduce operations by the use of car pools and increased use of public transportation and elimination of unnecessary operation.

### PART B. SOURCE CURTAILMENT

Any person responsible for the operation of a source of air pollutants listed below shall take all required control actions for this Alert Level to include the following:

1. Coal or oil-fired electric power generating facilities:

   a. Maximum reduction by utilization of fuels having lowest ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Maximum reduction by diverting electric power generation to facilities outside of Alert Area.

2. Coal and Oil-fired process steam generating facilities:

   a. Maximum reduction by utilization of fuels having the lowest available ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Making ready for use a plan of action to be taken if an emergency develops.

3. Manufacturing industries including petroleum refining, chemical, primary metals, glass, paper and allied products which require considerable lead time for shut-down:

   a. Maximum reduction of air contaminants from manufacturing operations by, if necessary, assuming reasonable economic hardships by postponing production and allied operations.

   b. Maximum reduction by deferring trade waste disposal operations which emit solid particles, gases, vapors or any malodorous substances.

   c. Maximum reduction of heat load demands for processing.

   d. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

4. Manufacturing industries including primary metals, chemical, mineral processing and grain which require relatively short lead times for shut-down:

   a. Elimination of air pollutants from manufacturing operations by ceasing, curtailing, postponing or deferring production and allied operations to the extent possible without causing injury to persons or damage to equipment.

   b. Elimination of air pollutants from trade waste disposal processes which emit solid particles, gases, vapors or malodorous substances.

   c. Maximum utilization of heat load demands for processing.

   d. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

TABLE 3 - EMISSION REDUCTION PLANS
EMERGENCY LEVEL

PART A. GENERAL

Upon declaration of Emergency Level the following will apply:

1. There shall be no open burning by any persons of tree waste, vegetation, refuse or debris in any form.

2. The use of incinerators for the disposal of any form of solid or liquid waste shall be prohibited.

3. All places of employment described below shall immediately cease operations:

   a. Mining and quarrying of nonmetallic minerals.

   b. All construction work except that which must proceed to avoid emergency physical harm.

   c. All manufacturing establishments except those required to have in force an air pollution emergency plan.

   d. All wholesale trade establishments, i.e., places of business primarily engaged in selling merchandise to retailers, or industrial, commercial, institutional or professional users, or to other wholesalers or acting as agents in buying merchandise for or selling merchandise to such persons or companies except those engaged in the distribution of drugs, surgical supplies and food.

   e. All offices of local, county and State government including authorities, joint meetings and other public bodies except such agencies which are determined by the chief administrative officer of local, county, or state government,authorities, joint meetings and other public bodies to be vital for public safety and welfare and the enforcement of the provisions of this order.

   f. All retail trade establishments except pharmacies, surgical supply distributors, and stores primarily engaged in the sale of food.

   g. Banks, credit agencies other than banks, securities and commodities brokers, dealers, exchangers and services; offices of insurance carriers; agents and brokers, real estate offices.

   h. Wholesale and retail laundries, laundry services and cleaning and dyeing establishments; photographic studios; beauty shops, barber shops, shoe repair shops.

   i. Advertising offices; consumer credit reporting, adjustment and collection agencies; duplicating, addressing, blueprinting; photocopying, mailing, mailing list and stenographic services; equipment rental services, commercial testing laboratories.

   j. Automobile repair, automobile services, garages.

   k. Establishments rendering amusement and recreational services including motion picture theaters.

1. Elementary and secondary schools, colleges, universities, professional schools, junior colleges, vocational schools, and public and private libraries.

4. All commercial and manufacturing establishments not included in this order will institute such actions as will result in maximum reduction of air pollutants from their operation by ceasing, curtailing, or postponing operations which emit air pollutants to the extent possible without causing injury to persons or damage to equipment.

5. The use of motor vehicles is prohibited except in emergencies with the approval of local or state police.

PART B. SOURCE CURTAILMENT

Any person responsible for the operation of a source of air pollutants listed below shall take all required control actions for this Emergency Level to include the following:

1. Coal or oil-fired electric power generating facilities:

   a. Maximum reduction by utilization of fuels having lowest ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

   c. Maximum reduction by diverting electric power generation to facilities outside of Emergency Area.

2. Coal and oil-fired process steam generating facilities:

   a. Maximum reduction by reducing heat and steam demands to absolute necessities consistent with preventing equipment damage.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Take the action called for in the emergency plan.

3. Primary metals, petroleum refining, chemical, mineral processing, grain, paper and allied products industries shall take the following control actions:

   a. Elimination of air pollutants from manufacturing operations by ceasing, curtailing, postponing or deferring production and operations to the extent possible without causing injury to persons or damage to equipment.

   b. Elimination of air pollutants from trade waste disposal processes which emit solid particles, gases, vapors, or malodorous substances.

   c. Maximum reduction of heat load demands for processing.

   d. Maximum utilization of mid-day (12noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

## REGULATION NO. 62.4

## HAZARDOUS AIR POLLUTION CONDITIONS

### A. Definitions

The following words and phrases when used in this regulation shall have the meanings respectively ascribed to them:

1. Hazardous Conditions (or hazardous levels) - Conditions created by the release or discharge into the ambient air of one or more air contaminants which because of the characteristic and/or quantity of material involved may pose an imminent threat to the health of anyone who might come in contact with the material through this release as well as involving substantial risk of injury, to include injury to property or plant and animal life. This includes the indirect threat to human life and property by the creation of traffic hazards.

2. Traffic Hazards - Impairment of visibility whenever the concentration of dust, fumes, condensed vapor, or any other substance is such that the horizontal visibility at or near ground level is reduced to 2400 feet or less.

### B. General

The owner or operator of any source, in addition to complying with all applicable regulations and standards, shall take all steps necessary to protect human health and welfare and otherwise minimize the effects of unintended, short-term or other releases of air contaminants and other substances which produce unintended hazardous conditions.

### C. Traffic Hazards

The emission of smoke, dust, fumes, condensed vapor, or any other substance which creates a traffic hazard on public roads by impairment of visibility, or intensifies an existing condition to the extent that a traffic hazard is created is prohibited.

### D. Emergency Actions

In the event that releases of dust, fumes, smoke, gases, mists, vapors or other substances occur in such quantity as to create imminently hazardous levels, the owner or operator of the source shall take all necessary emergency acts to cause the release to cease, to notify nearby residents and occupants, to assist in evacuation if deemed necessary, to notify the Department immediately and to take such other action as responsible officials deem advisable.

### E. Cleanup

If releases to the atmosphere of air contaminants result from spillage and cause such concentrations as to produce an imminently hazardous level, clean up activities shall begin as soon as possible and shall be completed to the satisfaction of the Commissioner.

F. Notification

The affected public, the Department, the South Carolina Disaster Preparedness Agency, and all law enforcement officials having jurisdiction shall be notified promptly by the owner or operator of the source in the event of releases of material which may cause imminently hazardous levels. If traffic hazards are created, notification shall be made to appropriate state or local agencies of the possible existence of such a condition and of the corresponding need for posting of appropriate signs, warning devices or flagmen. When the concentrations of materials are reduced sufficiently as to no longer present an imminent hazard, public announcement will be made, and normal operations may resume.

REGULATION 62.5

12/78

AIR POLLUTION CONTROL STANDARDS

STANDARD NO. 1
EMISSIONS FROM FUEL BURNING OPERATIONS

SECTION I - VISIBLE EMISSIONS

A. Existing Sources

No one shall discharge to the ambient air from any existing source constructed prior to February 11, 1971, smoke which exceeds an opacity of forty (40) percent. For a total of six (6) minutes in one hour or twenty-four (24) minutes in a twenty-four (24) hour period, forty (40) percent opacity may be exceeded for soot blowing; but shall in no case exceed an opacity of sixty (60) percent.

B. New Sources

No one shall discharge to the ambient air from any source constructed on or after February 11, 1971, smoke which exceeds an opacity of twenty (20) percent. For a total of six (6) minutes in one hour or twenty-four (24) minutes in a twenty-four (24) hour period, twenty (20) percent opacity may be exceeded for soot blowing; but shall in no case exceed an opacity of sixty (60) percent.

C. Special Provisions

Allowances may be granted for visible emissions in excess of that permitted in Paragraphs A and B above which occur during periods of start-up and shut-down of fuel burning equipment. As a conditional requirement the owner or operator shall maintain a current record of the time, magnitude, duration and any other information necessary to prove that these excess emissions were a result of a start-up or shut-down operation. These records shall be made available to the Department upon request. {Different soot blowing provisions for a single stack serving multiple boilers may be allowed as conditions of the operating permit.}

SECTION II - PARTICULATE EMISSIONS

A. Allowable Discharge

The allowable discharge of particulate matter resulting from fuel burning operations shall be limited to the values obtained by use of Figure 1 and/or Part B. (For the purpose of determining heat input, total equipment capacity refers to total equipment capacity discharging through each stack. If a boiler has more than one (1) stack the total rated capacity will be the boiler rated capacity discharging to these stacks). Interpolation of Figure 1 for fuel burning operations of 1300 million BTU per hour heat input and larger shall be accomplished by use of the equation:

$$E = 57.84\ P^{-0.637}$$

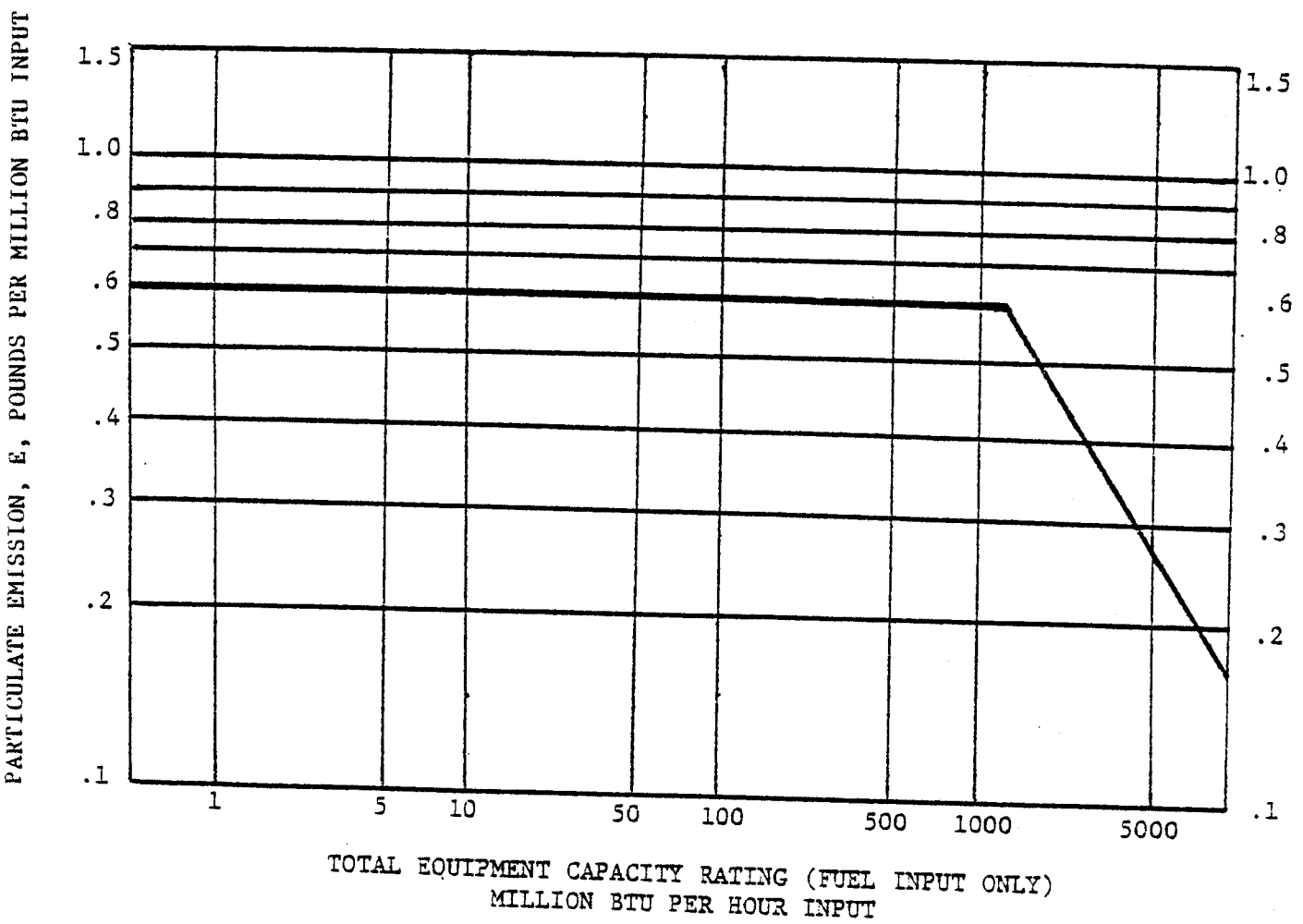
where $E$ = the allowable emission rate in pounds per million BTU heat input,

and $P$ = million BTU heat input per hour

B. Special Provisions

All fuel burning operations of 10 million BTU per hour heat input and smaller constructed prior to February 11, 1971 shall be allowed 0.8 pounds per million BTU input.

Figure 1



## SECTION III - SULFUR DIOXIDE EMISSIONS

### A. General

The maximum allowable discharge of sulfur dioxide ($SO_2$) from fuel burning operations shall be in accordance with a system of priorities as specified hereinafter in paragraph B. The classifications shall be delineated on a county basis. The maximum allowable discharge for the various classes is specified in paragraph C of this Section.

### B. Classifications

1. The class into which a given county falls has been determined by mathematical atmospheric diffusion models and other methods which evaluate those factors which necessitates limits on sulfur dioxide emissions. These factors included but were not limited to: (1) total sulfur dioxide emissions; (2) spatial distribution of sulfur dioxide sources; (3) effects of single, large sources; (4) existing, measured air quality; (5) topographical features of the county; (6) contributions to background levels due to sources outside the county being considered; (7) population density.

2. The assigned classifications will be reviewed periodically at intervals not to exceed three years, and changes will be made as required. When a county is assigned to a more restrictive class, individual compliance schedules will be established in such a way that reasonable time will be allowed for the sources to make necessary changes in equipment and/or fuel contracts.

3. The following classifications are assigned:

   Class I - Charleston County

   Class II - Aiken County - Anderson County

   Class III - All others

### C. Allowable Discharges

Sulfur dioxide emissions from fuel burning sources located in various counties will not exceed the following limits:

1. Counties in Class I

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/ million BTU Input) |
|---|---|
| Up to and including 10 million BTU/hr | 3.5 |
| Greater than 10 million BTU/hr | 2.3 |

2. Counties in Class II

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/million BTU Input) |
|---|---|
| Up to 1000 million BTU/hr | 3.5 |
| 1000 million BTU/hr and larger | 2.3 |

3. Counties in Class III

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/million BTU Input) |
|---|---|
| All | 3.5 |

D. Special Provisions

If it can be demonstrated to the satisfaction of the Board that ambient air standards will not be contravened by a source, alone or in combination with other sources, a greater allowance for sulfur dioxide discharges may be made on a case by case(s) basis.

SECTION IV - MONITORING REQUIREMENTS

A. Applicable Sources

The owner or operator of any fossil fuel-fired steam generator of more than 250 million BTU per hour heat input capacity shall install, calibrate, operate, and maintain no later than June 14, 1978, continuous monitoring system(s) for the measurement of opacity which meets the performance specifications of Paragraph E of this Section except where:

1. Gaseous fuel is the only fuel burned;

2. Oil or a mixture of gas and oil are the only fuels burned and the steam generator is able to comply with the provisions of Sections I and II of this Standard without utilization of particulate matter collection equipment, and where the steam generator has never been found, through any administrative or judicial proceedings,to be in violation of Section I of this Standard.

3. The steam generator operates with an annual average capacity factor of 30 percent or less, as reported to the Federal Power Commission for calendar year 1974 or otherwise adequately demonstrated to the Department; and has not subsequently increased this factor to more than 30 percent; or

4. The steam generator is scheduled for retirement on or before October 6, 1980, and provided adequate evidence and guarantees are submitted to the Department which clearly show that the generator will cease operations no later than this date.

B. Time Extensions

Reasonable extensions of time beyond June 14, 1978 may be granted if the owner or operator demonstrates that good faith efforts have been made to obtain and install such systems by this date.

C. Reporting Requirements

The owner or operator of any steam generator subject to the provisions of Paragraph A of this Section shall submit a written report to the Department at least quarterly, or more often if requested. This report shall include, as a minimum, all integrated six minute opacity measurements for the periods during which the applicable provisions of Section I have been exceeded; the date and time identifying each period during which the monitoring system was inoperative, except for zero and span checks; the nature of monitoring system repairs or adjustments; and proof of opacity monitoring system performance whenever system repairs or adjustments have been made. During periods when no excess opacity measurements are recorded and the monitoring system(s) have not been inoperative, repaired or adjusted, the report shall include information to this effect. Alternate data reporting procedures may be allowed if the owner or operator shows, to the satisfaction of the Department, that these procedures are at least as accurate as those described. The owner or operator shall maintain a file of all information contained in the quarterly reports; calibration data for the opacity monitoring system(s); relevant records of adjustments and maintenance performed on such system(s); and all other data collected by the continuous opacity monitoring system(s) for a minimum of two years from the date of submission of such reports or collection of such data.

D. Exemption from Reporting Requirements

A temporary exemption from the opacity monitoring and reporting requirements of this Section may be granted during any period of monitoring system(s) malfunction, provided the owner or operator shows, to the satisfaction of the Department, that the malfunction was unavoidable and is being repaired as expeditiously as possible.

E. Equipment Performance Specifications

The continuous opacity monitoring system(s) required by Paragraph A of this Section shall conform with the performance specifications set forth in 40 CFR, Part 60, Appendix B, Performance Specification 1 which is incorporated by reference as a part of this Standard except that where the term "Administrator" is used the term "Department" shall be substituted. In addition, the opacity monitoring system(s) shall complete a minimum of one cycle of operation for each successive 10-second period; be installed such that representative measurements of opacity from the affected steam generator are obtained; and have an instrument span of approximately 80 percent opacity. Any owner or operator who has purchased opacity monitoring system(s) prior to September 11, 1974, shall be exempt from meeting such test procedures prescribed in 40 CFR, Part 60, Appendix B, Performance Specification 1 until December 14, 1981.

The owner or operator shall record the zero and span drift in accordance with method prescribed by the manufacturer of such opacity monitoring system(s); subject the system(s) to the manufacturer's recommended zero and span check at least once daily unless the manufacturer has recommended adjustments at shorter intervals, in which case such recommendations shall be followed; adjust the zero and span whenever the 24-hour zero drift or 24-hour calibration drift limits of 40 CFR, Part 60, Appendix B, Performance Specification 1 are exceeded; adjust the opacity monitoring system(s) purchased prior to September 11, 1974 whenever the 24-hour zero drift or 24-hour calibration drift exceeds 4 percent opacity for those generators constructed prior to February 11, 1971 and 2 percent opacity for those generators constructed after February 11, 1971.

F. Monitor Location

When the effluents from two or more affected steam generators of similar design and operating characteristics are combined before being released to the atmosphere, the opacity monitoring system(s) shall be installed on the combined effluent. When the affected steam generators are not of similar design and operating characteristics, or when the effluent from one affected steam generator is released to the atmosphere through more than one point, the owner or operator shall apply for an alternate procedure to comply with the requirements of this Section.

G. Exemptions from Monitoring Requirements

Whenever the requirements for continuous opacity monitoring cannot be implemented by the owner or operator due to physical plant limitations, extreme economic burden, or infrequent steam generator operation of less than 30 days per year, or when the specified monitoring procedure would not provide accurate opacity determinations, alternate monitoring and reporting requirements may be approved on a case-by-case basis provided the owner or operator submits a written request to the Department which includes, but not limited to:

1. The basis or reason(s) that alternate requirements are necessary;

2. A proposal of the alternate monitoring and reporting requirements; and

3. Any other information needed by the Department to make a determination that the alternate requirements are adequate to meet the intent of this Section.

SECTION V - EXEMPTIONS

Residences or dwellings of four families or less and ocean-going vessels actually engaged in the physical process of national or international trade or defense shall be exempt from the provisions of this Standard.

STANDARD NO. 2

AMBIENT AIR QUALITY STANDARDS

The following table constitutes the ambient air quality standards for the State of South Carolina. The analytical methods to be used will be those applicable Federal Reference Methods published in 40 CFR 51, Appendices A-F. In the case of fluorides either the double paper tape sampler methods (ASTMD-3266-73T) or the

sodium bicarbonate-coated glass tube and particulate filter method (ASTM-3268-73T) may be used.

| POLLUTANT | MEASURING INTERVAL | MICROGRAMS/CUBIC METER* ** |
|---|---|---|
| Sulfur Dioxide | 3 hour | 1300**** |
| | 24 hours | 365**** |
| | annual | 80 |
| Suspended Particulates | 24 hours | 250 |
| | annual G.M.*** | 60 |
| Carbon Monoxide | 1 hour | 40,000 |
| | 8 hour | 10,000 |
| Photochemical Oxidant | 1 hour | 160 |
| Non-methane hydrocarbons | 3 hour | 160 |
| Gaseous Fluorides | 12 hr. avg. | 3.7 |
| (as HF) | 24 hr. avg. | 2.9 |
| | 1 wk. avg. | 1.6 |
| | 1 mo. avg. | 0.8 |
| Nitrogen Dioxide | annual | 100 |

* Arithmetic Average except in case of suspended particulates
** At 25° C and 760 mm Hg.
*** Geometric Mean
**** Not to be exceeded more than once a year

STANDARD NO. 3
EMISSIONS FROM INCINERATORS

All incinerators shall operate within the following minimum emission limitations:

A. Particulates in the flue gas discharged into the atmosphere shall not exceed 0.5 pounds per million BTU of heat input to the incinerator, excluding auxiliary fuel.

B. Emissions shall not produce smoke which exceeds twenty(20) percent opacity for an aggregate of more than three (3) minutes in any one hour or fifteen (15) minutes in a twenty-four hour period.

C. Odors from the incinerator shall be reduced to such a level as not to create an undesirable level.

D. Emissions shall not contain individual particles which are sufficiently large as to be visible as individual particles at the emission point or are of such size and nature as to be visible individually as incandescent particles. This requirement shall only apply if such particles fall on real property other than that of the person responsible for the emission.

## STANDARD NO. 4

## EMISSIONS FROM PROCESS INDUSTRIES

### SECTION I - SULFURIC ACID MANUFACTURING PLANTS

The rate of emission of sulfur dioxide from sulfuric acid manufacturing plants shall be limited to no more than 4 pounds of sulfur dioxide per ton of 100% sulfuric acid produced.

### SECTION II - PULP AND PAPER MANUFACTURING PLANTS

The rate of particulate emission from pulp and paper manufacturing plants shall be limited to the following:

| | Maximum allowable emission of particulates in pounds/equivalent ton of air dried, unbleached pulp produced. |
|---|---|
| Recovery Furnace Stack..... | 2.75 |
| Dissolving Tank Vents..... | 1.0 |
| Lime Kiln Stack..... | 1.0 |

### SECTION III- PORTLAND CEMENT MANUFACTURING PLANTS

The rate of emission of particulate matter from Portland cement plants shall be limited to the following:

| Production Rate Per Kiln (Tons per Hour) | Maximum Allowable Emissions of Particulate Matter Per Kiln (Pounds per Hour) |
|---|---|
| 10 | 14 |
| 15 | 18 |
| 20 | 22 |
| 25 | 25 |
| 30 | 29 |
| 50 | 40 |
| 60 | 42 |
| 80 | 45 |
| 100 | 47 |
| 120 | 48 |

SECTION IV - COTTON GINS

The particulate emission from a cotton ginning operation shall be limited to the maximum rate specified in the table below for the process rate allocated to such process.

| Production Rate (Output) (Bales* per Hour) | Maximum Allowable Rate of Particulate (Pounds per Hour) |
|---|---|
| 4 | 12.3 |
| 5 | 14.4 |
| 6 | 16.2 |
| 7 | 18.0 |
| 8 | 19.5 |
| 9 | 21.2 |
| 10 | 22.8 |
| 11 | 24.2 |
| 12 | 25.8 |
| 13 | 27.1 |
| 14 | 28.5 |
| 15 | 29.9 |
| 16 and above | 31.2 |

*For the purpose of this standard a bale is defined as a finished bale weighing 500 pounds.

SECTION V - HOT MIX ASPHALT PLANTS

A. The rate of emission of particulate matter from hot mix asphalt plants shall be limited to the following:

| Aggregate Process Weight (Tons per Hour) | Maximum Allowable Emission Rate (Pounds per Hour) |
|---|---|
| 20 | 22 |
| 50 | 31 |
| 100 | 38 |
| 150 | 45 |
| 200 | 51 |
| 250 | 56 |
| 300 | 61 |
| 350 and above | 65 |

B. All hot mix asphalt plants shall be equipped with a fugitive dust control system which shall be operated and maintained in such a manner as to reduce to a minimum the emission of particulate matter from any point other than the stack outlet.

## SECTION VI - OTHER PROCESS INDUSTRIES

A. The particulate emissions from all other process industries shall be limited to the rate specified in Table A for the process weight rate allocated to such process, and modified using the effect factors of Table B.

B. Interpolation of the data in this table for process weights up to 30 tons per hour shall be accomplished by use of the equation:

$$E = 4.10\ P^{0.67}$$

and interpolation and extrapolation of the data for process weight rates greater than 30 tons per hour shall be accomplished by using the equation:

$$E = 55.0\ P^{0.11} - 40$$

where E = the allowable emission rate in pounds per hour,
and P = process weight rate in tons per hour.

TABLE A

ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE

| PROCESS WEIGHT RATE (Tons/Hour) | RATE OF EMISSION (Pounds/Hour) | PROCESS WEIGHT RATE (Tons/Hour) | RATE OF EMISSION (Pounds/Hour) |
|---|---|---|---|
| 0.05 | 0.551 | 8 | 16.5 |
| 0.10 | 0.877 | 9 | 17.9 |
| 0.20 | 1.40 | 10 | 19.2 |
| 0.30 | 1.83 | 15 | 25.2 |
| 0.40 | 2.22 | 20 | 30.5 |
| 0.50 | 2.58 | 25 | 35.4 |
| 0.75 | 3.38 | 30 | 40.0 |
| 1.00 | 4.10 | 35 | 41.3 |
| 1.25 | 4.75 | 40 | 42.5 |
| 1.50 | 5.38 | 45 | 43.6 |
| 1.75 | 5.96 | 50 | 44.6 |
| 2.00 | 6.52 | 60 | 46.3 |
| 2.50 | 7.58 | 70 | 47.8 |
| 3.00 | 8.56 | 80 | 49.0 |
| 3.50 | 9.49 | 100 | 51.2 |
| 4.00 | 10.4 | 500 | 69.0 |
| 4.50 | 11.2 | 1000 | 77.6 |
| 5.00 | 12.0 | 3000 | 92.7 |

TABLE B

EFFECT FACTOR FOR PARTICULATE EMISSIONS*

(TO BE USED WITH STANDARD 4 - SECTION VI)

| MATERIAL | EFFECT FACTOR |
|---|---|
| a. All materials not specifically listed hereunder | 1.0 |
| b. Elements and their compounds on the basis of the element contained therein** | none assigned |
| c. Specific Materials: | |
| Acid Mists | 0.25 |

* The Board will make additions to this table as required from time to time to preserve public health and property in South Carolina.

** When a material contains two or more elements, the effect factor of the element having the lowest effect factor shall apply.

SECTION VII - NON-ENCLOSED OPERATIONS

A. All non-enclosed sources shall be operated in such a manner that a minimum of particulate matter becomes airborne. In no case shall established ambient air quality standards be exceeded at or beyond the property line.

B. The owner or operator of all sources shall maintain dust control of the premises and access roads by paving, oil treatment or other suitable measures.

C. All crushing, drying, classification and like operations shall employ a suitable control device acceptable to the Department, and shall discharge no more particulate matter than that specified in Section VI of this Standard.

REGULATION 62.5

AIR POLLUTION CONTROL STANDARDS

STANDARD NO. 5
VOLATILE ORGANIC COMPOUNDS

Section I - General Provisions

Part A. Definitions. Unless specifically defined elsewhere in this Standard, the definitions below and those contained in the South Carolina Pollution Control Act and Regulation 62.1, Section I will apply to this Standard.

1. "Major urban county" refers to Charleston, Berkeley, Lexington and Richland counties.

2. "Non-urban county" refers to any county not previously classified as a major urban county.

3. "Capture system" means the equipment (including hoods, ducts, fans, etc.) used to contain, capture, or transport a pollutant to a control device.

4. "Coating line" means one or more apparatus or operations which include a coating applicator, flash-off area, and oven wherein a surface coating is applied, dried, and/or cured.

5. "Commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a binding contractural obligation to undertake and complete, within a reasonable time a continuous program of construction or modification.

6. "Construction" means commencement of on-site fabrication, erection, or installation of an emission source, air pollution control equipment, or a facility.

7. "Control device" means equipment (incinerator, adsorber, or the like) used to destroy, contain, or remove air pollutant(s) prior to discharge to the ambient air.

8. "Continuous vapor control system" means a vapor control system that treats vapors dispaced from tanks during filling on a demand basis without intermediate accumulation.

9. "Emission" means the release or discharge, whether directly or indirectly, of any air pollutant into the ambient air from any source.

10. "Existing process" is any process in existence or having a valid construction permit prior to July 1, 1979.

11. "Facility" means any building, structure, installation, activity, or combination thereof which contains one or more stationary sources of air contaminants and which is located on one or more contiguous or adjacent properties and owned or operated by the same person or persons under common control.

12. "Flashoff area" means the space between the application area and the oven.

13. "Intermittent vapor control system" means a vapor control system that employs an intermediate vapor holder to accumulate vapors displaced from tanks during filling. The control device treats the accumulated vapors only during automatically controlled cycles.

14. "Loading rack" means an aggregation or combination of petroleum loading equipment arranged so that all loading outlets in the combination can be connected to a tank truck or trailer parked in a specified loading space.

15. "Non-attainment area" means an area which is determined by the Department to exceed any National ambient air quality standard.

16. "Organic material" means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

17. "Oven" means a chamber within which heat is used to bake, cure, polymerize, and/or dry a surface coating.

18. "Owner or operator" means any person who owns, leases, controls, operates or supervises a facility, emission source, or air pollution control equipment.

19. "Prime coat" means the first film of coating applied in a multi-coat operation.

20. "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases as determined by American Society for Treating and Materials, Part 17, 1973, D-323-72 (Reapproved 1977).

21. "Solvent" means organic materials which are liquid at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

22. "Standard conditions" for this Standard mean a temperature of 20°C (68°F) and pressure of 760 millimeters of mercury (29.92 inches of mercury).

23. "Stationary source" means any article, machine, process equipment, or other contrivance from which air pollutants emanate or are emitted to the ambient air, either directly or indirectly, from a fixed location.

24. "Topcoat" means the final film of coating applied in a multiple coat operation.

25. "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From Floating Roof Tanks," 1962.

26. "Vapor collection system" means a vapor transport system which uses direct displacement by the liquid loaded to force vapors from the tank into a vapor control system.

27. "Volatile organic compound" (also denoted as VOC) means any compound of carbon that has a vapor pressure greater than 0.5 millimeters of mercury at standard conditions excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. The following compounds will not be considered volatile organic compounds: methane,ethane, 1,1,1-trichloroethane (methyl chloroform), acetonitrile, and trichlorotrifluoroethane (Freon 113).

Part B. General Applicability

1. Unless otherwise stated this Standard will not apply:

a. in major urban counties, to existing stationary sources whose total potential emissions of volatile organic compounds are not more than 55 pounds (25 kilograms) in any one day, nor more than 5.5 pounds (2.5 kilograms) in any one hour, provided the emission rates are determined and certified before October 1, 1979 in a manner approved by the Department.

b. in non-urban counties, to existing facilities whose total potential emissions of volatile organic compounds are not more than 550 pounds (250 kilograms) in any one day, nor more than 150 pounds (68 kilograms) in any one hour, provided the emission rates are determined and certified before October 1, 1979 in a manner approved by the Department.

2. The effective date of this Standard is July 1, 1979.

Part C. Recordkeeping, Reporting, Monitoring

1. The owner or operator of any volatile organic compound emission source or control equipment shall maintain, as a minimum: records detailing all activities relating to any compliance schedule under Section III; records of all compliance testing conducted under Part F below, and records of all monitoring conducted under paragraphs 3.a. and 3.b. below.

2. The owner or operator of any applicable volatile organic compound emission source or control equipment shall, on request, make available to the Department, reports detailing the nature, specific sources, and total annual quantities of all volatile organic compound emissions.

3. The owner or operator of any volatile organic compound emission source or control equipment shall:

a. install, operate, and maintain process and/or control equipment monitoring instruments or procedures as necessary to comply with paragraphs 1 and 2 above; and,

b. maintain, in writing, data and/or reports relating to monitoring instruments or procedures which will, upon review, document the compliance status of the volatile organic compound emission source or control equipment to the satisfaction of the Department.

4. Copies of all records and reports under paragraphs 1, 2, and 3 above, shall be retained by the owner or operator for two years after the date on which the record was made or the reports submitted.

5. Copies of all records and reports required under this Part shall be available for inspection during normal working hours and furthermore, copies of the required records and reports shall be furnished within ten working days after receipt of a written request from the Department.

Part D. Petition for Alternative Controls

1. If the owner or operator of a source of volatile organic compounds regulated by this Standard can demonstrate that compliance with Section II below would not be feasible, he may petition the Department to allow the use of alternative operational and/or equipment controls for the reduction of volatile organic compound emissions of such source. Petition must be made for each source within a given facility and nothing herein should be in-

interpreted as permitting a source regulated by this Standard to exceed emission limits for that source as given in Section II below. The petition must be submitted in writing to the Department and must contain:

a. the name and address of the company and the name, address and telephone number of a company officer over whose signature the petition is submitted; and,

b. a description of all operations conducted at the location to which the petition applies and the purpose that the volatile organic compounds emitting equipment serves within the operations; and,

c. reference to the specific operational and/or equipment controls under Section II below which alternative operational and/or equipment controls are proposed; and,

d. a detailed description of the proposed alternative operational and/or equipment controls, the magnitude of volatile organic compound emission reduction which will be achieved, and the quantity and composition of volatile organic compounds which will be emitted if the alternative operational and/or equipment controls are instituted; and,

e. a schedule for the installation and/or institution of the alternative operational and/or equipment controls in conformance with Section III below.

2. The Department may approve a Petition for Alternative Control if:

a. the petition is submitted in accordance with paragraph 1 above; and,

b. the Department determines that the petitioner cannot comply with Section II below because of technological infeasibility (considering costs); and,

c. the petition contains a schedule for achieving and maintaining reduction of volatile organic compound emissions to the maximum extent feasible and as expeditiously as practicable; and,

d. a nuisance condition will not result from operation of the source as proposed in the Petition; and,

e. the alternative control system will have efficiencies at least as

good as the controls listed in the appropriate part of Section II below.

Part E.

1. The owner or operator of a facility which contains more than one source regulated by this standard may petition the Department for permission to control the emissions of volatile organic compounds from the separate sources to varying degrees, provided the combined resultant emissions do not exceed the total emissions that would result from the application of this standard to each source separately.

Petitions will be accepted only for those sources to which this standard applies and nothing herein should be interpreted as permitting the averaging of emissions from sources not subject to this standard with the emissions from sources which are subject to this standard. The petition shall be submitted in writing to the Department, and must contain:

a. the name and address of the company, the name, address and telephone number of a company officer over whose signature the petition is submitted, and the location of the facility which is the subject of the petition; and

b. a description of all sources the emissions from which are proposed for averaging; and

c. the reasons why the plant averaging method is necessary or desirable including cost analyses; and

d. a description of the method of determining the weighted average from all of the sources which are the subject of the petition.

2. The Department may approve a Petition for Alternative Compliance Method if:

a. the petition is submitted in accordance with paragraph 1 above; and

b. the petition contains a valid method for averaging emissions from the separate sources on a weighted basis; and

c. the reasons given for the alternative compliance method are reasonable and valid; and

d. the emissions of volatile organic compounds from the separate sources are quantifiable, and the total of such emissions will not exceed the emissions that would result from the application of this standard to each source separately.

Part F. Case by Case Exceptions to Provisions of Section II

1. If the owner or operator of a source of volatile organic compounds regulated by this standard can demonstrate that compliance with applicable portions of Section II below would not be economically feasible, the Department may, on a case-by-case basis, allow emission limitations less stringent than those required by applicable parts of Section 2 below.

All data pertinent to the showing of economic infeasibility must accompany a petition for this relief; and shall include a present value analysis showing economic infeasibility.

2. The Department may approve less stringent requirements, determined on a case-by-case basis if the preponderance of evidence justifies such approval.

3. No such approval shall be construed as granting exemptions from any of the steps in compliance schedules contained in Section III below, until approval is granted. Adjustments in compliance schedules as the result of this approval shall not extend, in any case, beyond December 31, 1982.

Part G. Circumvention

No owner or operator subject to this Standard may build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable Regulation. This includes, but is not limited to, the use of gaseous

dilutants to achieve compliance and the piecemeal carrying out of an operation to avoid coverage by this Standard that applies only to operations larger than a specified size.

Part H. Volatile Organic Compound Compliance Testing

1. The owner or operator of any volatile organic compound source required to comply with Section II below shall, at his own expense, conduct such tests as required by the Department in order to demonstrate complete compliance. Further, the test methods and procedures shall be those either specified by the Department or such alternative methods approved by the Department. All tests shall be made by, or under the direction of, a person qualified by training and/or experience in the field of air pollution testing.

2. No volatile organic compound emissions compliance testing will be allowed, nor the results accepted, unless prior notification has been supplied to the Department as required under paragraphs 3. and 4. below and the Department has granted approval.

3. Any person proposing to conduct a volatile organic compound emissions compliance test shall notify the Department, in the manner set forth under paragraph 4. below of the intent to test, not less than 15 days before the proposed initiation of the tests so the Department may at its option observe the test.

4. Any person notifying the Department of a proposed volatile organic compound emissions compliance test shall include, as part of notification, the following minimum information:

a. a statement indicating the purpose of the proposed test;

b. a description of the source to be tested;

c. a description of the test procedures, equipment, and sampling sites; and,

d. a timetable, setting forth the dates on which;

(i) the testing will be conducted; and,

(ii) a letter of preliminary results, containing, as a minimum, the process weight rates, % isokinetics, and the average emission rate (not later than 30 days after completion of on-site sampling).

(iii) the final test reports will be submitted (not later than 60 days after completion of on-site sampling).

5. For compliance testing, the owner or operator of any volatile organic compound emissions source shall be responsible for providing;

a. sampling ports, pipes, lines, or appurtenances for the collection of samples and data required by the test procedure;

b. safe access to the sample and data collection locations; and,

c. light, electricity, and other utilities required for sample and data collection.

Section II - Provisions for Specific Sources

Part A. Coating Industry

1. For the purpose of this Part, the following definitions apply:

a. "Coil coating" means the coating of any flat metal sheet or strip that comes in rolls or coils.

b. "Paper coating" means coatings put on paper and pressure sensitive tapes regardless of substrate. Related web coating processes on plastic film and decorative coatings on metal foil are included in this definition.

c. "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substance.

d. "Magnet wire coating" means the process of applying a coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

2. This Part will apply, in accordance with Sections I, above, and III, below, to:

a. coating applicator(s) and oven(s) of sheet, can or end coating lines involved in sheet basecoat (exterior and interior) and overvarnish; two-piece can exterior (basecoat and overvarnish); two and three-piece can interior body spray; two-piece can exterior end (spray or roll coat); three-piece can side-seam spray and end sealing compound operations. No owner or operator of a can coating line subject to this Part may cause, allow, or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 2.8 pounds per gallon (0.34 kilograms per liter of coating, excluding water, delivered to the coating applicator from sheet basecoat (exterior and interior) and overvarnish or two-piece can exterior (basecoat and overvarnish) operations.

(ii) 4.2 pounds per gallon (0.51 kilograms per liter) of coating, excluding water, delivered to the coating applicator from two and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

(iii) 5.5 pounds per gallons (0.66 kilograms per liter) of coating, excluding water, delivered to the coating applicator from three-piece can side-seam spray operations.

(iv) 3.7 pounds per gallon (0.44 kilograms per liter) of coating, excluding water, delivered to the coating applicator from end sealing compound operations.

b. coating applicator(s), oven(s) and quench area(s) of coil coating lines involved in prime and top coat or single coat operations. No owner or operator of a coil coating line subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 2.6 pounds per gallon (0.31 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime and topcoat or single coat operations.

c. roll knife or rotogravure coater(s) and drying oven(s) of fabric, paper and vinyl coating lines. No owner or operator of a fabric coating line or a vinyl coating line or a paper coating line subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 2.9 pounds per gallon (0.35 kilograms per liter) of coating, excluding water, delivered to the coating applicator from a fabric coating line or a paper coating line.

(ii) 3.8 pounds per gallon (0.45 kilograms per liter) of coating, excluding water, delivered to the coating applicator from a vinyl coating line.

d. the application area(s), flashoff area(s), and oven(s) of metal furniture coating lines or large applicance coating lines or components thereof involved in prime and topcoat or single coating operations. No owner or operator of a metal furniture coating line or a large applicance coating line or components thereof subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 3.0 pounds per gallon (0.36 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime and topcoat or single cost operations from a metal furniture coating line.

(ii) 2.8 pounds per gallon (0.34 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime, single or topcoat coating operations from a large appliance coating line or components thereof. This emission limit will not apply to the use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 1 quart (0.95 liters) in any one 8-hour period.

e. the oven(s) of magnet wire coating operations. No owner or operator of a magnet wire coating oven subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 1.7 pounds per gallons (0.20 kilograms per liter) of coating, excluding water, delivered to the coating applicator from magnet wire coating operations.

3. The emission limits under paragraph 2 above shall be achieved by:

(i) the application of low solvent content coating technology; or,

(ii) incineration, provided that 90 percent of the nonmethane volatile organic compounds (VOC measured as total combustible carbon) which enter the incinerator are oxidized to carbon dioxide and water; or,

(iii) carbon bed solvent recovery system; or,

(iv) alternative controls as allowed under Section I, Part D.

Part B. Petroleum Liquid Storage

1. For the purpose of this Part, the following definitions apply:

a. "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.

b. "Custody transfer" means the transfer of produced crude oil and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

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c. "External floating roof" means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the petroleum liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

d. "Internal floating roof" means a cover or roof in a fixed roof tank which rests upon or is floated upon the petroleum liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

e. "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oils, or through redistillation, cracking, extraction, or reforming unfinished petroleum derivatives.

f. "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils as specified in A.S.T.M. D396-69, gas turbine fuel oils Numbers 2-GT through 4-GT as specified in A.S.T.M. D2880-71, or diesel fuel oils Numbers 2-D and 4-D as specified in A.S.T.M. D975-68.

g. "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From Floating Roof Tanks," 1962.

2. Notwithstanding Section I, Part B, above, this Part will apply, in accordance with Section III, below, to all fixed roof storage vessels with capacities greater than 42,000 gallons (151,412 liters) containing volatile petroleum liquids whose true vapor pressure is greater than 1.52 psia (10.5 kilo Pascals).

3. This Part will not apply to volatile petroleum liquid storage vessels;

a. equipped with external floating roofs before July 1, 1979; or,

b. having capacities less than 420,000 gallons (1,600,000 liters) used to store produced crude oil and condensate prior to lease custody transfer.

4. No owner or operator shall permit the use of a non-exempt source unless;

a. the source has been retrofitted with an internal floating roof equipped with a closure seal, or seals, to close the space between the roof edge and tank wall; or,

b. the source has been retrofitted with equally effective alternative control approved by the Department; and,

c. the source is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials; and,

d. all openings except stub drains are equipped with covers, lids, or seals such that;

(i) the cover, lid, or seal is in the closed position at all times except when in actual use; and,

(ii) automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports; and,

(iii) rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting; and,

e. routine inspections are conducted through roof hatches once per month; and,

f. a complete inspection of cover and seal is conducted whenever the tank is emptied for nonoperational reasons or once per year; and,

g. records are maintained in accordance with Section I, Part C above that shall include;

(i) reports of the results of inspections conducted under subparagraphs 4.e. and 4.f. above; and,

(ii) a record of the average monthly storage temperatures and true vapor pressures of volatile petroleum liquids stored; and,

(iii) records of the throughput quantities and types of volatile petroleum liquids for each storage vessel.

Part C. Bulk Gasoline Plants

1. For the purpose of this Part, the following definitions apply:

a. "Bottom filling" means the filling of a tank truck or stationary storage tank through an opening that is flush with the tank bottom.

b. "Bulk gasoline plant" means a gasoline storage and distribution facility with an average daily throughput of less than 20,000 gallons (76,000 liters) which received gasoline from bulk terminals by trailer transport, stores it in tanks, and subsequently dispenses it via account trucks to local farms, businesses, and service stations.

c. "Bulk gasoline terminal" means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has a daily throughput of more than 20,000 gallons (76,000 liters) of gasoline.

d. "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

e. "Splash filling" means the filling of a tank truck or stationary storage tank through a pipe or hose whose discharge opening is above the surface level of the liquid in the tank being filled.

f. "Submerged filling" means the filling of a tank truck or stationary tank through a pipe or hose whose discharge opening is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

g. "Vapor balance system" means a combination of pipes or hoses which create a closed system between the vapor spaces of an unloading tank and a receiving tank such that vapors displaced from the receiving tank are transferred to the tank being unloaded.

2. Notwithstanding Section I, Part B., above, this Part will apply, in accordance with Section III, below, to the unloading, loading, and storage facilities of all bulk gasoline plants and all tank trucks or trailers delivering or receiving gasoline at bulk gasoline plants.

3. No owner or operator of a bulk gasoline plant may permit stationary storage tanks of more than 528 gallons (2,000 liters) capacity to load or unload gasoline unless each tank is equipped with a vapor balance system as described under paragraph 6, below, and approved by the Department; and,

a. each tank is equipped with a submerged fill pipe, approved by the Department; or,

b. each tank is equipped with a fill line whose discharge opening is flush with the bottom of the tank.

4. No owner or operator of a bulk gasoline plant, tank truck or trailer may permit the loading or unloading of tank trucks or trailers to a stationary storage tank of more than 528 gallons (2,000 liters) capacity at a bulk gasoline plant unless each tank truck or trailer is equipped with a vapor balance system as described under paragraph 6, below, and approved by the Department; and,

a. equipment is available at the bulk gasoline plant to provide for the submerged filling of each tank truck or trailer; or,

b. each tank truck or trailer is equipped for bottom filling.

5. No owner or operator of a bulk gasoline plant, tank truck or trailer may permit the transfer of gasoline between tank truck or trailer and stationary storage tank unless:

a. the transfer is conducted in accordance with paragraphs 3. and 4., above; and,

b. the vapor balance system is in good working order and is connected and operating; and,

c. tank truck or trailer hatches are closed at all times during loading operations; and,

d. there are no leaks in the tank trucks' or trailers' pressure/vacuum relief valves and hatch covers, nor the truck tanks or storage tanks associated vapor and liquid lines during loading or unloading and,

e. the pressure relief valves on storage vessels and tank trucks or trailers are set to release at no less than 0.7 psi (4.8 kPa) or the highest possible pressure (in accordance with state or local fire codes, or the National Fire Prevention Association guidelines).

6. Vapor balance systems required under paragraphs 3. and 4., above, shall consist of the following major components;

a. a vapor space connection on the stationary storage tank equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

b. a connecting pipe or hose equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

c. a vapor space connection on the tank truck or trailer equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material.

7. Notwithstanding Section I, Part B.2., no owner or operator of a bulk gasoline plant may permit gasoline to be spilled, discharged in sewers, stored in open containers or handled in any other manner that would result in evaporation.

Part D. Bulk Gasoline Terminals

1. For the purpose of this Part the following definitions apply:

a. "Bulk gasoline terminal" means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has a daily throughput of more than 20,000 gallons (76,000 liters) of gasoline.

b. "Gasoline means a petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

2. Notwithstanding Section I, Part B., above, this part will apply in accordance with Section III, below, to bulk gasoline terminals and the appurtenant equipment necessary to load the tank truck or trailer compartments.

3. No person may load gasoline into any tank trucks or trailers from any bulk gasoline terminal unless:

a. the bulk gasoline terminal is equipped with a vapor control system, capable of complying with paragraph 4., below,properly installed, in good working order, in operation and consisting of one of the following;

(i) an adsorber or condensation system which may not allow mass emissions of VOC's to exceed 4.7 grains per gallon (30 milograms per liter) of gasoline loaded; or

(ii) a vapor collection system which directs all vapors to a fuel gas system; or,

(iii) alternative controls as allows under Section I, Part D.

b. all displaced vapors and gases are vented only to the vapor control system; and,

c. a means is provided to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected; and,

d. all loading and vapor lines are equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

5. Sources affected under paragraph 2., above, may not;

a. allow gasoline to be discarded in sewers or stored in open containers or handled in any manner that would result in evaporation; nor,

b. allow the pressure in the vapor collection system to exceed the tank truck or trailer pressure relief settings.

Part E. Gasoline Service Stations - Stage 1.

1. For the purpose of this Part, the following definitions apply:

a. "Gasoline" means a petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

b. "Submerged Fill Pipe" means any fill pipe with a discharge opening which is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

c. "Owner" means any person who has legal or equitable title to the gasoline storage tank at a facility.

d. "Operator" means any person who leases, operates, controls or supervises a facility at which gasoline is dispersed.

e. "Gasoline Dispensing Facility" means any site where gasoline is dispersed to motor vehicle gasoline tanks from stationary storage tanks.

2. Notwithstanding Section I, Part B., above, this Part will apply in accordance with Section III, below, to all gasoline dispensing facilities, except:

a. transfers made to storage tanks of gasoline dispensing facilities equipped with floating roofs or their equivalent which have been approved by the Department.

b. stationary gasoline storage containers of less than 550 gallons (2,085 liters) capacity used exclusively for the fueling of implements of husbandry, provided the containers are equipped with submerged fill pipes.

3. No owner or operator subject to this Part may transfer or cause or allow the transfer of gasoline from any gasoline tank truck or trailer into any stationary storage tank described below unless the tank is equipped with a submerged fill pipe and the vapors displaced from the storage tank during filling are processed by a vapor control system in accordance with a paragraph 4., below;

a. any stationary storage tank located at a gasoline dispensing facility, with a capacity of 2,000 gallons (7,580 liters) or more which is in place before June 30, 1979; and,

b. any stationary storage tank located at a gasoline dispensing facility, with a capacity of 250 gallons (948 liters) or more, which is installed after June 30, 1979.

4. The vapor control system required by paragraph 3., above, shall include one or more of the following:

a. a vapor-tight line from the storage tank to the delivery vessel and a system that will ensure the vapor line is connected before the gasoline can be transferred into the tank; or,

b. a refrigeration-condensation system or equivalent designed to recover at least 90 percent by weight of the volatile organic compounds in the displaced vapor; or,

c. a system demonstrated to have control efficiency equivalent to or greater than provided under subparagraph a. or b., above, and approved by the Department.

5. The vapor-laden gasoline tank truck or trailer shall be subject to the following conditions;

a. the tank truck or trailer must be designed and maintained to be vapor tight at all times; and

b. the vapor-laden tank truck or trailer may be refilled only at;

(i) bulk gasoline plants complying with Part C., above,

(ii) bulk gasoline terminals complying with Part D., above.

6. Each owner of a gasoline storage tank covered by paragraphs 2. and 3., above, shall;

a. purchase and install all necessary control systems and make all necessary process modifications in accordance with paragraphs 3, 4, and 5, above; and,

b. in accordance with Section I, Part C and Section I, Part D provide instructions to the operator of the gasoline dispensing facility describing necessary maintenance operations and procedures for prompt notification of the owner in case of any malfunctions of the control system; and,

c. repair, replace or modify any worn out or malfunctioning component or element of design and keep records, in accordance with Section I, Part C, above, of the repair, replacement or modification of any component or element of design of the control system.

7. Each operator of a gasoline dispensing facility covered by paragraphs 2. and 3., above, shall;

a. maintain and operate the control system in accordance with the specifications and the operating and maintenance procedures specified by the owner; and,

b. promptly notify the owner of the control system of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system; and,

c. maintain records, in accordance with Section I, Part C, above, of all maintenance performed by the operator and of all notifications to the owner of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system and the action taken by the owner. Such records shall at a minimum include;

(i) the scheduled date for maintenance or the date a malfunction was detected; and,

(ii) the date the need for maintenance or malfunction of major system components was reported to the owner; and,

(iii) the date the maintenance was performed or the malfunction corrected by either the operator or the owner; and,

d. maintain gauges, meters, or other specified testing devices in proper working order.

Part F. Solvent Metal Cleaning

1. For the purpose of this section the following definitions apply:

a. "Cold cleaning" means the batch process of cleaning and removing soils from metal surfaces by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. Wipe cleaning is not included in this definition.

b. "Conveyorized degreasing" means the continuous process of cleaning and removing soils from metal surfaces by operating with either cold or vaporized solvents.

c. "Freeboard height" means the distance from the top of the vapor zone to the top of the degreaser tank.

d. "Freeboard ratio" means the freeboard height divided by the width of the degreaser.

e. "Open top vapor degreasing" means the batch process of cleaning and removing soils from metal surfaces by condensing hot solvent vapor on the colder metal parts.

f. "Solvent metal cleaning" means the process of cleaning soils from metal surfaces by cold cleaning or open top vapor degreasing or conveyorized degreasing.

2. Notwithstanding Section I, Part B, above, this Part applies in accordance with Section III, below, in the following manner:

a. Control System A shall apply to cold cleaning, open top vapor degreasing and conveyorized degreasing operations; if,

(i) the facility is located in a non-urban county and uses more than 100 tons per year of solvents on a facility-wide basis based upon annual solvent purchase records,

(ii) the facility is located in an urban county and is not exempted by 4(a) or 4(b).

b. Control System B shall apply to cold cleaning, open top vapor degreasing and conveyorized degreasing operations, if the facility is located in

an urban county and uses more than 100 tons per year of solvents on a facility-wide basis based upon annual solvent purchase records.

3. In lieu of meeting the requirements of 2(a)(i), a facility in a non-urban county may choose to retain all solvent purchase and return records, including, making them available to the Department and if the potential loss to the ambient air, by evaporation or by other means, of solvent is less than 100 tons/year, then the facility is exempted from control system A requirements. Potential loss for this purpose shall be determined by subtracting returned solvent from purchased solvent.

4. The provisions of this section shall apply with the following exceptions:

a. open top vapor degreasers with an open area smaller than one square meter (10.8 square feet) shall be exempt from paragraphs 6(b)(iii) b and 6(b)(iii)d of this section,

b. conveyorized degreasers with an air/vapor interface smaller than 2.0 square meters (21.6 square feet) shall be exempt from paragraphs 7(b)(iii) of this section,

c. sources exempted under Section I, Part B.

5. Except as provided under paragraph (4) of this section, the owner or operator of a cold cleaning facility shall;

a. for Control System A;

(i) equip the cleaner with a cover; and,

(ii) equip the cleaner with a facility for draining cleaned parts; and,

(iii) provide a permanent, conspicuous label, summarizing the operating requirements; as such,

(iv) drain the cleaned parts for at least 15 seconds or until dripping ceases; and,

(v) close degreaser cover whenever parts are not handled in the cleaner; and,

(vi) store waste solvent only in covered containers; and,

(vii) do not dispose of waste solvent nor transfer it to another party, such that greater than 20 percent of the waste (by weight) can evaporate into the atmosphere.

b. For Control System B;

(i) equip the cleaner with a cover and the cover shall be so designed that it can be easily operated with one hand; if,

(a) the solvent volatility is greater than 2 kilo Pascals (15 millimeters of mercury or 0.3 pounds per square inch) measured at 38°C (100°F); or,

(b) the solvent is agitated; or,

(c) the solvent is heated; and,

(ii) equip the cleaner with a facility for draining cleaned parts and the drainage facility shall be constructed internally so that parts are enclosed under the cover while draining if the solvents volatility is greater than 4.3 kilo Pascals (32 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), except that the drainage facility may be external for applications where an internal type cannot fit into the cleaning system; and,

(iii) install one of the following control devices if the solvent volatility is greater than 4.3 kilo Pascals (33 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), or if the solvent is heated above 50°C (120°F);

(a) freeboard that gives a freeboard ratio greater than or equal to 0.7; or,

(b) water cover (solvent must insoluble in and heavier than water); or,

(c) other systems of equivalent control, such as refrigerated chiller or carbon adsorption, approved by the Department; and,

(iv) provide a permanent, conspicuous label, summarizing the operating requirements; and,

(v) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(vi) close the cover whenever parts are not being handled in the cleaner; and,

(vii) drain the cleaned parts for at least 15 seconds or until dripping ceases; and,

(viii) if used, supply a solvent spray that is a solid fluid stream (not a fine, atomized or shower type spray) at a pressure which does not cause excessive splashing.

6. Except as provided under paragraph (4) of this section, the owner or operator of an open top vapor degreaser shall;

a. For Control System A;

(i) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and,

(ii) keep the cover closed at all times except when processing work loads through the degreaser; and,

(iii) minimize solvent carryout by:

(a) racking parts to allow complete drainage; and,

(b) moving parts in and out of the degreaser at less than 3.3 meters per second (11 feet per minute); and,

(c) holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and,

(d) tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and,

(e) allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and,

(iv) not degrease porous or absorbent materials, such as cloth, leather, wood, or rope; and,

(v) not occupy more than half of the degreaser's open top area with a workload; and,

(vi) not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is removed from the vapor zone; and,

(vii) always spray below the vapor level; and,

(viii) repair solvent leaks immediately, or shutdown the degreaser; and,

(ix) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(x) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xii) not use ventilation fans near the degreaser opening, not provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degrease open area, unless necessary to meet OSHA requirements; and,

b. for Control System B;

(i) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and,

(ii) provide the following safety switches;

(a) a condenser flow switch and thermostat which shut off the pump heat if the condenser coolant is either not circulating or too warm; and,

(b) a spray safety switch which shuts off the spray pump if the vapor level drops more than 10 centimeters (4 inches); and,

(iii) install one of the following control devices;

(a) powered cover, if the freeboard ratio is greater than or equal to 0.75, and if the degreaser opening is greater than 1 square meter (10 square feet); or,

(b) refrigerated chiller; or,

(c) enclosed design (cover or door opens only when the dry part is actually entering or exiting the degreaser); or,

(d) carbon adsorption system with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when cover is open), and exhausting less than 25 parts per million of solvent averaged over one complete adsorption cycle; or,

(e) a control system, demonstrated to have control efficiency equivalent to or greater than any of the above, and approved by the Director; and,

(iv) permanent, conspicuous label, summarizing operating procedures (v) to (x).

(v) keep the cover closed at all times except when processing work loads through the degreaser; and,

(vi) minimize solvent carryout by;

(a) racking parts to allow complete drainage; and,

(b) moving parts in and out of the degreaser at less than 3.3 meters per second (11 feet per minute); and,

(c) holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and,

(d) tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and,

(e) allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and,

(vii) not degrease porous or absorbent materials, such as cloth, leather, wood or rope; and,

(viii) not occupy more than half of the degreaser's open top area with a workload; and,

(ix) not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is removed from the vapor zone; and,

(x) always spray below the vapor level; and,

(xi) repair solvent leaks immediately, or shutdown the degreaser; and,

(xii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(xiii) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xiv) not use ventilation fans near the degreaser opening, nor provide exhuast ventilation excedding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser open area, unless necessary to meet OSHA requirements; and,

7. Except as provided under paragraph (4) of this section the owner or operator of a conveyorized degreaser shall;

a. For Control System A;

(i) not use workplace fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser opening, unless necessary to meet OSHA requirements; and,

(ii) minimize carryout emissions by;

(a) racking parts for best drainage; and,

(b) maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and,

(iii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(iv) repair solvent leaks immediately, or shutdown the degreaser; and,

(v) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

b. For Control System B;

(i) install one of the following control devices;

(a) refrigerated chiller; or,

(b) carbon adsorption system, with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when downtime covers are open), and exhausting less than 25 parts per million of solvent by volume averaged over a complete adsorption cycle; or,

(c) a system, demonstrated to have a control efficiency equivalent to or greater than paragraph 7(b)(i)a or 7(b)(i)b of this section, and approved by the Director; and,

(ii) equip the cleaner with equipment, such as a drying tunnel or rotating (tumbling) basket , sufficient to prevent cleaned parts from carrying out solvent liquid or vapor; and,

(iii) provide the following safety switches;

(a) a condenser flow switch and thermostate which shut off the pump heat if the condenser coolant is either not circulating or too warm; and,

(b) a spray safety switch which shuts off the spray pump or the conveyor if the vapor level drops more than 10 centimeters (4 inches); and,

(c) a vapor level control thermostat which shuts off the pump heat when the vapor level rises too high; and,

(iv) minimize openings during operation so that entrance and exits will silhouette workloads with an average clearance between the parts and the edge of the degreaser opening of less than 10 centimeters (4 inches) or less than 10 percent of the width of the opening; and,

(v) provide downtime covers for closing off the entrance and exit during shutdown hours; and,

(vi) not use workplace fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser opening, unless

necessary to meet OSHA requirements; and,

(vii) minimize carryout emissions by;

(a) racking parts for best drainage; and,

(b) maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and,

(viii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(ix) repair solvent leaks immediately, or shutdown the degreaser; and,

(x) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xi) place downtime covers over entrances and exits of conveyorized degreasers immediately after the conveyors and exhausts are shutdown and not remove them until just before start-up.

Part G. Cutback Asphalt

1. For the purpose of this section "cutback asphalt" means asphalt cement which has been liquefied by blending with petroleum solvents (diluents).

2. No person may cause, allow or permit the use or application of cutback asphalt except as follows:

a. used solely as a penetrating prime coat,

b. long-life asphalt mix stockpile storage,

c. other use or application when the average ambient air temperature, on the day of use, is predicted to be less than $10^{o}C$ ($50^{o}F$).

Section III - Compliance Schedule

Part A. Process and Emission Control Equipment Installations

1. Except as provided under Part C and Part D, below, the owner or operator of a volatile organic compound emission source proposing to install and operate volatile organic compound emission control equipment and/or replacement process equipment and/or modification of existing process equipment to comply with Section II, above, shall adhere to the increments of progress contained in the following schedule:

a. Construction permit applications for the emission control system and/or process equipment and/or modification of existing process equipment must be submitted before January 1, 1980.

b. Contracts for the emission control systems and/or process equipment and/or modification of existing process equipment must be awarded or orders must be issued for purchase of component parts to accomplish emission control before July 1, 1980.

c. Initiation of on-site construction or installation of the emission control and/or process equipment and/or modification of existing process equipment must begin before September 1, 1980.

d. On-site construction of installation of the emission control and/or process equipment and/or modification of existing process equipment must be completed before March 1, 1981.

e. Final compliance shall be achieved before May 1, 1981.

f. Any owner or operator of a stationary emission source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress whether the required increment of progress has been met.

Part B. Low Solvent Content Coating

1. Except as provided under Part D or Part E, below, or under paragraph 2, below, the owner or operator of a volatile organic compound emission source proposing to employ low solvent content coating technology to comply with Section II, above, shall adhere to the increments of progress contained in the following schedule;

a. Construction permit applications for the application of low solvent content coating technology must be submitted before January 1, 1980.

b. Research and development of low solvent content coating must be completed before July 1, 1980.

c. Evaluation of product quality and commercial acceptance must be completed before January 1, 1981.

d. Purchase orders must be issued for low solvent content coatings and process modifications before March 1, 1981.

e. Initiation of process modifications must begin before May 1, 1981.

f. Process modifications must be completed and use of low solvent content coatings must begin before October 1, 1981.

g. Final compliance, shall be achieved before December 1, 1981.

h. Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

2. Where the Department determines that low solvent content coating technology has been sufficiently researched and developed for a particular application, the owner or operator of a volatile organic compound emission source proposing to comply with Section II, above, through application of low solvent content coatings shall adhere to the increments of progress

contained in the following schedule;

a. Final plans for the application of low solvent content coating technology must be submitted before January 1, 1980.

b. Evaluation of product quality and commercial acceptance must be completed before July 1, 1980.

c. Purchase orders must be issued for low solvent content coatings and process modifications before September 1, 1980.

d. Initiation of process modifications must begin before November 1, 1980.

e. Process modifications must be completed and use of low solvent content coatings must begin before April 1, 1981.

f. Final compliance, shall be achieved before June 1, 1981.

g. Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

Part C. Alternate Compliance Schedule

1. Nothing in this Section shall prevent the Department from promulgating a separate schedule for any source if it finds that the application of a compliance schedule in Part A or Part B, above, would not be technologically feasible.

2. Nothing in this Section shall prevent the owner or operator of a volatile organic compound source from submitting to the Department a proposed alternative compliance schedule provided:

a. the proposed alternative compliance schedule is submitted before January 1, 1980; and,

b. the final control plans for achieving compliance with Section II, above, are submitted simultaneously; and,

c. the alternative compliance schedule contains the same increments of progress as the schedule for which it is proposed; and,

d. sufficient documentation and certification from appropriate suppliers, contractors, manufactureres, or fabricators is submitted by the owner or operator of the volatile organic compound source to justify the dates proposed for the increments of progress.

3. All alternative compliance schedules proposed or promulgated under this section shall provide for compliance of the volatile organic compound emission source with Section II, above, as expeditiously as practicable but not later than December 31, 1982.

4. Any schedule approved under this section will automatically terminate if the source does not meet the increments of progress stipulated.

Part D. Exception

Parts A through D, above, will not apply to sources which are in compliance with Section II, above, before the effective date of this Standard and which have determined and certified compliance to the satisfaction of the Department before November 1, 1979.

## Appendix I - ITEM 4

Fugitive Emission Regulation

Regulation 62.6

Control of Fugitive Particulate Matter

Section I - Control of Fugitive Particulate Matter in Non-Attainment Areas

(a) No person shall cause or permit any fugitive particulate matter to go beyond property boundaries below a height of 150 feet. Necessary precautions shall be taken to prevent such occurrences and be in accordance with good dust control practices as determined by the Department taking into consideration economic reasonableness, the seriousness of the dust conditions, and anticipated benefits, and may include but not be limited to the following:

1. Use, where possible, of water or chemicals for control of dust in demolition or construction operations, the grading of roads, or the clearing of land;

2. Application of asphalt (cut back asphalt is prohibited), water, or suitable chemicals on dirt roads, material stockpiles, and other surfaces which can give rise to airborne dust;

3. Installation and use of hoods, scrubbers, fabric filters or other dust cleaning devices where feasible and effective to capture and contain fugitive particulate matter while handling dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations;

4. The paving of roadways and the prompt removal of earth or other materials from paved streets that have been deposited by vehicu-

lar traffic, earth moving equipment, water erosion or other means;

5. Stabilization of long term storage piles by vegetation or appropriate chemicals and reclamation of mined areas;

6. Modifying the process or materials handling system;

7. Use of a slurry to move material if feasible;

8. Use of traveling booms, telescopic chutes, rotary stackers, adequate shrouding of openings in containers to be filled;

9. Avoid use of front end loader in handling dry dusty materials unless there is no other reasonable option;

10. Impose strict slow speed limits for vehicular traffic on plant property or construction/destruction sites;

11. Ensure proper loading of trucks, trailers, front end loaders, etc., to prevent spillage on paved roadways.

(b) No visible dust in excess of 10% opacity will be allowed to come from transfer points of any conveyor system for raw material or finished product unless the source/facility owner can demonstrate to the satisfaction of the Department that such control is not feasible.

(c) No new source/facility will be granted a permit to construct in a non-attainment area for primary standards if any part of materials handling of dry and dusty material is to be done with a front end loader, dump truck, or similar type handling which permits excessive dust to escape to the ambient air.

## Section II - Control of Fugitive Particulate Matter in Problem Areas

(a) For the purpose of this section, problem areas are defined as areas in which ambient levels of particulate matter are at or near primary standards; areas where an undesirable level of air pollution exists; areas in which excessive levels of fugitive particulate matter results in complaints from the general public; areas in which fugitive particulate matter is determined to be impacting upon a non-attainment area.

(b) No person shall cause or permit any fugitive particulate matter that can reasonably be controlled to escape into the ambient air. Such reasonable control shall be in accordance with recognized and generally accepted methods as determined by the Department and may include, but not be limited to, the following:

1. Restrictions as applicable and contained in Section II;

2. Enclosure of any dust generating process to prevent fugitive emissions/dust; and

3. Modification or reduction of materials handling to minimize the generation of dust.

## Section III - Control of Fugitive Particulate Matter Statewide

(a) Emissions of fugitive particulate matter shall be controlled in such a manner and to the degree that it does not create an undesirable level of air pollution.

(b) Restrictions and requirements may be contained in operating permits on a case-by-case basis that are deemed appropriate and necessary

to control fugitive particulate matter in accordance with reasonably available control technology.

(c) No source/facility shall use any method of materials handling which will generate fugitive particulate matter that is not fully described in the permit application.

(d) Volatile organic compounds shall not be used for dust control purposes.

## Appendix I - ITEM 5

Memoranda

SOUTH CAROLINA
DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
P.O. BOX 191
COLUMBIA, S.C. 29202

October 13, 1978

Mr. W. G. Crosby, Chief
Bureau of Air Quality Control
S. C. Dept. of Health & Environmental Control
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Crosby:

Thank you for your September 29 letter addressed to Mr. Crockett relative to a proposed public hearing on the State Implementation Plan (SIP). Please include the motor vehicle Inspection and Maintenance (I/M) Program as part of that hearing. This seems to be more practical than having to schedule another hearing just for I/M at a later date. Let us know the arrangements on the public hearing and what we need to do.

As you know, we are using a consultant to evaluate various I/M alternatives and to prepare a detailed analysis of the preferred option. The study results will be used by the Department in recommending I/M legislation. Working in cooperation with DHEC, we have also applied for an EPA grant to help fund a voluntary vehicle inspection program. This includes purchase and operation of a mobile vehicular testing station and related public relations activity to acquaint the public with the problem.

The target dates that you requested for various I/M activities are shown on the enclosed schedule. These are our best estimates at this time.

If you need any other information, please let me know.

Very truly yours,

Paul W. Cobb

Paul W. Cobb
Chief Commissioner

# State of South Carolina

JAMES B. EDWARDS
GOVERNOR

OFFICE OF THE GOVERNOR
POST OFFICE BOX 11450
COLUMBIA 29211

March 30, 1978

Mr. John C. White
Regional Administrator
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. White:

In accordance with the provisions of Section 174(a) of the Clean Air Act as amended, the State of South Carolina and elected local officials have designated agencies and responsibilities for planning and implementation in three areas of the State where national standards for carbon monoxide and/or photochemical oxidants will not be attained by July 1, 1979. This correspondence serves to certify to the Administrator Environmental Protection Agency, the agencies selected and their responsibilities.

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for development of an accurate, comprehensive, and current emission inventory of mobile, stationary, and area sources of carbon monoxide and photochemical oxidants; and,

* The State of South Carolina through the Department of Health and Environmental Control and the Department of Highways and Public Transportation shall be responsible for analysis of existing air quality and determining through application of appropriate modeling techniques the level of control of stationary and mobile sources needed to demonstrate attainment and maintenance, by 1982, of the national standard for carbon monoxide and photochemical oxidants. The joint findings of these agencies shall be submitted to a task force composed of State agencies and affected local governments for review and approval; and,

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for developing control strategies for the necessary reduction of emissions from applicable new and existing stationary sources which would contribute to the carbon monoxide and/or photochemical oxidant levels; and,

* The Berkeley-Charleston-Dorchester Council of Governments, Catawba Regional Planning and Development Council, or Central Midlands Regional Planning and Development Council, as appropriate, shall be responsible for developing control strategies for the necessary reduction of emissions from mobile sources through transportation control measures that reduce in-use automobile emission rates and auto usage; and,

* The State of South Carolina through the Department of Highways and Public Transportation shall provide for development of an inspection and maintenance program designed to ensure continued and effective operation of automobile pollution control devices. The Department of Health and Environmental Control shall assist through provision of quality control services.

Both the Department of Health and Environmental Control and the Department of Highways and Public Transportation are agencies of State Government and, thus, exercise jurisdiction statewide. The Berkeley-Charleston-Dorchester Council of Governments includes all of Berkeley, Charleston, and Dorchester Counties. The Catawba Regional Planning and Development Council includes all of Chester, Lancaster, Union, and York Counties. The Central Midlands Regional Planning and Development Council includes all of Fairfield, Lexington, Newberry, and Richland Counties.

The Central Midlands Council is a metropolitan planning organization designated pursuant to Section 134 of Title 23, United States Code. The Berkeley-Charleston-Dorchester Council is contractually linked to the MPO for provision of necessary staff services. Other organizations jointly considered by State and local officials included County Planning Commissions and County Health Departments.

With warmest regards,

James B. Edwards

James B. Edwards

JBE/WMS

JOE D. TANNER
Commissioner

J. LEONARD LEDBETTER
Division Director

# Department of Natural Resources

ENVIRONMENTAL PROTECTION DIVISION
270 WASHINGTON STREET, S.W.
ATLANTA, GEORGIA 30334

November 2, 1977

Mr. W. G. Crosby, Chief
Bureau of Air Quality Control
South Carolina Dept. of Health and Environmental Control
J. Marion Sims Building
2600 Bull Street
Columbia, South Carolina 29201

Dear Mr. Crosby:

In accordance with Section 126(a)(2) of the Clean Air Act amendments of 1977, enclosed is a computer listing of Point Source emission information from all Georgia counties which border on your State.

It is our judgment that emissions from these listed sources are not significantly impacting upon the air quality within your State. However, we feel you should be aware of their existence and the emission strength which they exhibit.

As previously committed to you several years ago under 40 CFR 51.21 involving Implementation Plans, I recommit to you our willingness to supply you any data concerning our activities and sources within Georgia which you may need for proper planning and control within your State.

Sincerely yours,

Robert H. Collom

Robert H. Collom, Jr.
Chief
Air Protection Branch

RHC:sc

Encl.

AN AFFIRMATIVE ACTION/EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

October 12, 1977

Mr. Bob Collom, Supervisor
Air Portection Branch
Environmental Protection Division
Department of Natural Resources
270 Washington St., S.W.
Atlanta, Georgia 30334

Dear Mr. Collom:

As you are no doubt aware, provisions of amendments to the Clean Air Act require states to provide their neighboring state with emissions data on sources in areas where potential air pollution problems exist.

Towards that end, I ameenclosing a printout of sources within South Carolina which are in the Aiken-Augusta and Savannah-Beaufort Interstate Air Quality Control Regions.

I took the liberty of assuming that these were the only potential problem area along our borderlines. If there are any other areas of concern, I will be happy to supply you with similar data upon your request.

Very truly yours,

W. G. Crosby, Chief
Bureau of Air Quality Control

WGC:JZC:is

Enclosure

COPY

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

October 11, 1977

Mr. James A. McColman
N. C. Department of Natural
Resources and Community Development
Air Quality Section
P. O. Box 27687
Raleigh, N.C. 27611

Dear Mr. McColman:

As you are no doubt aware, provisions of amendments to the Clean Air Act require states to provide their neighboring states with emissions data on sources in areas where potential air pollution problems exist.

Towards that end, I am enclosing a printout of sources within South Carolina which are in the Metropolitan Charlotte Interstate Air Quality Control Region.

I took the liberty of assuming that this was the only potential problem area along our borderlines. If there are any other areas of concern, I will be happy to supply you with similar data upon your request.

Very truly yours,

W. G. Crosby, Chief
Bureau of Air Quality Control

WGC:JEC:is

COPY

North Carolina Department of Natural Resources & Community Development
James B. Hunt, Jr., Governor
Howard N. Lee, Secretary

November 2, 1977

Mr. W. G. Crosby
Chief, Bureau of Air Quality Control
S. C. Department of Health and
Environmental Control
J. Marion Sims Building
2600 Bull Street
Columbia, S. C. 29201

Dear Mr. Crosby:

In keeping with the requirements of the 1977 Amendments to the Clean Air Act as it relates to Section 126 (a) (2), North Carolina does not have any known sources that may significantly contribute to levels of air pollution in excess of the national ambient air quality standards adjacent to your State. However, in keeping with Mr. Asa B. Foster's letter of October 28, 1977, we are submitting to you a list of all sources from which there is a potential of emitting 100 tons per year of any criteria pollutant and which may significantly contribute to the air pollution levels in your State.

In addition to the above, we are furnishing an up-dated list of all sources under the 40 CFR 51.21 criteria for your general information and use that are in the counties bordering your State. In no way do we anticipate these sources contributing to levels of air pollution in excess of the national ambient air quality standards.

Should you need additional information, please feel free to contact us.

Sincerely,

James A. McColman, Chief
Air Quality Section

JAM/apc

cc: Tom Helms

Attachment

BOARD
William M. Wilson, Chairman
William C. Moore, Jr., D.M.D., Vice-Chairman
I. DeQuincey Newman, Secretary
Leonard W. Douglas, M.D.
George G. Graham, D.D.S.
J. Lorin Mason, Jr., M.D.
C. Maurice Patterson

# SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Albert G. Randall, M.D., M.P.H.
Commissioner

Sims-Aycock Buildings
2600 Bull Street, Columbia, SC 29201

September 21, 1978

MEMORANDUM

TO: William B. Crosby, Chief
Bureau of Air Quality Control

FROM: Walton J. McLeod, III
General Counsel

RE: Requirements of the 1977 Clean Air Act as amended regarding the absence of potential conflicts of interest by State Environmental Quality Governing Boards; compliance by the South Carolina Board of Health and Environmental Control with the subject requirements

Thank you for your memorandum of March 29, 1978 in which you forwarded to me the applicable Federal Law and various interpretations regarding Section 128 (a) of the Clean Air Act, as amended August 1977.

You request comments and an opinion regarding the posture of the Board of Health and Environmental Control,more specifically, whether or not it is in compliance with the provisions of Section 128(a) relating to the absence of potential conflicts of interest by State regulatory boards charged with enforcing environmental quality laws and regulations.

Section 128(a) is set forth below:

> Section 128. (a) Not later than the date one year after the date of the enactment of this section, each applicable implementation plan shall contain requirements that---
>
> (1) any board or body which approves permits or enforcements orders under this Act shall have at least a majority of members who represent the public interest and do not derive any significant portion of their income from persons subject to permits or enforcement orders under this Act, and
>
> (2) any potential conflicts of interest by members of such board or body or the head of an executive agency with similar powers be adequately disclosed.

A State may adopt any requirements respecting conflicts of interest for such boards or bodies or heads of executive agencies, or any other entities which are more strin-

> gent than the requirements of paragraph (1) and (2), and the Administrator shall approve any such more stringent requirements submitted as part of an implementation plan.

In regard to the provision of law that a majority of the members of the DHEC Board represent the public interest and derive no significant portion of their income from a regulated person, it would appear to me that the DHEC Governing Board is in compliance with this requirement.

The rationale behind this opinion is based upon the fact that the DHEC Governing Board consists of seven members, all of which are appointed by the Governor, and of the present seven Board members, two are medical doctors, two are dentists, one is a minister employed full time in the State's Division of Administration, one Board member is an attorney-at-law in private practice and one is employed by E.I. DuPont Company at its Savannah River Plant. It is clear that substantially more than a majority of the members of the Board of Health and Environmental Control do not derive any significant portion of their income from persons subject to permits or enforcement orders under the Clean Air Act, and thereby represent the public interest.

The second requirement of Section 128(a) is that South Carolina's implementation plan contain assurances that any potential conflict of interest by Governing Board members or agency heads be adequately disclosed. This requirement is met and enforced by Code Section 8-13-410 through 8-13-490, known as the Rules of Conduct of the South Carolina Ethics Act of 1975.

As provided by Section 8-13-450, conflicts of interest by Governing Board members and agency heads is forbidden by the following language:

> Unless otherwise provided by law, no person shall serve as a member or employee of a governmental regulatory commission that regulates any business with which that person is associated.

Moreover, Code Section 8-13-460 provides as follows:

> Any public official or public employee who, in the discharge of his official duties, would be required to take action or make a decision which in his opinion would substantially affect directly his personal financial interest or those of a member of his household, or a business with which he is associated, shall instead take the following actions:

> (a) Prepare a written statement describing the matter requiring action or decisions, and the nature of his potential conflict of interest with respect to such action or decision;
>
> ...(c) If he is not a legislator, he shall furnish a copy to his superior, if any, who shall assign the matter to another employee who does not have a potential conflict of interest. If he has no immediate superior, he shall take such steps as the State Ethics Commission shall prescribe through rules or regulations to remove himself from influence over actions and decisions on the matter on which the potential conflicts exists.

Although the State Ethics Commission has as yet issued no official opinions regarding conflicts of interest by regulatory governing board members or regulatory agency heads, the Commission has issued opinions regarding the county auditor, a candidate for mayor, and a member of city council, each of whom desired to disclose a potential conflict of interest. Based on the pattern established in these three official opinions of the State Ethics Commission, the pattern regarding regulatory agency board members is clear and has been transmitted by the State Ethics Commission to certain state agency board members unknown to me. In any event the unofficial opinion of the State Ethics Commission is that potential conflicts of interest by regulatory board members should be disclosed to the chairman of the board, and any potential conflicts of interest on the part of the chairman of the board should be disclosed to the State Ethics Commission.

In conclusion, Section 8-13-460(a) and (c) provides that in the case of a potential conflict of interest by a regulatory agency head, the proper course of action for the agency head is to submit a written statement about the conflict of interest and submit it to his immediate superior, which in the context of this Department would be the Board of Health and Environmental Control. In regard to the potential conflict of interest on the part of a DHEC Board member, the proper course of action under Code Section 18-13-460 and the opinions of the State Ethics Commission would be for the Board member to submit a written statement regarding the potential conflict of interest to the Chairman of the DHEC Board. Finally, Section 8-13-460 and the opinions of the State Ethics Commission also prescribe the procedure in the event of a potential conflict of interest on the part of the Chairman of the DHEC Board; in which event that official would submit a written statement regarding the potential conflict of interest to the State Ethics Commission.

In conclusion, it appears to me that the Department of Health and Environmental Control is in full compliance with the requirements mandated by Section 128(a) of the Clean Air Act, as amended August 1977. It is clear that at least a majority of the members of the DHEC Board represent the public interest and do not derive any significant portion of their income from persons subject to regulation by DHEC and/or the DHEC Board. Moreover, it appears to me that the rules of conduct of the 1975 Ethics Act, and the opinions of the State Ethics Commission issued pursuant thereto, provide adequate procedure for the disclosure of any possible conflicts of interest by members of the DHEC Board or the DHEC Commissioner.

WJM:swc

# APPENDIX J

Transportation and Inspection/Maintenance Schedule

## Appendix J - ITEM 1

I/M Schedule

# I/M SCHEDULE

| ACTIVITY | DATE |
|---|---|
| 1. Initiation of Public Information Program | October 1, 1978 OK |
| 2. Decision on Type of System to be Implemented | December 15, 1978 OK |
| 3. Legislative Proposal | January 31, 1979 OK |
| 4. Necessary Legislation | July 1, 1979 OK |
| 5. Development and Issuance of Request for Proposals | |
| 6. Award to Contractor | Not Applicable. Schedule will be submitted if State-appointed program isn't used. |
| 7. Initiation of Construction of Facilities | |
| 8. Completion of Construction of Facilities | |
| 9. Completion of Equipment Purchase | |
| 10. Adoption of Quality Control Procedures and Guidelines | December 1, 1979 |
| 11. Adoption of Cutpoints | January 31, 1980 |
| 12. Initiation of Hiring and Training of Inspectors or Licensing of Garages | July 1, 1980 |
| 13. Initiation of Pilot Program | January 1, 1979 |
| 14. Mechanics Training and/or Information Program | July 31, 1981 |
| 15. Initiation of Mandatory Inspection Program | July 31, 1981 if a garage program must start Dec 31,8 |
| 16. Initiation of Mandatory Maintenance | December 31, 1981 |

## Appendix J - ITEM 2

Columbia Area Transportation Control Schedule

Appendix E

Item 4

# COLUMBIA, S.C. NON-ATTAINMENT AREA 1979 SIP TRANSPORTATION PLANNING REQUIREMENTS

## Introduction

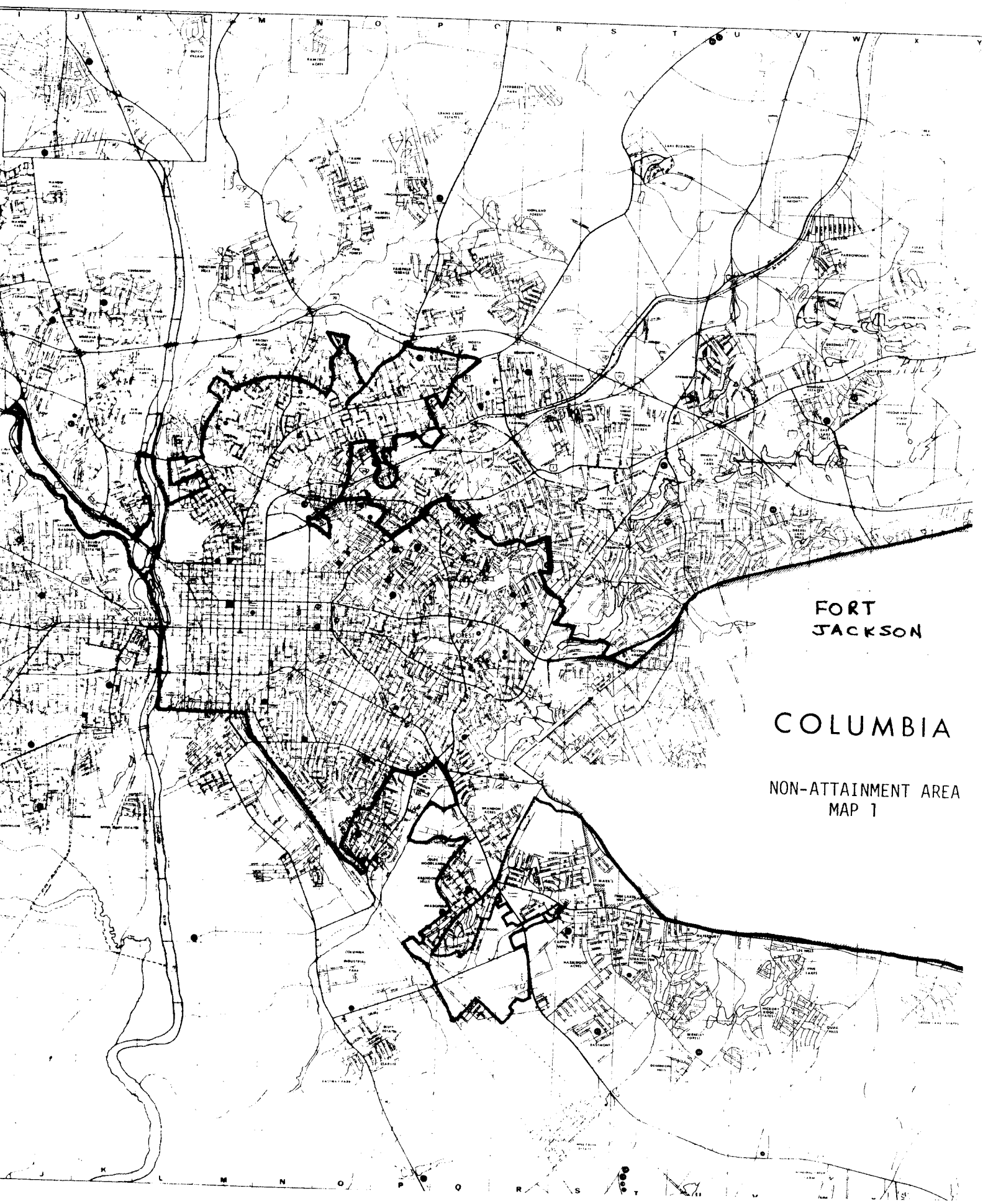
The city limits of Columbia, South Carolina has been declared a non-attainment area for carbon monoxide (CO). In addition, the counties of Richland and Lexington (the Columbia SMSA) have been designated non-attainment for oxidants. Since the Columbia SMSA exceeds 200,000 population, it has been declared a major urban area and as such is required to consider transportation control measures. This portion of the South Carolina 1979 SIP submittal will document the procedures the Columbia SMSA will follow in developing a transportation control plan that will assist in lowering carbon monoxide and oxidant emission levels to the national standard. Map 1 outlines the Columbia city limit boundary while Map 2 delineates Richland and Lexington counties. The transportation control plan will address that portion of Richland and Lexington counties that is expected to be urbanized by the year 2000. This 750 square mile area (Map 3) is that area covered by the Columbia Area Transportation Study (COATS) 3-C transportation planning process.

## Current Emissions Inventory

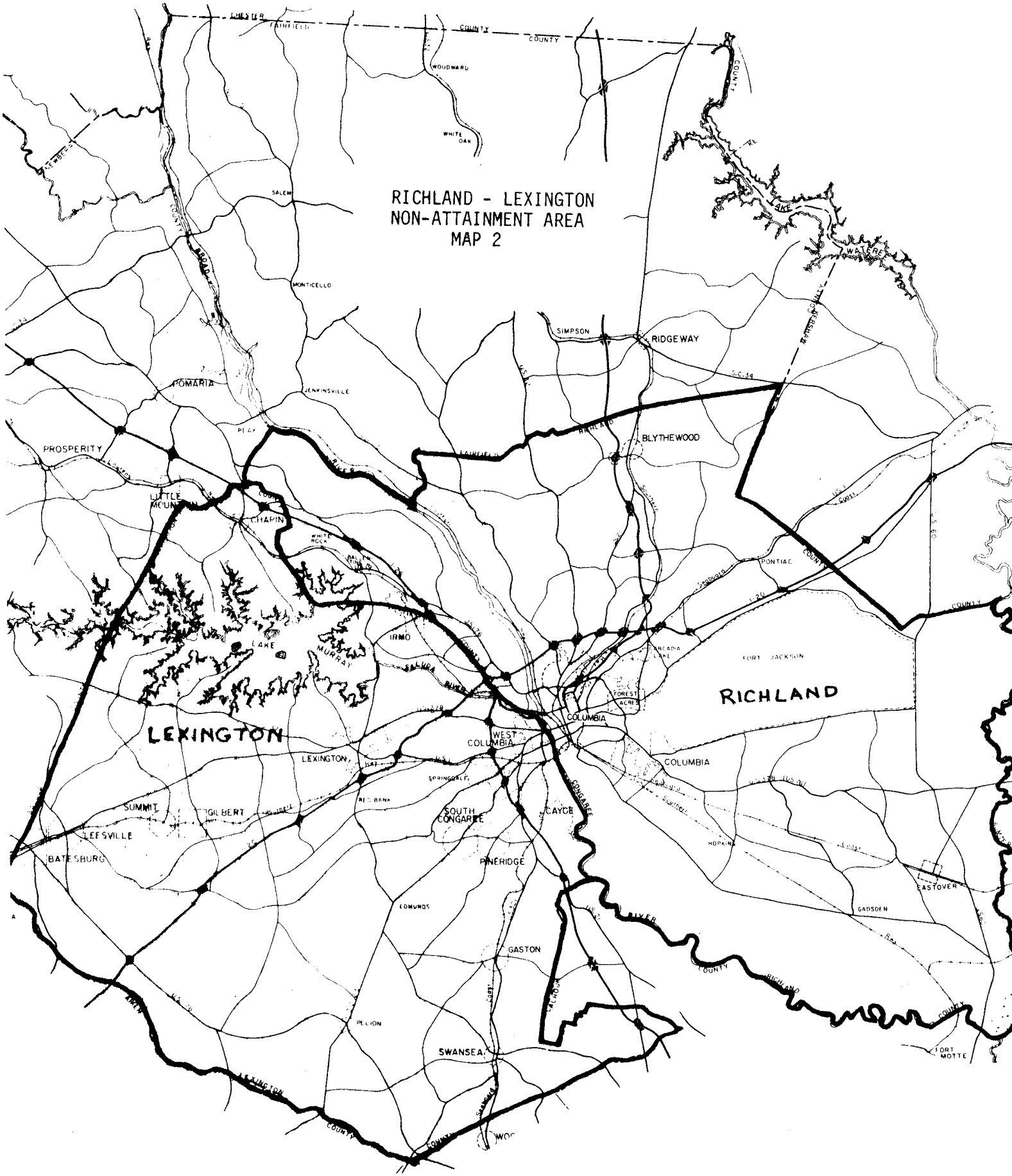
The base year (1977) inventory for hydrocarbons and carbon monoxide and documentation for this inventory can be found in Appendix J, Item 2 entitled "South Carolina Highway Emissions for Contract 68-02-2869, Task Order No. 8" prepared by Engineering Science for the Department of Health and Environmental Control (DHEC).

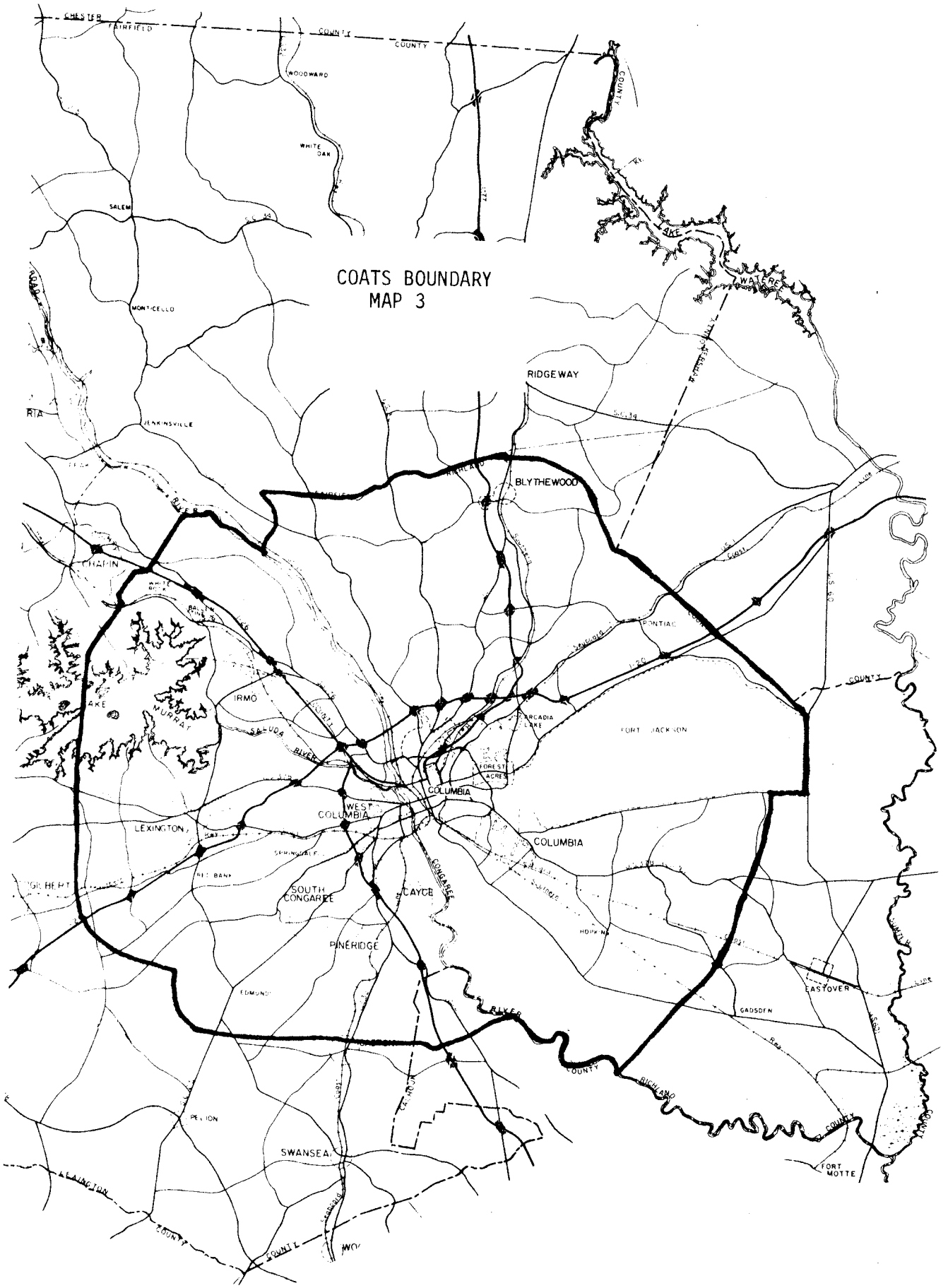
## Estimate of Emission Reductions Needed

The design value for oxidant reduction in the Richland-Lexington area is 305 ug/m$^3$. Using this value and the oxidant standard of 160 ug/m$^3$ the amount




NON-ATTAINMENT AREA
MAP 1


RICHLAND - LEXINGTON
NON-ATTAINMENT AREA
MAP 2
LEXINGTON
RICHLAND
LAKE MURRAY
LAKE WATERE
CHESTER COUNTY
FAIRFIELD COUNTY
WOODWARD
WHITE OAK
SALEM
MONTICELLO
JENKINSVILLE
POMARIA
PROSPERITY
LITTLE MOUNTAIN
CHAPIN
WHITE ROCK
IRMO
SIMPSON
RIDGEWAY
BLYTHEWOOD
PONTIAC
FORT JACKSON
ARCADIA LAKE
FOREST ACRES
COLUMBIA
WEST COLUMBIA
LEXINGTON
SPRINGDALE
RED BANK
SOUTH CONGAREE
CAYCE
SUMMIT
GILBERT
LEESVILLE
BATESBURG
PINERIDGE
EDMUNDS
GASTON
PELION
SWANSEA
HOPKINS
EASTOVER
GADSDEN
FORT MOTTE
CONGAREE RIVER
RICHLAND COUNTY
LEXINGTON COUNTY
AIKEN COUNTY
S.C.34
I-20
U.S. 1
U.S. 76
U.S. 60
U.S. 21
U.S. 378
U.S. 76


COATS BOUNDARY
MAP 3
CHESTER
FAIRFIELD
COUNTY
COUNTY
WOODWARD
WHITE OAK
SALEM
MONTICELLO
JENKINSVILLE
RIDGEWAY
BLYTHEWOOD
CHAPIN
IRMO
MURRAY
SALUDA
RIVER
PONTIAC
ARCADIA LAKE
FORT JACKSON
FOREST ACRES
COLUMBIA
WEST COLUMBIA
LEXINGTON
COLUMBIA
SPRINGDALE
RED BANK
SOUTH CONGAREE
CAYCE
CONGAREE
PINERIDGE
HOPKINS
EASTOVER
GADSDEN
RIVER
COUNTY
RICHLAND
COUNTY
PELION
SWANSEA
FORT MOTTE
LEXINGTON
COUNTY
COUNTY

of reduction needed is:

$$305\ ug/m^3 - 160\ ug/m^3 = .475 \text{ or a}$$

47.5 percent reduction in volatile organic compounds (VOC) emissions.

The projected emissions for 1982, which includes reductions from new car emission standards, and reductions from applying RACT controls to applicable stationary sources are 22,492 tons per year (TPY). Since the total VOC emission from all sources for the base year (1977) is 30,748 (TPY), the estimated VOC emission reduction is 27 percent:

$$\frac{30,748 - 22,492}{30,748} = .27$$

Since at the very most, the transportation control measures can only reduce VOC emissions by 5% and the additional stationary control program can be expected to only reduce VOC emissions by a maximum of 10%, the total maximum expected reduction in VOC emissions by 1982 is 42%. Thus the strictest measures will be less than that needed (47% reduction) by 1982. The Columbia SMSA requests that an extension be granted to 1987 to meet the standards. A commitment toward the implementation of an Inspection and Maintenance Program (I/M Program) is addressed in the Appendix of this SIP. A commitment to plan for the improvement of Columbia's privately owned transit system is addressed in subsequent sections of this document.

Documentation of current, 1982, and 1987 travel demand and VMT estimates and the modeling procedures and assumptions used in their development are contained in Appendix J, Item 2.

As for reductions in carbon monoxide in the Columbia area, DHEC has determined (see Carbon Monoxide Control Strategy in other section of SIP) that Columbia will not be able to meet the standard by 1982 but through vehicular controls the standard should be met by 1987. A search of the Columbia area has not identified any stationary sources of CO.

Specific Agency Tasks and Responsibilities

A letter from the Governor of South Carolina to Mr. John C. White of EPA documents the assignment of agency responsiblities in formulating the 1979 SIP. A copy of this letter follows this page. In this letter the Governor designated the Central Midlands Regional Planning Council, the Columbia Metropolitan Planning organization (MPO), as the appropriate agency for developing transportation control strategies for the Richland-Lexington non-attainment area.

As mentioned previously, preliminary estimates indicate that even maximum emission reduction efforts will not be able to lower emission levels in Richland and Lexington counties to national standards by 1982. Thus an I/M program is required and a commitment toward implementation has been received from the South Carolina Department of Highways and Public Transportation. It has been estimated (documented in Appendix J, Item 2) that by 1987 the VOC emission in the Richland-Lexington area can be reduced to 5,812 TPY through the implementation of the federal new car pollution standards. This would lower the 22,492 TPY figure estimated for 1982 to 18,194 TPY or a 41% reduction from the base year figure of 30,748. If the I/M program were implemented by 1981 the 1987 VOC emissions could be lowered to 16,845 TPY or a 45% overall reduction by 1987. These figures do not represent any transportation control measure (TCM) implementation. It is assumed that the remaining 2% reduction that is needed by 1987 and any further reduction required for future growth can be obtained through the implementation of the TCM plan and further stationary controls. It has been estimated that the maximum benefit from the implementation of the TCM plan would be a 5% reduction in VOC emissions and further stationary controls could net a 10% reduction. As outlined in the draft 1979 Unified Planning Work Program (UPWP, the Central Midlands Regional Planning Council, as the MPO for the Columbia urbanized area, is committed to the full study and evaluation of all 19 transportation control measures specified by EPA. As the study of these measures progresses and as a plan of implementation is chosen, the actual reductions from implementation of the TCM plan can be determined.

# State of South Carolina

JAMES B. EDWARDS
GOVERNOR

OFFICE OF THE GOVERNOR
POST OFFICE BOX 11450
COLUMBIA 29211

March 30, 1978

Mr. John C. White
Regional Administrator
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. White:

In accordance with the provisions of Section 174(a) of the Clean Air Act as amended, the State of South Carolina and elected local officials have designated agencies and responsibilities for planning and implementation in three areas of the State where national standards for carbon monoxide and/or photochemical oxidants will not be attained by July 1, 1979. This correspondence serves to certify to the Administrator, Environmental Protection Agency, the agencies selected and their responsibilities.

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for development of an accurate, comprehensive, and current emission inventory of mobile, stationary, and area sources of carbon monoxide and photochemical oxidants; and,

* The State of South Carolina through the Department of Health and Environmental Control and the Department of Highways and Public Transportation shall be responsible for analysis of existing air quality and determining through application of appropriate modeling techniques the level of control of stationary and mobile sources needed to demonstrate attainment and maintenance, by 1982, of the national standard for carbon monoxide and photochemical oxidants. The joint findings of these agencies shall be submitted to a task force composed of State agencies and affected local governments for review and approval; and,

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for developing control strategies for the necessary reduction of emissions from applicable new and existing stationary sources which would contribute to the carbon monoxide and/or photochemical oxidant levels; and,

* The Berkeley-Charleston-Dorchester Council of Governments, Catawba Regional Planning and Development Council, or Central Midlands Regional Planning and Development Council, as appropriate, shall be responsible for developing control strategies for the necessary reduction of emissions from mobile sources through transportation control measures that reduce in-use automobile emission rates and auto usage; and,

* The State of South Carolina through the Department of Highways and Public Transportation shall provide for development of an inspection and maintenance program designed to ensure continued and effective operation of automobile pollution control devices. The Department of Health and Environmental Control shall assist through provision of quality control services.

Both the Department of Health and Environmental Control and the Department of Highways and Public Transportation are agencies of State Government and, thus, exercise jurisdiction statewide. The Berkeley-Charleston-Dorchester Council of Governments includes all of Berkeley, Charleston, and Dorchester Counties. The Catawba Regional Planning and Development Council includes all of Chester, Lancaster, Union, and York Counties. The Central Midlands Regional Planning and Development Council includes all of Fairfield Lexington, Newberry, and Richland Counties.

The Central Midlands Council is a metropolitan planning organization designated pursuant to Section 134 of Title 23, United States Code. The Berkeley-Charleston-Dorchester Council is contractually linked to the MPO for provision of necessary staff services. Other organizations jointly considered by State and local officials included County Planning Commissions and County Health Departments.

With warmest regards,

James B. Edwards

JBE/WMS

It is anticipated that the S.C. Department of Health and Environmental Control (DHEC) and the Central Midlands Regional Planning Council (CMRPC) will work closely in periodically reviewing implementation progress of the stationary controls and the TCM plan to determine actual reductions and identify target reductions that need to be revised.

The 3-C Process for the Columbia Urbanized Area

The urban transportation planning process is cyclical in nature. Figure 1 illustrates this process. The socio-economic conditions that produce transportation problems are analyzed and projected to a future design year. Alternatives are evaluated to meet this projected transportation demand. A plan to meet this demand is refined and priority projects from this plan are programmed for implementation, i.e. the Transportation Improvement Program and the Annual Element. The socio-economic variables that were projected are monitored over the next several years and when a significant change in these variables occurs, a reappraisal or plan update begins. This starts the entire planning process over again. You will notice from Figure 1 that this process is the same, except for projections, for short range and long range planning.

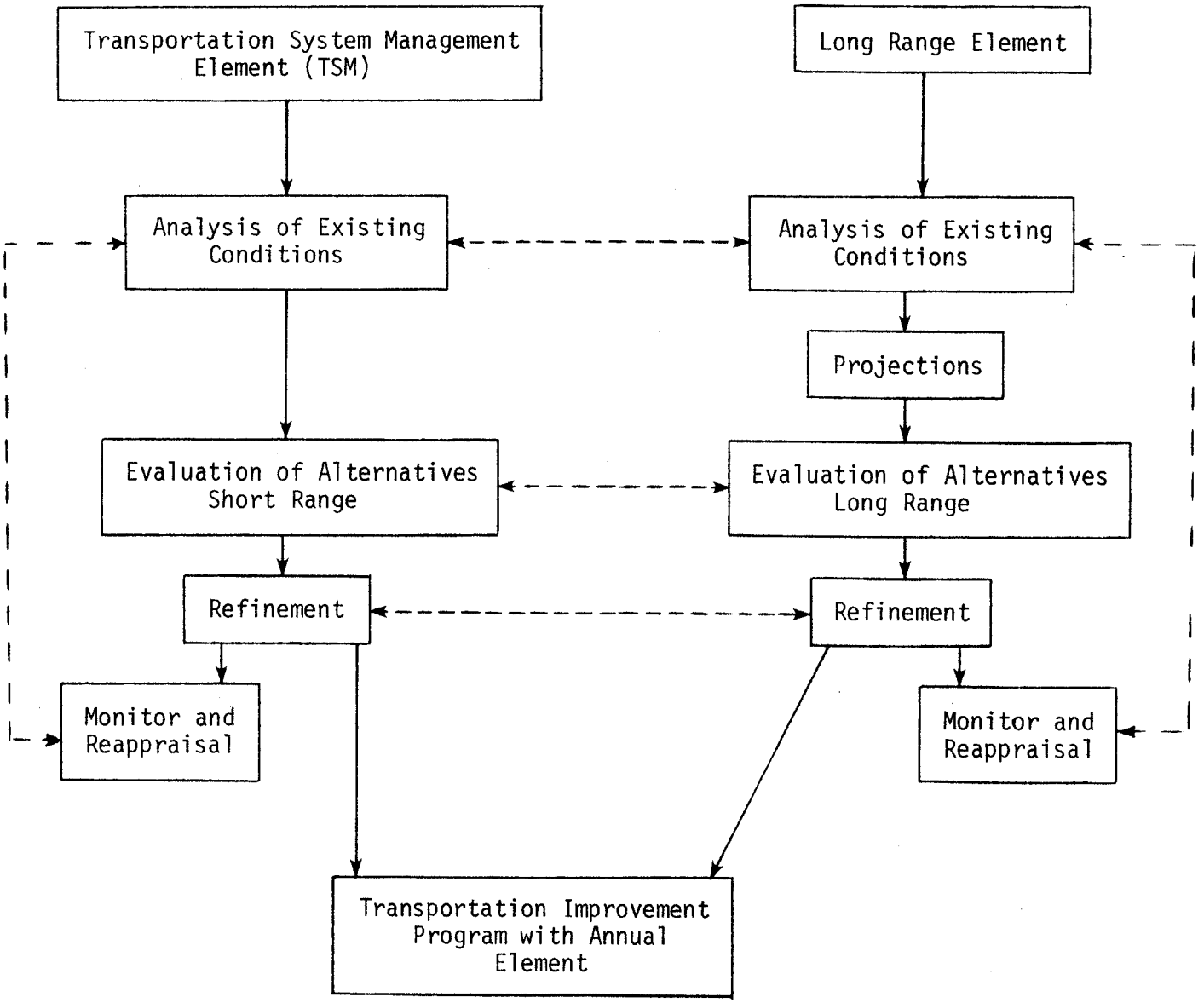
COATS has cycled through this process twice and is on the verge of another pass. The original cycle concluded with the adoption of the COATS plan by local governments in the first quarter of 1967. The updated COATS plan was published in September of 1973 and was adopted by the local governments shortly thereafter.

The Central Midlands Regional Planning Council as the COATS Policy Committee and Columbia MPO is responsible for the policy input and committee structure for COATS. As the policy body the Council Board endorses the COATS recommended plan and the COATS Transportation Improvement Program (TIP). The Central Midlands Regional Planning Council has thirty-two voting members according to population

FIGURE 1

TRANSPORTATION PLANNING PROCESS

HIGHWAYS AND TRANSIT



from the counties of Fairfield, Lexington, Newberry and Richland and the cities of Batesburg, Cayce, West Columbia, Columbia, Winnsboro, Forest Acres and Newberry. The Planning Council membership is comprised of two-thirds local elected officials and one-third citizen members appointed by the various local governments. The Planning Council Board meets regularly to take action on various elements of its planning program. When important matters concerning transportation issues need to be considered by the Planning Council Board, an entire meeting may be devoted to this task. In any case, the Planning Council Board relies heavily on the recommendations of its COATS Transportation Planning Advisory Committee when considering transportation matters. The Governor of South Carolina designated the Central Midlands Regional Planning Council as the metropolitan planning organization to receive Section 104 (f) of Title 23 USC planning funds for the Columbia urban area. On May 22, 1974 the Regional Planning Council entered into an agreement with the South Carolina Highway Department concerning the responsibilities of carrying out the transportation planning process and the use of these planning funds. This document can be found on the following page.

The Planning Council Board chairman appoints the chairman and members of the COATS Transportation Planning Advisory Committee. The COATS Transportation Planning Advisory Committee is chaired by a member of the Regional Council Board appointed by its chairman. This committee serves in an advisory capacity to the Regional Council Board concerning transportation matters. The Advisory Committee is comprised of forty members. Thirty-four of these members are appointed, by the Regional Council Board chairman, from recommendations of the local governments within the COATS boundary. Each local government is represented according to the percentage its population comprises of the total COATS area population. The other six members are appointed to represent agencies that are directly involved in transportation matters in the Columbia area. The Chief Commissioner for the Department of Highways and Public Transportation and the Vice President

AGREEMENT BY AND BETWEEN
SOUTH CAROLINA STATE HIGHWAY DEPARTMENT AND THE
CENTRAL MIDLANDS REGIONAL PLANNING COUNCIL
FOR USE OF SECTION 104(f) USC PLANNING FUNDS
IN THE COLUMBIA URBANIZED AREA

THIS AGREEMENT entered into this 21 day of [illegible], 1974 by and between the South Carolina State Highway Department (hereinafter referred to as "SCHD") and the Central Midlands Regional Planning Council (hereinafter referred to as "CMRPC").

W I T N E S S E T H:

WHEREAS, section 104(f) of title 23 USC makes certain planning funds (hereinafter referred to as "PL funds") available for carrying out the provisions of section 134 of title 23 USC in the Columbia urbanized area (hereinafter referred to as "Columbia");

WHEREAS, as provided for in the 9 May 1972 SCHD- CMRPC agreement for the Columbia Area Transportation Study, carrying out the provisions of section 134 in Columbia is the joint responsibility of CMRPC and SCHD;

NOW, THEREFORE, in consideration of the foregoing, CMRPC and SCHD agree as follows as to the use of PL funds allocated for conducting the section 134 planning process in Columbia.

## I. SCOPE OF WORK

The work to be performed, the division of work responsibility between CMRPC and SCHD, and work items eligible for PL funding are described in the approved annual Unified Work Program (hereinafter referred to as "UWP"), including approved modifications thereof.

## II. RESPONSIBILITY FOR COMPLIANCE WITH FEDERAL REQUIREMENTS

CMRPC will prepare, publish and distribute the annual UWP and Annual Reports required by the Federal Highway Administration (FHWA). SCHD will furnish to CMRPC - for inclusion in these documents - information and data on pertinent activities performed by SCHD.

As said material is furnished to SCHD by FHWA, SCHD will in turn furnish to CMRPC copies of Policy and Procedure Memorandums (PPM's), Instructional Memorandums (IM's), DOT Orders, FHWA Notices, regulations and other material relative to the use of PL funds. CMRPC will furnish all records, reports, justification, documentation and other red tape required by federal regulations and will carry out all federal procedures specified for the use of PL funds by CMRPC.

## III. PERIOD OF PERFORMANCE

A UWP will be prepared annually to describe the work proposed to be performed during the calendar year covered by the UWP. Either party may terminate this agreement at the end of a calendar year (December 31) by giving to the other party, on or before October 1 of said calendar year, written notice of its intention to terminate. In the absence of such notice, this agreement shall continue in full force and effect for carrying out the approved UWP (including approved modifications thereof) for the ensuing calendar year.

## IV. REIMBURSEMENT

SCHD will reimburse CMRPC for only the federal share payable - currently eighty percent (80%) - of costs actually incurred by CMRPC in performing (in the manner described in the UWP) those UWP work items for which CMRPC has received from SCHD prior written authorization to proceed. In procuring services or goods from consultants, contractors, vendors and the like, CMRPC shall follow all of the procedures required of SCHD by FHWA PPM 30-11, when SCHD procures similar services or goods. SCHD will reimburse CMRPC only for those outside services and goods for which CMRPC has received from SCHD written authorization prior to procurement.

SCHD reimbursement to CMRPC will be based on periodic progress vouchers submitted by CMRPC to SCHD. Such vouchers may cover work completed during periods of one or more calendar months, provided that no voucher covers months in more than one calendar year.

## V. AVAILABILITY OF FUNDS

When PL funds are apportioned to the State, SCHD will allocate the funds by formula to Columbia and to other South Carolina urbanized areas.

CMRPC may begin to incur charges against PL funds allocated to Columbia when it receives from SCHD written authorization to proceed with those UWP items for which said portion is to be used to cover the federal share payable. No reimbursement will be made by SCHD to CMRPC for costs incurred by CMRPC prior to written authorization to proceed.

Except when prevented by the lapsing provisions of title 23 USC, balances of Columbia's PL fund allocations not required to carry out any year's UWP may be carried f : ard and used for subsequent UWP's.

## VI. INSPECTION OF WORK

SCHD and FHWA shall at all times have the right to review and inspect the work being performed by CMRPC.

## VII. ACCESS TO RECORDS

CMRPC shall maintain all books, documents, papers, accounting records and other evidence pertaining to costs incurred and shall make such materials available at its office at all reasonable times while work covered by any annual UWP is being performed and for three (3) years from the date of final payment from SCHD for such work, for inspection by SCHD, FHWA or any authorized representatives of the federal government and copies thereof shall be furnished if requested.

## VIII. PUBLICATION

Publication by either party shall be in accordance with Publication Provisions of FHWA PPM 50-1.2 (section 5u), dated May 18, 1972, including subsequent modifications thereof.

## IX. CIVIL RIGHTS

During the performance of the work provided for in this agreement, CMRPC will comply with Title VI of the Civil Rights Act of 1964, as more specifically stated in attachment A.

## X. CANCELLATION OF PREVIOUS AGREEMENT

Except for any reimbursement still due CMRPC from SCHD for preparing, publishing and distributing the FY 1973 Annual Report and the CY 1974 UWP, this agreement cancels and supersedes the July 13, 1972 SCHD-CMRPC agreement for Annual and Management reports.

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year first hereinabove written.

SOUTH CAROLINA STATE HIGHWAY DEPARTMENT

By:_____
State Highway Engineer

Approved:_____
Chief Highway Commissioner

Attest:_____
Secretary-Treasurer

CENTRAL MIDLANDS REGIONAL PLANNING COUNCIL

By:_____
(Title)

Attest:_____
(Title)

of Columbia's private transit operator are represented on this committee. The citizen sub-committees that will be formed for the COATS update and any other COATS sub-committees report their findings to the COATS Advisory Committee for their consideration.

The staff of the Regional Council has the responsibility of monitoring and updating the socio-economic information used in the COATS process. Staff members also serve on the COATS Study Team. The Study Team is responsible for the technical evaluation of different test systems and various proposed amendments to the COATS plan. Many of the day to day administrative functions concerning COATS are conducted by Planning Council staff.

The Regional Planning Council receives Urban Mass Transportation Administration Section 9 planning funds to plan for the mass transit needs of the Columbia urban area. In this capacity the staff of the Regional Council works closely with the South Carolina Electric and Gas Company's Transit Division in developing the best possible transit system for Columbia.

Every attempt is made to ensure that the general public is made aware of the COATS process and the mechanisms open to them for their input. An annual COATS Report is published in the morning and afternoon Columbia newspapers to keep the public informed relative to the COATS plan and its implementation. This report and other COATS news stories stimulate interest in COATS. The staff of the Regional Planning Council and of the South Carolina Department of Highways and Public Transportation spend a good deal of time answering questions and speaking to various civic groups concerning the COATS process.

## Recently Adopted Transportation Control Measures

In June of 1977 the Central Midlands Regional Planning Council published a report entitled "An Investigation of Rescheduling Work Hours to Relieve Peak Traffic Congestion in the Columbia Area". This report documented the positive affects of staggering the working hours of state employees in Columbia, the capital of South Carolina.

The Regional Planning Council pushed for adoption of this study's recommendations by the State Budget and Control Board, which has the authority to authorize state agencies to stagger the working times of their employees. In October of 1977 the State Budget and Control Board adopted this study and authorized state agencies "at the discretion of the agency head" to adopt a schedule of variable work hours.

Since this time, some twenty-seven state agencies and both Richland and Lexington County governments have adopted variable work hour schedules for their approximately 3,600 employees. That figure could greatly increase according to a survey conducted by the Personnel Division of the State Budget and Control Board. Eight other state agencies with some 12,000 employees report they are in the process of implementing a variable schedule.

Technical assistance and information is available from the Regional Planning Council to government agencies or members of the private sector who are interested in learning more about the use of flextime or variable work schedules.

Reducing peak hour congestion by spreading the traffic volumes over a longer period of time will alleviate the stop and go traffic situation in many Columbia traffic corridors. The air quality benefits of this are evident but very difficult to quantify. The Regional Planning Council will rely on DHEC monitoring data and yearly travel time studies to determine the environmental effectiveness of this program.

Several months ago the Regional Planning Council employed a full time coordinator for the Council's rideshare program. The Rideshare Coordinator will plan, promote and implement an areawide carpool/vanpool program for the Richland-Lexington non-attainment area. Although this program is just getting underway, several major employers in the Columbia area have already been contacted relative to this program and a slide presentation explaining the benefits of carpool/vanpool program is being developed. As indicated in the UPWP (Attachment 1) the Central Midlands Regional Planning Council is fully committed to this project.

Complete records will be kept, documenting either the success or failure of this program. These records along with DHEC monitoring data will enable the Regional Planning Council to estimate the air quality benefits of this transportation control measure.

The number one urban priority in the current Annual Element of the Columbia Transportation Improvement Program (TIP) (Attachment 2) is the implementation of an urban areawide computerized traffic signal control system. The engineering plans for this 2.5 million dollar system are being prepared with staggered implementation scheduled to take place over the next four years.

According to the report "Traffic Signal Control Systems, Columbia, S.C." by Wilbur Smith and Associates, delays caused by the inadequate signal system in the Columbia area could be improved from 6-27% with the implementation of the computerized signal system. As implementation of this system progresses firmer estimates of delay benefits will be calculated and analyzed for air quality benefits. DHEC monitoring data will also be utilized to estimate system improvement.

Efforts are continuing in the Columbia CBD to eliminate one of the area's most frustrating transportation problems...the daily conflict of trains and automobile traffic. The solution is to consolidate train traffic to a single grade separated corridor through town.

Preliminary engineering plans have been drafted which pinpoint the route that such a corridor will follow. When built (funding opportunities are being explored) this project would free 58 lanes of traffic now often blocked during rush hour traffic by trains moving through the city.

The air quality benefits of implementing this project are obvious. It has been estimated that, when blocked, four major crossings of this rail line waste over 16,000 gallons of gasoline per year. In addition, a blocked arterial in this area of Columbia emits 300 times more air pollution than the same arterial under a free flow condition. The Mayor of Columbia is committed to the implementation of this project and as funding is obtained this project will undoubtedly be implemented. The actual reduction in VOC emission produced by this product will be calculated as a function of the full development of the Columbia Transportation Control Plan.

There have been numerous roadway and intersectional improvements implemented in the Columbia area over the last several years that have improved average speeds in certain corridors. One project currently underway, will add additional capacity to the most heavily congested highway corridor in the Columbia area. I-26 and I-126 from St. Andrews into the Columbia CBD is being widened to three lanes in each direction with four lanes in each direction being provided over the Broad River into Columbia. This improvement, along with major improvements to interchanges should greatly reduce stop and go driving currently experienced in this corridor during the peak hours. Again, it is very difficult to estimate VOC emission reductions related to this improvement.

Alternative Analysis

The calendar year 1979 draft UPWP which has been approved by the Central Midlands Regional Planning Council (CMRPC) Board and submitted to the Intermodal Planning Group (IPG) in Atlanta documents the future analysis and estimated

expense of formulating a transportation control measures plan for the Richland-Lexington non-attainment area. A copy of this UPWP can be found in Attachment 1.

Work task C-7 specifically commits the Regional Planning Council to the study and evaluation of all 19 transportation control measures listed by EPA. Short and long range methods of improving the privately owned transit system, exclusive bus and carpool lanes, park and ride and fringe parking lots, and traffic flow improvements are all being considered for possible inclusion in the recommended year 2000 transportation plan for COATS. The development of which is taking place under work task E-2.1 and 2.2 in the UPWP. In addition a bikeway plan will be developed for the COATS area during CY 79 (work task D-1). Also, UMTA Section 9 grant funds will be utilized to undertake a management alternatives study for mass transportation service in the Columbia area (work task C-3). This study will analyze various management schemes. One management alternative would be continued private ownership of the system, with UMTA Section 5 funds being utilized for improving transit service. A detailed analysis of the costs and applications of the private operator using Section 5 funds will be provided. Another management alternative would be public ownership. The cost and benefits of public ownership of the transit system will be examined. Sources of local funds for transit system expenditures would be compiled and analyzed. The results of this study will be presented to the various local governments in the Columbia area and the current private transit provider for their consideration.

Thus, all 19 transportation control measures that, according to the 1977 Clean Air Act Amendments, must be studied are listed in the 1979 UPWP for the Columbia area. If financial resources and appropriate methodologies are made available over the upcoming months by the EPA, the Central Midlands Regional

Planning Council will be able to complete the analysis of the 19 transportation control measures by July 30, 1980 (see attachments for schedule). Each decision not to adopt difficult but reasonably available measures will be justified. The study and evaluation of each alternative will produce either a recommendation to implement measures or a justification not to implement. All known technologies available to perform these studies will be used and every attempt will be made to train Regional Planning Council staff in transportation related air quality analysis. A procedure for reporting progress on the approved studies will be negotiated with EPA.

Participation of Public and Elected Officals in the Planning Process

As stated earlier, two-thirds of the Board of the Central Midlands Regional Planning Council are elected officals. Both Richland and Lexington County Councils and the Columbia City Council sent resolutions to the Governor of South Carolina asking that Central Midlands Regional Planning Council be designated as the cooperative forum for developing the transportation control measures plan required by the 1977 Clean Air Act Amendments for the Richland-Lexington non-attainment areas. Copies of these resolutions follow this page.

In the past the general public has been heavily involved in COATS planning activities and the Regional Planning Council plans to continue this effort in the development of the TCM plan. During November and December of 1977 the Regional Planning Council hosted a series of seven citizen meetings to receive ideas concerning needed transportation improvements in the COATS area. These meetings were well attended and provided a foundation of information concerning citizen attitudes toward various types of transportation improvements and controls. It is anticipated that this format will be used in the future to receive citizen reactions to various transportation plans and controls. Attachment 4 contains a report documenting the most recent citizen participation program for transportation planning in the Columbia area. This report also documents the methodology utilized by the Regional Planning Council in obtaining maximum input from the citizenship.

RESOLUTION

DESIGNATION OF AREA-WIDE AGENCY - - CLEAN AIR ACT AMENDMENTS

WHEREAS, under the provisions of the Clean Air Act Amendments of 1977, all or part of the Central Midlands area may be designated as a "non-attainment" area; and

WHEREAS, the local governments in this area have until February 7, 1978, to designate an appropriate planning agency to update the transportation control program for this area; and

WHEREAS, the Central Midlands Regional Planning Council is the Metropolitan Planning Organization for continuing transportation planning; and

WHEREAS, the Clean Air implementation plan is an expansion of the transportation planning process;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Columbia this 12 day of Jan, 1978, that under the terms of the Clean Air Act Amendments of 1977 the Central Midlands Regional Planning Council is hereby designated as the appropriate area-wide planning agency for purposes of developing the required plans under the terms of this legislation.

MAYOR

Requested by:
City Manager

Approved by:

City Manager

Approved as to form:

City Attorney

Attest:

City Clerk

Introduced: _____

Final Reading 1-18-78

R-78 4

# COUNTY OF LEXINGTON, SOUTH CAROLINA

## R E S O L U T I O N

THE COUNCIL FOR THE COUNTY OF LEXINGTON, SOUTH CAROLINA, MEETING IN GENERAL SESSION, THE 11TH DAY OF JANUARY, NINETEEN HUNDRED AND SEVENTY-EIGHT, CONSIDERED AND PASSED THE FOLLOWING RESOLUTION:

WHEREAS, under the provisions of the Clean Air Act Amendments of 1977, all or part of the Central Midlands area may be designated as a "non-attainment" area; and

WHEREAS, the local governments in this area have until February 7, 1978, to designate an appropriate planning agency to update the transportation control program for this area; and

WHEREAS, the Central Midlands Regional Planning Council is the Metropolitan Planning Organization for continuing transportation planning; and

WHEREAS, the Clean Air implementation plan is an expansion of the transportation planning process.

NOW THEREFORE BE IT RESOLVED, by Lexington County Council that under the terms of the Clean Air Act Amendments of 1977 the Central Midlands Regional Planning Council is hereby designated as the appropriate area-wide planning agency for purposes of developing the required plans under the terms of this legislation.

ATTEST:

Dorothy K. Wingard
Clerk

STATE OF SOUTH CAROLINA )
)
COUNTY OF RICHLAND )

RESOLUTION NO. 74

DESIGNATION OF AREA-WIDE AGENCY -- CLEAN AIR ACT AMENDMENTS

WHEREAS, under the provisions of the Clean Air Act Amendment of 1977, all or part of the Central Midlands area may be designated as a "non-attainment" area; and,

WHEREAS, the local governments in this area have until February 7, 1978, to designate an appropriate planning agency to update the transportation control program for this area; and,

WHEREAS, the Central Midlands Regional Planning Council is the Metropolitan Planning Organization for continuing transportation planning; and,

WHEREAS, the Clean Air implementation plan is an expansion of the transportation planning process,

NOW, THEREFORE, BE IT RESOLVED by the Richland County Council that under the terms of the Clean Air Act Amendments of 1977 the Central Midlands Regional Planning Council is hereby designated as the appropriate area-wide planning agency for purposes of developing the required plans under the terms of this legislation.

SIGNED A SEALED this the 25 day of January, 1978, having been adopted by the Richland County Council on January 4, 1978.

RICHLAND COUNTY COUNCIL

James R. Barber III, Chairman

W. D. Grimsley, Vice-Chairman

Jimmy C. Bales

A. T. Butler, Sr.

James W. Cothran, Jr.

John R. Harper II

A. Frank Harrison III

James C. Leventis

Julius W. McKay

Julius Murray

Susie Newman

Billy E. Taylor

Candy Waites

## Columbia Transportation Improvement Program

The FY 79 (federal fiscal year) Columbia TIP and Annual Element can be found in Attachment 2. The number one urban priority is the implementation of a computerized traffic control system which should greatly reduce stop and go driving in the Columbia urban area. The greatest portion of financial resources is devoted to the implementation of widened or new highway facilities. When completed, this highway network will greatly reduce congestion levels. Page 10 (TIP) lists transit projects that are recommended in the Columbia Transit Development Program. These projects are eligible for UMTA Section 5 funding. Unfortunately, Columbia's private transit operator has not yet accepted these funds due to the numerous federal requirements involved. It is anticipated that the Columbia MPO will use the TIP document to begin the implementation process for the selected transportation control measures.

## Public Hearing and A-95 Review of this Document

A public hearing on the 1979 SIP is to be held in the Columbia area on November 20, 1978. Copies of publicity for this hearing and comments received during the hearing are contained within this SIP.

ATTACHMENTS

ATTACHMENT 1

DRAFT

# 1979
# Unified Planning Work Program
# For The
# Continuing Transportation
# Planning Process
# Of The
# Columbia, S.C. Metropolitan Area

for the Period
January 1, 1979 through June 30, 1982

THIS REPORT PREPARED BY CENTRAL MIDLANDS REGIONAL PLANNING COUNCIL AND THE SOUTH CAROLINA DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION IN COOPERATION WITH THE UNITED STATES DEPARTMENT OF TRANSPORTATION.

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# INTRODUCTION

I.

This document contains the Unified Planning Work Program for all transportation planning activities in the Columbia urban area of the South Carolina Department of Highways and Public Transportation (SCDHPT) during calendar year (CY) 1979, while the activities of the other agencies are based on a fiscal year (FY) 1980, regardless of funding source. The program is divided into major categories which outlines the issues and objectives of each program area. The subcategories describe specific projects to be carried out in the attempt to achieve the objective.

While the development of this Unified Planning Work Program is the responsibility of the Central Midlands Regional Planning Council, other agencies involved in planning and operating transportation systems in the Columbia urban area must be involved in the development of this program. This is accomplished through direct staff contact with these agencies in developing the initial draft. Input is also provided through representation on the COATS Transportation Planning Advisory Committee. The draft of the Unified Planning Work Program is reviewed and recommended for approval by the Transportation Planning Advisory Committee of the Regional Planning Council. The Regional Planning Council, acting on the recommendation of the Advisory Committee, approves the Unified Planning Work Program before A-95 and Intermodal Planning Group reviews.

## Status of Current Transportation Planning Activities

A. Highways - Listed below are major projects in the planning stages that will effect highway efficiency in the Columbia Metropolitan Area.

1. Plan Reappraisal - A major update of the COATS recommended plan is underway. Current land use, population, employment and other transportation dependent characteristics have been projected to the year 2000 based on a revised 1995 transportation plan that reflects available funding allocations. A series of seven community meetings have been held to receive ideas concerning Columbia's future transportation system. All this data will aid the various COATS committees in developing a revised transportation plan for the year 2000.

2. Transportation Improvement Program - The Central Midlands Regional Planning Council as the Policy Committee for COATS, has the responsibility of developing a six year capital improvement program, including a detailed Annual Element, for both highways and transit. The Policy Committee constantly monitors growth in the COATS area and places high priorities on improvements that will do the most good for the dollar spent.

3. Arterial Traffic Control Signal System - A coordinated traffic signal control system has been given the highest priority for implementation by the COATS Policy Committee. A consultant for the design of the system has been selected.

4. Carpooling - The Regional Planning Council has recently employed a carpool/vanpool coordinator to begin actively promoting carpooling and vanpooling among employers in the Central Midlands Region. The carpooling program utilizes the Bureau of the Census CARPOOL Program with the DIME/GBF reference file.

5. Flextime Plan - Following the recommendations of the report, "An Investigation of Rescheduling Work Hours To Relieve Peak Traffic Congestion In The Columbia Area" many state agencies have implemented a staggered work hour program.

B. Transit - Providing a balanced transportation system for the Columbia area currently includes a greater emphasis on public transportation planning.

1. Transit Development Program - A five year transit development program has been outlined in the report, Columbia Area Public Transportation Study Update, July 1976. Improvements in routes and schedules along with new buses and other transit amenities are recommended. Since Columbia's private transit operator has decided not to apply for UMTA operating or capital assistance, funding methods for implementing the transit program have been stymied.

2. UMTA Section 5 Funds - The Regional Planning Council continues to assist the transit operator in evaluating the impacts of accepting Section 5 funds. An evaluation of management alternatives for the Columbia transit system is being planned.

3. Public Transportation Plan for the Elderly and Handicapped - A study to determine the transportation needs of the transportation disadvantaged in the Central Midlands Region has been completed. Coordination of existing facilities as well as implementation capabilities for new facilities are being explored.

C. Airports - A significant effort is being made to involve local citizens and elected officials in airport planning activities.

1. Update Metropolitan Master Plan - A major update of the Columbia Metropolitan Airport Plan is underway. Methods of reducing conflicts between residential areas and airport noise are being investigated. An effort is being made to develop criteria for land use planning around the Metro Airport.

2. Terminal Expansion, Access Roads and Parking Areas - Implementation of the recommended terminal expansion, rerouting of the terminal access road and parking improvements will be completed by December 1978 at the Columbia Metropolitan Airport.

3. Reliever Airport - A location study for a major reliever airport north of the city has been completed. Due to significant citizen opposition plans to locate a reliever airport in the Blythewood/ Cedar Creek area have been abandoned.

D. Railroads - the efficiency of railroad operations is directly related to transportation cost levels. Sometimes, at the sacrifice of time and patience, railroad operation conflicts significantly with the efficiency of highway transportation.

1. Railroad Facilities Study - In the city of Columbia, much attention has been given toward minimizing the conflict of railroad operations with peak hour highway travel. The recommendations of the recently completed Columbia Area Railroad Relocation and/or Consolidation Study, are being further studied in order to insure an efficient implementation program.

## Status of Comprehensive Planning

The purpose of the Regional Planning Council is to provide planning and coordination of programs and services. In an effort to provide required comprehensive planning, the Council's work program includes governmental management, growth and development, environmental planning, housing planning, public safety planning, transportation planning and human resources planning. Other elements of comprehensive planning include recreation and open space, water and sewer, storm drainage, historic preservation, elderly, law enforcement, highway safety, fire protection, solid waste, and education.

## Major Overall Transportation Issues and Needs

### Funding

1. Highway construction appropriations for the Columbia Metropolitan area are anticipated to be inadequate to implement the 1995 transportation plan. A major reevaluation of the plan is currently underway. A major land use update has been completed.

2. Transit operating losses for the private operator increase each year. The updated Transit Development Program lists the requirements for receiving Section 5 funds. It is up to the private transit operator and the local governments involved to decide whether Section 5 funds can be utilized to upgrade the transit system in Columbia.

### Requirement for UMTA Certification

1. Legislation regarding handicapped and elderly requires their consideration into the transportation planning process. A significant amount of data is being collected and evaluated in the Region's transportation disadvantaged study. Implementation of the study recommendations are underway.

## II. Organization and Management

The organizational sturcture and management for the Columbia, South Carolina transportation planning process is outlined in a document entitled A Prospectus for the Columbia Area Transportation Study, July, 1977.

## III. Transportation Planning Work Program

### A. Administration - This section covers the general administration of the transportation planning process for CY 1979/FY 1980

#### 1. Management of Work Program

Objective: The objective of this element is the smooth and efficient management of the transportation planning process. This is accomplished by involving the public, local governments and all transportation planning and implementing agencies in a coordinated, comprehensive and continuing effort to provide the best possible transportation plan for the Columbia area.

Previous Work: The transportation planning process is a continuing effort. Each year a Unified Planning Work Program is prepared for the upcoming calendar and fiscal years. Also a Prospectus, outlining the transportation planning and decision making process for the Columbia area, has been published. Each year a Transportation Annual Report, which informs the public of transportation planning activities, is published. Files are available that document the transportation planning process.

Methodology: This work element involves the preparation of narrative and expenditure reports, routine correspondence, administrative record keeping, preparation of billings, Unified Planning Work Programs and staff training activities. An updated description of Columbia's transit system is maintained and provided to UMTA. Transportation committee activities such as membership, record keeping, preparation of minutes, agendas and mail outs are also part of this element. One of the most important activities of this work element involves citizen participation and service. The public is provided information upon request, and the COATS Annual Report is prepared to inform the public of transportation planning activities. Community talks and radio and T.V. shows are also used to keep the public informed. Various data is provided to other state and local agencies and information is provided to the SCDHPT Urban Design Section to aid the design of COATS projects. Citizen meetings are also held as the planning process needs public participation.

Products: Administrative and Transportation Committee files are maintained. Each year a Unified Planning Work Program, and an Annual Report are prepared and the Prospectus is updated as needed.

Staffing: In-house staff of the SCDHPT and the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/81 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | $ 500 | $ 500 | $ 500 |
| Federal (FHWA-PL) | 80% | 2,000 | 2,000 | 2,000 |
| State (SCDHPT) | 22% | 725 | 725 | NA |
| Federal (FHWA-HPR) | 78% | 2,575 | 2,575 | NA |
| Local (CMRPC) | 20% | 400 | 500 | 500 |
| Federal (UMTA) | 80% | 1,600 | 2,000 | 2,000 |
| | | $7,800 | $8,300 | $5,000 |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | $1,000 | $ 500 | $1,000 |
| Federal (FHWA-PL) | 4,000 | 2,000 | 4,000 |
| State (SCDHPT) | 1,450 | 725 | 725 |
| Federal (FHWA-HPR) | 5,150 | 2,575 | 2,575 |
| Local (CMRPC) | 900 | 400 | 1,000 |
| Federal (UMTA) | 3,600 | 1,600 | 4,000 |
| | $16,100 | $7,800 | $13,300 |

Functional Agency Responsibility: South Carolina Department of Highways and Public Transportation and the Regional Planning Council.

2. Printing Reports

Objective: The objective of this element is to print reports that will give citizens and agencies at all levels of government exposure to the transportation planning process.

Previous Work: Each year since 1972 the Regional Planning Council and the SCDHPT have published annual reports and unified planning work programs.

Methodology: The Unified Planning Work Program will be printed in-house by the Regional Planning Council. The Annual Report will be layed out by the Regional Planning Council and published in the State and Columbia Record newspapers.

Products: Two published documents: a COATS Annual Report and (CY 79) Unified Planning Work Program.

Staffing: Staff of the Regional Planning Council

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | $ 400 | $ 400 | $ 400 |
| Federal (FHWA-PL) | 80% | 1,600 | 1,600 | 1,600 |
| Local (CMRPC) | 20% | 800 | 400 | 400 |
| Federal (UMTA) | 80% | 3,200 | 1,600 | 1,600 |
| | | $6,000 | $4,000 | $4,000 |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | $ 800 | $ 400 | $ 800 |
| Federal (FHWA-PL) | 3,200 | 1,600 | 3,200 |
| Local (CMRPC) | 1,200 | 800 | 800 |
| Federal (UMTA) | 4,800 | 3,200 | 3,200 |
| | $10,000 | $6,000 | $8,000 |

Functional Agency Responsibility: Regional Planning Council

B. Transportation Surveillance

1. Highway Surveillance

Objective: The objective of this element is to monitor the annual usage of the highway system to determine where growth in travel is occurring.

Previous Work: The annual count program has continued and vehicle miles of travel (VMT) were summarized by traffic analysis areas. A traffic flow map of the area was published. Travel time runs were conducted in all corridors. Results were published in the COATS Annual Report.

Methodology: Manual classification counts will be made at select locations to measure traffic composition. The annual traffic count program will continue and the VMT summarized by the traffic analysis areas. Travel time runs will be conducted to measure the relative travel time and congestion along select routes.

Products: Data obtained will be tabulated, analyzed and compared with previous data to determine growth trends. These data will also be used in evaluating priorities and identifying potential needs for TSM improvements.

Staffing: Staff of the South Carolina Department of Highways and Public Transportation and the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost CY 79 | Cost FY 80 |
|---|---|---|---|
| State (SCDHPT) | 22% | $1,760 | $ 880 |
| Federal (FHWA-HPR) | 78% | 6,240 | 3,120 |
| Local (CMRPC) | 20% | 400 | 400 |
| Federal (FHWA-PL) | 80% | 1,600 | 1,600 |
| | | $10,000 | $6,000 |

Functional Agency Responsibility: South Carolina Department of Highways and Public Transportation and the Regional Planning Council.

2. High Occupancy Vehicle (HOV) Surveillance

Objective: The objective of this element is to monitor transit, carpool and vanpool usage in the Columbia area.

Previous Work: Basic transit information was collected for the transit development program and the annual report.

Methodology: Transit information such as patronage, miles of service, route coverage, service standards, and financial and operating results must be collected and evaluated in order to monitor significant changes in this mode of transportation. Trial checks will be conducted to determine local points, speed and delays and walking points associated with the Columbia transit system. Information will be collected on vanpool/carpool usage associated with the Regional Planning Council's new vanpool/carpool coordination efforts (D-2).

Products: Data will be tabulated, analyzed and compared with previous data and relevant data will be published in the transportation annual report. An evaluation of this data will indicate the effectiveness of on going programs to improve transit usage and vehicle occupancy.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost CY 79 | Cost FY 80 |
|---|---|---|---|
| Local (CMRPC) | 20% | $ 200 | $ 400 |
| Federal (UMTA) | 80% | 800 | 1,600 |
| | | $1,000 | $2,000 |

Functional Agency Responsibility: Regional Planning Council.

3. Air Travel Surveillance

Objective: The objective of this element is to monitor Columbia Metropolitan Airport usage (passenger and freight) for use in updating the Columbia Metro Airport Master Plan.

Previous Work: A Columbia Metropolitan Airport Master Plan was published in September, 1970.

Methodology: A methodology for this element will be developed as this element becomes active.

Products: Data for evaluating and updating the Columbia Metropolitan Airport Master Plan will be available.

Staffing: Undetermined

Financial Responsibility and Scheduling:

No Activity

Funding Agency Responsibility: Richland/Lexington Airport Commission

C. Non-transportation Surveillance

1. Base Mapping

Objective: The objective of this element is to improve the basis for local development decision making by providing a consistent set of aerial photographs and topographic maps.

Previous Work: The Regional Planning Council initiated a mapping program in 1964 which resulted in mapping 180 square miles in the metropolitan area. In 1973 ground control and photography were purchased for an additional 310 square miles. Only 15 square miles of map coverage was ordered. Additional map coverage was purchased in 1974 and 1975 in the Columbia area, 45 square miles and 56 square miles, respectively.

Methodology: Mapping priorities will be assigned and in-house updating will be performed.

Products: Updated planimetric maps for use in the transportation planning process.

Staffing: Regional Planning Council staff.

Financial Responsibility and Scheduling:

No Activity

Funding Agency Responsibility: Regional Planning Council.

2. Update Geographic Base File

Objective: The objective of this element is to improve the data base used for local decision making by keeping the Census Geographic Base File current.

Previous Work: Work has been performed from the data base that includes carpooling matching, the identification of federal registered voters, and the locations of health and criminal justice indices in the metropolitan area.

Methodology: Addresses will be matched with reference to enumeration districts, census tracts, counties, and cities within the metropolitan area. A pen plotter will be utilized to graphically display assembled information.

Products: Maps and computer print-outs will be generated for use in the transportation planning process.

Staffing: Staff of the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

No Activity

Functional Agency Responsibility: Regional Planning Council.

3. Socio-Economic Surveillance

Objective: The objective of this element is to monitor population growth, land use activities, office space availability and employment and labor force data to determine if the socio-economic projections made for COATS remain valid.

Previous Work: Socio-economic variables (population, dwelling units, employment, auto ownership, labor force, school enrollment and retail sales) have been projected to the year 2000 for use in the COATS update. The Metropolitan Sketch Development Plan was updated in 1977. An office space report has been completed for the Columbia area. A year 2000 land use plan has been prepared.

Methodology: Population projections to the year 2000 will be monitored using building permit data and other growth indices. Data such as drainage, population densities, critical areas, historic sites, and other factors effecting growth will be monitored. Changes in land use patterns will be monitored through review of subdivision plans. Data on office space availability will be collected through a survey of office complex owners or managers. Employment and labor force statistic will be monitored using data available monthly from the S.C. Employment Security Commission.

Products: The variables used in the various trip forecasting models will be updated as needed. Data collected will be filed and available as input into future COATS update efforts. Growth trends will be compared to the COATS long range transportation pla

Staffing: Staff of the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost CY 79 | Cost FY 79 | Cost FY 80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | $1,400 | $ 700 | $1,400 |
| Federal (FHWA-PL) | 80% | 5,600 | 2,800 | 5,600 |
| | | $7,000 | $3,500 | $7,000 |

Functional Agency Responsibility: Regional Planning Council.

4. Housing Market Surveillance

Objective: The objective of this element is to maintain current data on housing conditions, supply, and distribution as input into the transportation Plan Reappraisal.

Previous Work: Other related housing market information accomplished to date included a Housing Start Study by traffic zones and a Multi-family Survey updated every six months.

Methodology: Monitoring of the housing stock and the determination of the needs for additional housing will be accomplished through a systematic program of field surveys, a semi-annual multi-family housing survey, and an annual housing starts survey.

Products: A published report will be prepared.

Staffing: Staff of the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 1/3 | 2,000 | 2,000 | 2,000 |
| Federal (HUD) | 2/3 | 4,000 | 4,000 | 4,000 |
| | | $6,000 | $6,000 | $6,000 |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | 4,000 | 2,000 | 4,000 |
| Federal (HUD) | 8,000 | 4,000 | 8,000 |
| | $12,000 | $6,000 | $12,000 |

Functional Agency Responsibility: Regional Planning Council.

5. Air Quality Surveillance

Objective: The objective of this element is to monitor Columbia's air quality to determine if sources of carbon monoxide and photochemical oxidants are being reduced to meet the provisions of the 1977 Clean Air Act.

Previous Work: DHEC has monitored Columbia's air quality over the past several years.

Methodology: All air quality monitoring is performed by the Bureau of Air Quality Control. In the Columbia Metropolitan Area, one monitoring site is operated for carbon monoxide and one for photochemical oxidants (ozone).

Products: Air quality data for the Columbia area is made available to the transportation planning process.

Staffing: Staff of the South Carolina Department of Health and Environmental Control.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost | | |
|---|---|---|---|---|
| | | 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
| SCDHEC | 100% | $4,900 | $4,900 | $4,900 |
| | | CY 79 Total | FY 80 Total | |
| SCDHEC | 100% | $9,800 | $9,800 | |

Functional Agency Responsibility: South Carolina Department of Health and Environmental Control

D. Transportation Systems Management Planning - In todays economy the construction dollar is rapidly being consumed by inflation. Major construction for highways and transit is being spread over an even longer period of time. It is, therefore, more important to provide for short-range improvements that will make a more efficient use of existing transportation resources. In Columbia there have been several studies in the past that need to be given more attention. In 1972 the Columbia TOPICS (Traffic Operations Program to Increase Capacity and Safety) study was completed. Also in 1972, the Columbia Area Public Transportation Plan was published and in July of 1976 this report was updated. A Transportation System Management Plan was developed for COATS in March of 1976. The basic goal of the following work elements is to coordinate all modes of urban transportation through operating, regulatory, and service policies so as to achieve maximum efficiency and productivity for the system as a whole.

1. Bikeway Plan

Objective: The objective of this element is to develop a comprehensive network of bikeways for the Columbia urban area. These bikeways will aid recreational biking in the Columbia area and the person wishing to use a bike to commute to work. The idea is to give an option to using the private automobile.

Previous Work: None

Methodology: A Bikeway Sub-committee of the COATS Transportation Planning Advisory Committee will be formed to guide this study. Representatives of local governments and bicycle enthusiasts will be represented on this committee. All existing plans involving bikeways will be compiled for evaluation. Major origin and destinations that have potential for bicycle use will be identified. A cost feasible plan will be recommended. Potential funding sources will be identified and an implementation schedule will be formulated.

Products: A report detailing the recommendations of the bikeway study will be written and printed.

Staffing: Staff of the Regional Planning Council and in cooperation with the Department of Highways and Public Transportation

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | Cost 7/79-12/79 |
|---|---|---|---|
| Local (CMRPC) | 20% | $1,400 | $1,400 |
| Federal (FHWA-PL) | 80% | 5,600 | 5,600 |
| State (SCDHPT) | | 110 | 110 |
| Federal (FHWA-HPR) | | 390 | 390 |
| | | $7,500 | $7,500 |

| | | CY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | 20% | $2,800 | $1,400 |
| Federal (FHWA-PL) | 80% | 11,200 | 5,600 |
| State (SCDHPT) | | 220 | 110 |
| Federal (FHWA-HPR) | | 780 | 390 |
| | | $15,000 | $7,500 |

Functional Agency Responsibility: Regional Planning Council

2. Carpool/Vanpool Planning and Implementation

Objective: The objective of this element is to encourage carpooli and vanpooling in the metropolitan area thereby reducing conges pollution and the consumption of fuel.

Previous Work: The Regional Planning Council in cooperation with the University of South Carolina adapted a computer program for carpooling to the geographic base file for Columbia. The progra matches potential carpools by home address.

Methodology: A full time staff position will be devoted to promoting, planning and implementing carpool and vanpool programs in the Columbia area. Major employers will be contacted and made aware of this carpool/vanpool planning service. All practical methods of notifying the public of this service will be pursued.

Products: A report documenting this effort and its effectiveness will be published.

Staffing: Regional Planning Council Staff

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Dept. of Energy | 100% | 5,000 | 0 | 0 |
| Economic Development Admin. | 75% | $10,000 | $10,000 | 0 |
| Local (CMRPC) | 25% | 3,333 | 3,333 | 0 |
| Local (CMRPC) | 20% | 0 | 0 | $1,800 |
| Federal (FHWA-PL) | 80% | 0 | 0 | 7,200 |
| Local (CMRPC) | 20% | 0 | 0 | 1,800 |
| Federal (UMTA) | 80% | 0 | 0 | 7,200 |
| | | $18,333 | $13,333 | $18,000 |

| | | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|---|
| Dept. of Energy | 100% | $ 5,000 | $ 5,000 | 0 |
| Economic Development Admin. | 75% | 20,000 | 10,000 | $10,000 |
| Local (CMRPC) | 25% | 6,666 | 3,333 | 3,333 |
| Local (CMRPC) | 20% | 0 | 0 | 1,800 |
| Federal (FHWA-PL) | 80% | 0 | 0 | 7,200 |
| Local (CMRPC) | 20% | 0 | 0 | 1,800 |
| Federal (UMTA) | 80% | 0 | 0 | 7,200 |
| | | $31,666 | $18,333 | $31,333 |

Functional Agency Responsiblity: Regional Planning Council

3. Management Alternatives Study For Mass Transportation Service In The Columbia Area

Objective: The objective of this element is to study management alternatives for improving transit service in the Columbia urban area.

Previous Work: A Transit Development Program for the Columbia area was updated in 1976. Transit system organization, finances and physical plant information has been collected and updated each year.

Methodology: Various management schemes will be studied. One management alternative would be continued private ownership of the system, with UMTA Section 5 funds being utilized for improving transit service. A detailed analysis of the costs and applications of the private operator using Section 5 funds will be provided. Another alternative would be public ownership. The costs and benefits of public ownership of the transit system will be examined. Sources of local funds for transit system expenditures would be compiled and analyzed. The results of this study will be presented to the various local governments in the Columbia area and the current private transit provider for their consideration.

Products: A report documenting this study will be published and distributed to various local governments, the private transit provider and other interested persons. This report will help decision makers decide the future course of the Columbia transit system.

Staffing: A consultant will be selected to perform this study.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | NA | $3,000 | $3,000 |
| Federal (UMTA) | 80% | NA | 12,000 | 12,000 |
| | | | $15,000 | $15,000 |

| | CY 79 | FY 79 | FY 80 |
|---|---|---|---|
| Local (CMRPC) | $3,000 | NA | $6,000 |
| Federal (UMTA) | 12,000 | NA | 24,000 |
| | $15,000 | | $30,000 |

Functional Agency Responsibility: Regional Planning Council

4. Traffic Operation Studies

Objective: The objective of this element is to improve circulatio reduce congestion and reduce traffic accidents caused by traffi engineering problems.

Previous Work: Traffic accident studies have been prepared for the cities of West Columbia and Cayce. Numerous school circulation plans have been prepared. Traffic engineering service has been given to cities and counties within the COATS area.

Methodology: Staff of the Regional Planning Council and the Department of Highways will use highway surveillance data, accident records, development plans and other information to identify existing and potential areas where safety, congestion and/or circulation can be enhanced through operational improvements. The Regional Planning Council's Traffic Engineer works with developers and reviews development plans to ensure proper driveway locations and circulation patterns. The Traffic Engineer serves on various city traffic committees. Traffic accident studies and circulation plans are prepared as problems are identified.

Products: Reports are prepared as studies are completed. TSM projects are identified and considered for inclusion in the COATS TIP.

Staffing: Staff of the Regional Planning Council and Department of Highways and Public Transportation.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| State (SCDHPT) | 22% | $ 330 | $ 330 | NA |
| Federal (FHWA-HPR) | 78% | 1,170 | 1,170 | NA |
| Local (CMRPC) | 20% | 500 | 500 | 500 |
| Federal (FHWA-PL) | 80% | 2,000 | 2,000 | 2,000 |
| | | $4,000 | $4,000 | $2,500 |

| | | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|---|
| State (SCDHPT) | 22% | $ 660 | $ 330 | $ 330 |
| Federal (FHWA-HPR) | 78% | 2,340 | 1,170 | 1,170 |
| Local (CMRPC) | 20% | 1,000 | 500 | 1,000 |
| Federal (FHWA-PL) | 80% | 4,000 | 2,000 | 4,000 |
| | | $8,000 | $4,000 | $6,500 |

Functional Agency Responsibility: Regional Planning Council and Department of Highways and Public Transportation

5. Coordinating Transportation Service to the Elderly and Handicapped

Objective: The objective of this element is to ensure the implementation of recommendations made by the recently completed Transportation Disadvantaged Study.

Previous Work: A study of the transportation needs of the elderly and handicapped of the Central Midlands Region has been completed. The final study report recommended methods of improving transportation service to the region's transportation disadvantaged.

Methodology: Assistance will be given to local governments and/or public agencies in the implementation of a coordinated transportation system for the elderly and handicapped population of the Central Midlands Region. The assistance provided will include: the preparation of needed federal grant application, serving as liaison between various governments and agencies and attending public meetings concerning the implementation of elderly and handicapped services. An advisory committee comprised of key decision makers from the public and private sectors will be formed and staffed by the Regional Planning Council. This committee will begin to examine methods of coordinating transportation service.

Products: An improved and coordinated transportation service to the region's transportation disadvantaged.

Staffing: Staff of the Regional Planning Council.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost | | |
|---|---|---|---|---|
| | | CY 79 Total | FY 79 Total | FY 80 Total |
| Local (CMRPC) | 20% | $1,540 | $1,540 | $1,540 |
| Federal (UMTA) | 80% | 6,160 | 6,160 | 6,160 |
| | | $7,700 | $7,700 | $7,700 |

Functional Agency Responsibility: Regional Planning Council.

6. Transit Development Program - Monitoring and Implementation

Objective: The objective of this element is to monitor and revise the Columbia Transit Development Program (TDP) and to identify projects that should be included in the Columbia TIP.

Previous Work: A major update of the Columbia Transit Development Program was completed during 1976.

Methodology: Transit planning assistance is provided to Columbia's private transit operator. Data collected from the transit surveillance element will be analyzed. The TDP will be revised as needed. Through contacts with the management of the private transit operator, projects that should be included in the Columb TIP will be identified.

Products: The Columbia Transit Development Program will be maintained and programmed for implementation.

Staffing: Staff of the Regional Planning Council.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost FY 80 |
|---|---|---|
| Local (CMRPC) | 20% | $ 450 |
| Federal (UMTA) | 80% | 1,800 |
| | | $2,250 |

Functional Agency Responsibility: Regional Planning Council

7. Impacts of TSM Planning on Air Quality

Objective: The objective of this element is to develop and maintain a transportation control plan to improve air quality in the Columbia area.

Previous Work: Various TSM studies have been completed and are in various stages of implementation.

Methodology: Preliminary analysis will be performed on the following alternative measures of reducing air pollution: inspection/maintenance, vapor recovery, improved public transit, exclusive bus and carpool lanes, area wide carpool programs, private car restrictions, long range transit improvements, on street parking controls, park and ride and fringe parking lots, pedestrian malls, employer programs to encourage car and van pooling, mass transit, bicycling and walking, bicycle lanes and storage facilities, staggered work hours, road pricing to discourage single occupancy auto trips, controls on extended vehicle idling, traffic flow improvements, alternative fuels or engines and other fleet vehicle controls, other than light duty vehicle retrofit, and extreme cold start emission reduction programs. A more detailed analysis will be performed on selected alternatives. Improvements in air quality and travel and the economic effects of each alternative will be analyzed.

Products: A transportation control plan for the Columbia non-attainment area will be developed and documented in a report. Decisions to reject or select certain alternatives will be explained.

Staffing: Staffs of the Regional Planning Council, South Carolina Department of Highways and Public Transportation and South Carolina Department of Health and Environmental Control.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 0 | 0 | 0 | NA |
| Federal (EPA) | 100% | $15,000 | $15,000 | NA |
| State (SCDHPT) | 22% | 220 | 220 | NA |
| Federal (FHWA-HPR) | 78% | 880 | 880 | NA |
| | | $16,100 | $16,100 | |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | 0 | 0 | 0 |
| Federal (FHWA- | $30,000 | $15,000 | $15,000 |
| State (SCDHPT) | 440 | 220 | 220 |
| Federal (FHWA-HPR) | 1,560 | 880 | 880 |
| | $32,000 | $16,100 | $16,100 |

Functional Agency Responsibility: Regional Planning Council, South Carolina Department of Highways and Public Transportation

E. Major Plan Evaluation and Update - The current long-range transportatio planning program for the Columbia Metropolitan Area was initiated in 1964 with the development of the COATS plan. The first major update of that plan was completed in 1973. Another major update is presently being completed. Continued efforts in reviewing and updating these plans are necessary to reflect changing attitudes and transportation plan implementation constraints.

1. Corridor Studies

Objective: The objective of this element is to provide transportation decision makers with recommendations concerning major transportation corridors within the Columbia area. Corridors that have been identified by the COATS update or the Columbia Area Public Transportation Plan as having a potential deficiency in travel capacity and those that have recommended highway facilities that appear to be unfeasible to construct will need detailed study.

Previous Work: The East-West Corridor Study was completed in December of 1976.

Methodology: A Study Design will be developed for each study.

Products: A report documenting all findings and recommendations will be produced for each study.

Staffing: The study staff may vary with each corridor study. In some cases a consultant will be utilized in other cases the staff of the Regional Planning Council and the South Carolina Department of Highways and Public Transportation will be responsible for the work.

Financial Responsibility and Scheduling:

No activity at this time.

Functional Agency Responsibility: South Carolina Department of Highways and Public Transportation and the Regional Planning Council.

2. Major Update:

2.1 Highway Plan

Objective: The objective of this item is to complete a major transportation plan update for the design year 2000, and to develop the capability for making intermediate year travel projections and traffic assignments.

Previous Work: A 1985 plan was published in 1966 and an updated 1995 plan was published in 1973. A study design for the current update has been developed.

Methodology: The approved study design (see appendix) details the methodology and staffing that the COATS update is following. It is estimated that the update can be completed during the first part of CY 79. Two work tasks will probably need to be completed in CY 79. These work tasks are as follows:

9. Plan Finalization and Refinement

10. Preparation and Printing of Final Reports

Products: An updated transportation plan, that has been examined for best utilization of highways and mass transportation, and based on new land use and socio economic projections and realistic funding estimates. In addition, the added capability for shorter-range traffic analysis for assistance in program evaluation and system management will be realized. A plan definition package will be prepared.

Staffing: Staff of the South Carolina State Department of Highways and Public Transportation and the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | 1,260 | 0 | 0 |
| Federal (FHWA-PL) | 80% | 5,040 | 0 | 0 |
| State (SCDHPT) | 22% | 1,850 | 0 | 0 |
| Federal (FHWA-HPR) | 78% | 6,550 | 0 | 0 |
| Local (CMRPC) | 20% | 0 | 0 | 0 |
| Federal (UMTA) | 80% | 0 | 0 | 0 |
| | | $14,700 | | |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | 1,260 | 1,260 | 0 |
| Federal (FHWA-PL) | 5,040 | 5,040 | 0 |
| State (SCDHPT) | 1,850 | 1,850 | 0 |
| Federal (FHWA-HPR) | 6,550 | 6,550 | 0 |
| Local (CMRPC) | 0 | 0 | 0 |
| Federal (UMTA) | 0 | 0 | 0 |
| | $14,700 | $14,700 | |

Functional Agency Responsibility: South Carolina State Department of Highways and Public Transportation and Regional Planning Council.

## 2.2 Transit Plan

Objective: The objective of this element is to develop a long-range transit program that is coordinated with the long-range highway plan for the Columbia area. Utilizing transit and other high occupancy vehicles in overloaded corridors where additional highway capacity cannot be obtained.

Previous Work: The Columbia Area Public Transportation Plan (1972) recommended several route changes, improved physical facilities, and a Transportation Center Complex. This plan was updated in 1976.

Methodology: This element will be performed as a work task of the COATS update. See appendix for Study Design. Work Task 3, Analysis of Auto Trip Diversion Techniques and Work Task 7, Plan Development and Testing will provide the base for the Development of the transit portion of the COATS updated Transportation Plan for the year 2000.

Products: An updated transportation plan, that has been examined for best utilization of highways and mass transportation, and based on new land use and socio-economic projections and realistic funding estimates. In addition, the added capability for shorter range traffic analysis for assistance in program evaluation and system management will be realized. Reports documenting this process will be prepared as needed.

Staffing: Staff of the Regional Planning Council will be utilized.

Financial Responsibility and Scheduling:

It is anticipated that this work element will be completed during CY 78.

Functional Agency Responsibility: Regional Planning Council

## 2.3 Airport Plan

Objective: The objectives of this element are to update the Master Plan to reflect recent levels of operation and access plans and to establish guidelines for the local communities pertaining to land use in the clearance zones and to building construction.

Previous Work: A Regional Airport Systems Plan was completed for the Central Midlands Region in 1971. It recommended that a system of reliever airports be constructed in the Columbia vicinity to preserve the investment in the Columbia Metropolitan Airport. In 1974 a study to locate potential reliever airport sites was begun and it included a master plan. Also, the State of South Carolina has updated the State Airport Systems Plan. The Airport Layout Plan for the Metropolitan Airport was completed in September 1970. Since that time, the level of operation has increased substantially and the highway plan for ground access to the airport has been updated.

Methodology: Passenger and cargo forecasts will be updated and based on the latest state and regional economic projections. Noise contours near the airport will be developed and vertical clearance zones will be related to compatible land uses.

Products: A published report will be produced with recommendations for development of and scheduling of implementation.

Staffing: A consultant will be utilized as well as staff assistance from the staff of Columbia Metropolitan Airport.

Financial Responsibility and Scheduling:

| Source of Funds | Ratio | Cost CY 78-80 | CY 79* | FY 80* |
|---|---|---|---|---|
| Local (RLAC) | 20% | $51,200 | $17,067 | $17,067 |
| Federal (FAA) | 80% | 204,800 | 68,267 | 68,267 |
| | | $256,000 | $85,334 | $85,334 |

Functional Agency Responsibility: Richland-Lexington Airport Commission/ Richland Lexington Airport District

* Estimate

3. Air Quality Impact of the Transportation Plan

Objective: The objective of this element is to assess the impact of the Recommended Transportation Plan for the year 2000 on air quality of the Columbia Urban Area.

Previous Work: Air quality analysis was a part of the systems evaluation methodology during the major plan update. A procedure has been previously established by the South Carolina Department of Highways and Public Transportation, the Regional Planning Council and the Bureau of Air Quality Control of the South Carolina Department of Health and Environmental Control for assessing compliance with the State Air Quality Implementation Plan.

Methodology: Available computer programs will be employed to provide estimated future pollution levels on the approved transportation plan. Data will be submitted to the Bureau of Air Quality Control for review. Further analysis will be conducted in accordance with FHWA and EPA directives.

Products: Air Quality data for the Recommended Plan will be included in documentation reports. The Bureau of Air Quality Control will make a determination as to plan compliance, to be approved by the Policy Committee.

Staffing: Staff of the South Carolina Department of Highways and Public Transportation.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost CY 79 | Cost FY 79 | FY 80 |
|---|---|---|---|---|
| State (SCDHPT) | 22% | $ 440 | $ 220 | [illegible] |
| Federal (FHWA-HPR) | 78% | 1,560 | 780 | [illegible] |
| | | $2,000 | $1,000 | |

Functional Agency Responsibility: South Carolina Department of Highways and Public Transportation.

F. Maintenance, Evaluation and Programming of the Transportation Plan - Columbia's rapid development renders even more important the vigorous structuring of public spending and implementation. Characteristically, the needs for transportation improvements far exceed the community's capability of meeting that need. Therefore, careful planning is eminently more important to insure that funds are expended in the most necessary areas first without unduly ignoring lessor priorities.

1. Minor Revision, Maintenance and Annual Review of the Transportation Plan

Objective: The objective of this element is to maintain the COATS transportation plan and ensure its acceptance and viability among local decision makers.

Previous Work: In the past minor revisions to the COATS plan have been documented. The COATS plan network has been kept up to date. The COATS Policy Committee annually reviews the COATS plan.

Methodology: A definition package for the COATS updated plan will be modified as needed. Minor changes to the plan will be evaluated and decisions documented. Each year the COATS Advisory and Policy Committees will be provided a status report on the transportation plan and the committee will be asked to annually affirm the COATS plan.

Products: A plan definition package will be available. Files documenting minor plan evaluations will be maintained. An annual certification of the COATS plan will be provided by the COATS Policy Committee.

Staffing: Staff of the Regional Planning Council and the South Carolina Department of Highways and Public Transportation will be utilized.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | $ 200 | $ 200 | $ 200 |
| Federal (FHWA-PL) | 80% | 800 | 800 | 800 |
| State (SCDHPT) | 22% | 220 | 220 | NA |
| Federal (FHWA-HPR) | 78% | 780 | 780 | NA |
| | | $2,000 | $2,000 | $1,000 |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | $ 400 | $ 200 | $ 400 |
| Federal (FHWA-PL) | 1,600 | 800 | 1,600 |
| State (SCDHPT) | 440 | 220 | 220 |
| Federal (FHWA-HPR) | 1,560 | 780 | 780 |
| | $4,000 | $2,000 | $3,000 |

Functional Agency Responsibility: Regional Planning Council and South Carolina Department of Highways and Public Transportation.

2. Transportation Improvement Program (TIP)

Objective: The objective of this element is to update the capital improvement program for both highway construction and transit improvements.

Previous Work: The six-year Transportation Improvement Program including an Annual Element was updated during the previous year.

Methodology: Priorities will be reviewed and information compiled on anticipated revenues during the six year period.

Products: A program will be prepared including highway and transit improvements. This will include a detailed Annual Element.

Staffing: Staffs of the Regional Planning Council, South Carolina Department of Highways and Public Transportation and the transit operator.

Financial Responsibility and Scheduling:

| Source of Funds | Funding Ratio | Cost 1/79-6/79 | 7/79-12/79 | 1/80-6/80 |
|---|---|---|---|---|
| Local (CMRPC) | 20% | $ 280 | $ 280 | $ 280 |
| Federal (FHWA-PL) | 80% | 1,120 | 1,120 | 1,120 |
| State (SCDHPT) | 22% | 330 | 330 | NA |
| Federal (FHWA-HPR) | 78% | 1,170 | 1,170 | NA |
| Local (CMRPC) | 20% | 280 | 280 | 280 |
| Federal (UMTA) | 80% | 1,120 | 1,120 | 1,120 |
| | | $4,300 | $4,300 | $2,800 |

| | CY 79 Total | FY 79 Total | FY 80 Total |
|---|---|---|---|
| Local (CMRPC) | $ 560 | $ 280 | $ 560 |
| Federal (FHWA-PL) | 2,240 | 1,120 | 2,240 |
| State (SCDHPT) | 660 | 330 | 330 |
| Federal (FHWA-HPR) | 2,340 | 1,170 | 1,170 |
| Local (CMRPC) | 560 | 280 | 560 |
| Federal (UMTA) | 2,240 | 1,120 | 2,240 |
| | $8,600 | $4,300 | $7,100 |

Functional Agency Responsibility: Regional Planning Council and South Carolina Department of Highways and Public Transportation.

IV PROPOSED BUDGET
PROPOSED FUNDING SOURCES
$000 - 1979 Calendar Year Totals
$(000) - 1980 Fiscal Year Totals

| TASK | FHWA HPR(1)/SLS | | FHWA PL (2)/SLS | | UMTA/SLS | | FAA(3)/SLS | | OTHER FEDERAL/SLS | | LOCAL | TOTAL/SLS | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-1 | 5,150 (2,575) | 1,450 (725) | 4,000 (4,000) | 1,000 (1,000) | 3,600 (4,000) | 900 (1,000) | | | | | | 12,750 / 3,350 (10,575)/(2,725) | 16,100 (13,300 |
| A-2 | | | 3,200 (3,200) | 800 (800) | 4,800 (3,200) | 1,200 (800) | | | | | | 8,000 / 2,000 (6,400)/(1,600) | 10,000 (8,000 |
| B-1 | 6,240 (3,120) | 1,760 (880) | 1,600 (1,600) | 400 (400) | | | | | | | | 7,840 / 2,160 (4,720)/ (1,280 | 10,000 (6,000 |
| B-2 | | | | | 800 (1,600) | 200 (400) | | | | | | 800 / 200 (1,600)/ (400) | 1,000 (2,000 |
| B-3 | | | | | | | 0 (0) | 0 (0) | | | | NA | NA |
| C-1 | | | | | | | | | 0 (0) | 0 (0) | | NA | NA |
| C-2 | | | | | | | | | 0 (0) | 0 (0) | | NA | NA |
| C-3 | | | 5,600 (5,600) | 1,400 (1,400) | | | | | | | | 5,600 / 1,400 (5,600)/(1,400) | 7,000 (7,000) |
| C-4 | | | | | | | | | 8,000 (8,000) | 4,000 (4,000) | | 8,000 / 4,000 (8,000)/(4,000) | 12,000 (12,000) |
| C-5 | | | | | | | | | 0 (0) | 9,800 (9,800) | | 0 / 9,800 (0) /(9,800) | 9,800 (9,800) |

A-1 = Management of Work Program
A-2 = Printing Reports
B-1 = Highway Surveillance
B-2 = High Occupancy Vehicle (HOV) Surveillance
B-3 = Air Travel Surveillance
C-1 = Base Mapping
C-2 = Update Geographic Base File
C-3 = Socio-Economic Surveillance
C-4 = Housing Market Surveillance
C-5 = Air Quality Surveillance

## IV PROPOSED BUDGET (Cont'd.)

| TASK | FHWA HPR(1)/SLS | | FHWA PL (2)/SLS | | UMTA/SLS | | FAA(3)/SLS | OTHER FEDERAL/SLS | | LOCAL | TOTAL/SLS | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D-1 | 780<br>(390) | 220<br>(110) | 11,200<br>(5,600) | 2,800<br>(1,400) | | | | | | | 11,980 / 3,020<br>(5,990)/(1,510) | 15,000<br>(7,500) |
| D-2 | | | 0<br>(7,200) | 0<br>(1,800) | 0<br>(7,200) | 0<br>(1,800) | | 25,000<br>(10,000) | 6,666<br>(3,333) | | 25,000 / 6,666<br>(24,400)/(6,933) | 31,666<br>(31,333) |
| D-3 | | | | | 12,000<br>(24,000) | 3,000<br>(6,000) | | | | | 12,000 / 3,000<br>(24,000)/(6,000) | 15,000<br>(30,000) |
| D-4 | 2,340<br>(1,170) | 660<br>(330) | 4,000<br>(4,000) | 1,000<br>(1,000) | | | | | | | 6,340 / 1,660<br>(5,170)/(1,330) | 8,000<br>(6,500) |
| D-5 | | | | | 6,160<br>(6,160) | 1,540<br>(1,540) | | | | | 6,160 / 1,540<br>(6,160)/(1,540) | 7,700<br>(7,700) |
| D-6 | | | | | 0<br>(1,800) | 0<br>(450) | | | | | 0 / 0<br>(1,800)/ (450) | 0<br>(2,250) |
| D-7 | 1,560<br>(880) | 440<br>(220) | | | | | | 30,000<br>(15,000) | 0<br>(0) | | 31,560 / 440<br>(15,880)/ (220) | 32,000<br>(16,100) |
| E-1 | | | | | | | | | | | NA | NA |
| E-2.1 | 6,550<br>(0) | 1,850<br>(0) | 5,040<br>(0) | 1,260<br>(0) | | | | | | | 11,590 / 3,110<br>(0) | 14,700<br>(0) |
| E-2.2 | | | | | | | | | | | NA | NA |

D-1 = Bikeway Plan
D-2 = Carpool/Vanpool Planning & Implementation
D-3 = Management Alternatives Study for Mass Transportation Service in the Columbia Area
D-4 = Traffic Operation Studies
D-5 = Coordination Transportation Service to the Elderly and Handicapped
D-6 = Transit Development Program
D-7 = Impact of TSM Planning on Air Quality
E-1 = Corridor Studies
E-2.1 = Highway Plan
E-2.2 = Transit Plan

## IV PROPOSED BUDGET (Cont'd.)

| TASK | FHWA HPR(1)/SLS | | FHWA PL (2)/SLS | | UMTA/SLS | | FAA(3)/SLS | | OTHER FEDERAL/SLS | | LOCAL | TOTAL/SLS | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E-2.3 | | | | | | | 68,267 (68,267) | 17,067 (17,067) | | | | 68,267 / 17,067 (68,267)/(17,067) | 85,334 (85,334) |
| E-3 | 1,560 (0) | 440 (0) | | | | | | | | | | 1,560 / 440 (0) | 2,000 (0) |
| F-1 | 1,560 (780) | 440 (220) | 1,600 (1,600) | 400 (400) | | | | | | | | 3,160 / 840 (2,380)/ (620) | 4,000 (3,000) |
| F-2 | 2,340 (1,170) | 660 (330) | 2,240 (2,240) | 560 (560) | 2,240 (2,240) | 560 (560) | | | | | | 6,820 / 1,780 (5,650)/ (1,450) | 8,600 (7,100) |
| Total | 28,080 (10,085) | 7,920 (2,815) | 38,480 (35,040) | 9,620 (8,760) | 29,600 (50,200) | 7,400 (12,550) | 68,267 (68,267) | 17,067 (17,067) | 63,000 (33,000) | 20,466 (17,133) | | 227,427 / 62,473 (196,592)/(58,325) | |
| Grand | 36,000 (12,900) | | 48,100 (43,800) | | 37,000 (62,750) | | 85,334 (85,334) | | 83,466 (50,133) | | 0 (0) | 289,900 (254,917) | |

E-2.3 = Airport Plan
E-3 = Air Quality Impact of the Transportation Plan
F-1 = Minor Revision, Maintenance and Annual Review of the Transportation Plan
F-2 = Transportation Improvement Program (TIP)

V PROPOSED AGENCY PARTICIPATION
$000 - 1979 Calendar Year Totals
($000) - 1980 Fiscal Year Totals

| Tasks | CMRPC(1) | SCDHPT(2) | DHEC(3) | Consultants | Totals |
|---|---|---|---|---|---|
| A-1 | 9,500<br>(10,000) | 6,600<br>(3,300) | | | 16,100<br>(13,300) |
| A-2 | 10,000<br>(8,000) | | | | 10,000<br>(8,000) |
| B-1 | 2,000<br>(2,000) | 8,000<br>(4,000) | | | 10,000<br>6,000 |
| B-2 | 1,000<br>(2,000) | | | | 100<br>(200) |
| B-3 | | | | | 0<br>(0) |
| C-1 | | | | | 0<br>(0) |
| C-2 | | | | | 0<br>(0) |
| C-3 | 7,000<br>(7,000) | | | | 7,000<br>(7,000) |
| C-4 | 12,000<br>(12,000) | | | | 12,000<br>(12,000) |
| C-5 | | | 9,800<br>(9,800) | | 9,800<br>(9,800) |
| D-1 | 14,000<br>(7,000) | 1,000<br>(500) | | | 15,000<br>(7,500) |
| D-2 | 31,666<br>(31,333) | | | | 31,666<br>(31,333) |
| D-3 | | | | 15,000<br>30,000 | 15,000<br>30,000 |
| D-4 | 5,000<br>(5,000) | 3,000<br>(1,500) | | | 8,000<br>(6,500) |
| D-5 | 7,700<br>(7,700) | | | | 7,700<br>(7,700) |
| D-6 | 0<br>(2,250) | | | | 0<br>(2,250) |
| D-7 | 30,000<br>15,000 | 2,000<br>(1,100) | | | 32,000<br>(16,100) |

## V PROPOSED AGENCY PARTICIPATION (Cont'd)

| Tasks | CMRPC(1) | SCDHPT(2) | DHEC(3) | Consultants | Totals |
|---|---|---|---|---|---|
| E-1 | | | | | 0<br>(0) |
| E-2.1 | 6,300<br>(0) | 8,400<br>(0) | | | 14,700<br>(0) |
| E-2.2 | | | | | 0<br>(0) |
| E-2.3 | | | | 85,334<br>(85,334) | 85,334<br>(85,334) |
| E-3 | | 2,000<br>(0) | | | 2,000<br>(0) |
| F-1 | 2,000<br>(2,000) | 2,000<br>(1,000) | | | 4,000<br>(3,000) |
| F-2 | 5,600<br>(5,600) | 3,000<br>(1,500) | | | 8,600<br>(7,100) |
| Totals | 143,766<br>(116,883) | 36,000<br>(12,900) | 9,800<br>(9,800) | 100,334<br>(115,334) | 289,900<br>(254,917) |

(1) Central Midlands Regional Planning Council (designated MPO)
(2) South Carolina Department of Highways and Public Transportation
(3) South Carolina Department of Health and Environmental Control

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# C O A T S

## Study Update Design

Central Midlands Regional
Planning Council
and
South Carolina Highway Department

January, 1977

STUDY UPDATE DESIGN

## I INTRODUCTION

The Columbia Area Transportation Study (COATS) is a program of comprehensive continuing transportation planning for the Columbia urban area conducted cooperatively by the South Carolina Highway Department and Central Midlands Regional Planning Council. COATS was begun in 1964, and the original study report released in 1966. An update of the study, including an expansion of the study area, redefinition of traffic zones and synthetic generation of new base year trips, was conducted and released in September 1973.

Traffic growth and land use changes have been regularly monitored through the annual surveillance process. Implementation of the recommended plan has proceeded with some degree of success. Recent reductions in funding levels, coupled with inflated construction costs, have placed urban transportation plans in serious difficulty, particularly with regard to the building of major new facilities.

Thus the continuing aspect of the urban transportation planning process takes on even greater significance. The ability of the process to react positively to this sort of rapid and drastic change will reflect the degree of commitment of the participating agencies to planning as an important tool for resource allocation. The study update which is proposed in this document will attempt to respond to the travel needs of the urban community while facing the reality of severe funding limitations and rising costs. The study update will also place emphasis upon intermediate range travel projections for program evaluation, as well as a systems management plan for short-range elements of the overall plan.

## II ORGANIZATION

This update will include the same geographical area as the previous update, which was expanded from the original COATS effort. This area encompasses approximately 750 square miles in Richland and Lexington counties, including the cities of Columbia, West Columbia, Cayce, Forest Acres and Lexington. The estimated population of this area is in excess of 350,000.

The formal agreement between the South Carolina State Highway Department and the Central Midlands Regional Planning Council establishes COATS as a comprehensive, cooperative and continuing transportation study. The Advance Planning Section of the Highway Department and the staff of the Planning Council serve as primary participants in the transportation study. The Planning Council serves as the A-95 agency for the central midlands region.

The Central Midlands Regional Planning Council, consisting of both elected and appointed officials from throughout the region, serves as the COATS Policy Committee. It is charged with the overall responsibility for review and approval of the study and all plans and programs which are developed by the study.

The Advisory Committee is currently being restructured to provide not only broad representation from the urban area but also local representation at the neighborhood level. Forty members will be appointed to this committee, thirty-four of these from specific sectors of the urban area and six at large. The thirty-four members representing sectors of the area will be appointed from recommendations made by the local governments. Local interest and citizen involvement in each sector will be provided by an expanded subcommittee. The Advisory Committee will submit reports and recommendations to the Policy Committee.

An inter-disciplinary study team will provide technical expertise and input for the study. This team will be composed of various sections of the Highway Department and the Planning Council. The study team will monitor and review the progress of the study and report on a regular basis to the Advisory Committee.

## III OBJECTIVES

1. A transportation system which effectively serves the needs of the traveling public.
2. A system which offers a transportation option, insofar as is practicable, to the citizens of the COATS area.
3. Minimize the adverse social, cultural and environmental impacts of the transportation system, while maximizing the positive benefits of the system to the community and its environment.
4. Involvement of the local citizen in all phases of the planning process, giving input into the development of the system as well as reaction to system evaluation and impact analysis.
5. A system which is projected to be economically feasible in terms of funding expectations for the next 20 years. This does not rule out longer range elements which are deemed needed but which are presently out of financial range.
6. Maximize use of existing system through more efficient transportation systems management techniques, with appropriate emphasis on short-range, low-cost improvements.
7. Make the plan truly comprehensive by incorporating transit and para-transit considerations.
8. Develop the capability for intermediate range traffic assignments to assist in program evaluation and analysis of the impact of partial system implementation.

## IV WORK ELEMENTS

1. Traffic Models - The trip generation and trip distribution models which were redeveloped during the previous update will be used in this phase of the study. A new base year (1976) trip table will be developed (either from new socio-economic data and existing models or from 1969 trip table factored on the basis of count histories). Some adjustments to models will be made if indicated through comparisons with traffic counts. The Highway Department will be primarily responsible for model application.

2. Assignment of 1976 Trips - The newly developed 1976 trip table will be assigned to the existing transportation network. This assignment will be evaluated to determine the accuracy of the models and the techniques used in developing the trip table. This evaluation will involve comparison of assigned volumes with traffic counts, screenline and cutline comparisons and VMT comparisons. If indicated by this evaluation, adjustments will be made to improve the level of accuracy. The Highway Department will be primarily responsible for the traffic assignment and analysis.

3. Analysis of Auto Trip Diversion Techniques - During plan development and testing, estimates of potential diversion of trips from autos will be made. These estimates will be developed from published information as well as local data currently available. There are numerous methods available to decrease the number of automobiles currently using Columbia area streets (especially during peak hours). Carpooling programs, transit development, staggered work hours and parking policies along with other promising methods will be evaluated. Once these methods have been evaluated, the projected reduction of year 2000 auto trips will be estimated. The methods used to reduce auto trips must have a reasonable chance of implementation and the recommended implementation procedures must be

fully documented. The Planning Council and the Highway Department will share responsibility for analysis of trip diversion techniques.

4. Development of Future (2000) Land Use - Using existing information and socio-economic projections, policies addressing long term issues with respect to the physical development of the area will be prepared. These policies will consider social, economic and environmental impacts and be coordinated with existing state and local government policies or functional plans. Using citizen participation in the form of an advisory committee, the policies will be interpreted into a future land use plan. The Planning Council will be primarily responsible for development of future land use.

5. Socio-Economic Projections - Using 1976 as the base year, socio-economic projections will be developed on a five year basis beginning in 1980 and ending in the year 2000. The following eight socio-economic variables will be projected by census tract for the COATS study area: population, number of dwelling units, labor force, employment, retail sales, automobile registration, school enrollment and enrollment at the University of South Carolina. Data for the year 2000 will be refined to the traffic zone level. A list of potential sources for the raw data would include: the South Carolina Highway Department, Employment Security Commission, Dunn and Bradstreet, Richland County school districts, Lexington County school districts, the University of South Carolina, Southern Bell Telephone Company and the South Carolina Electric and Gas Company. The Planning Council will be primarily responsible for socio-economic projections.

6. Development of Future (2000) Trip Table - Using socio-economic projections developed by the Planning Council, future year trip ends will be generated and distributed to form a trip table. Careful analysis at the district level will be used to evaluate the reasonableness of trip end totals through comparisons with current estimates and 1995 projections in current use. The Highway Department will be primarily responsible for the future traffic assignment and analysis.

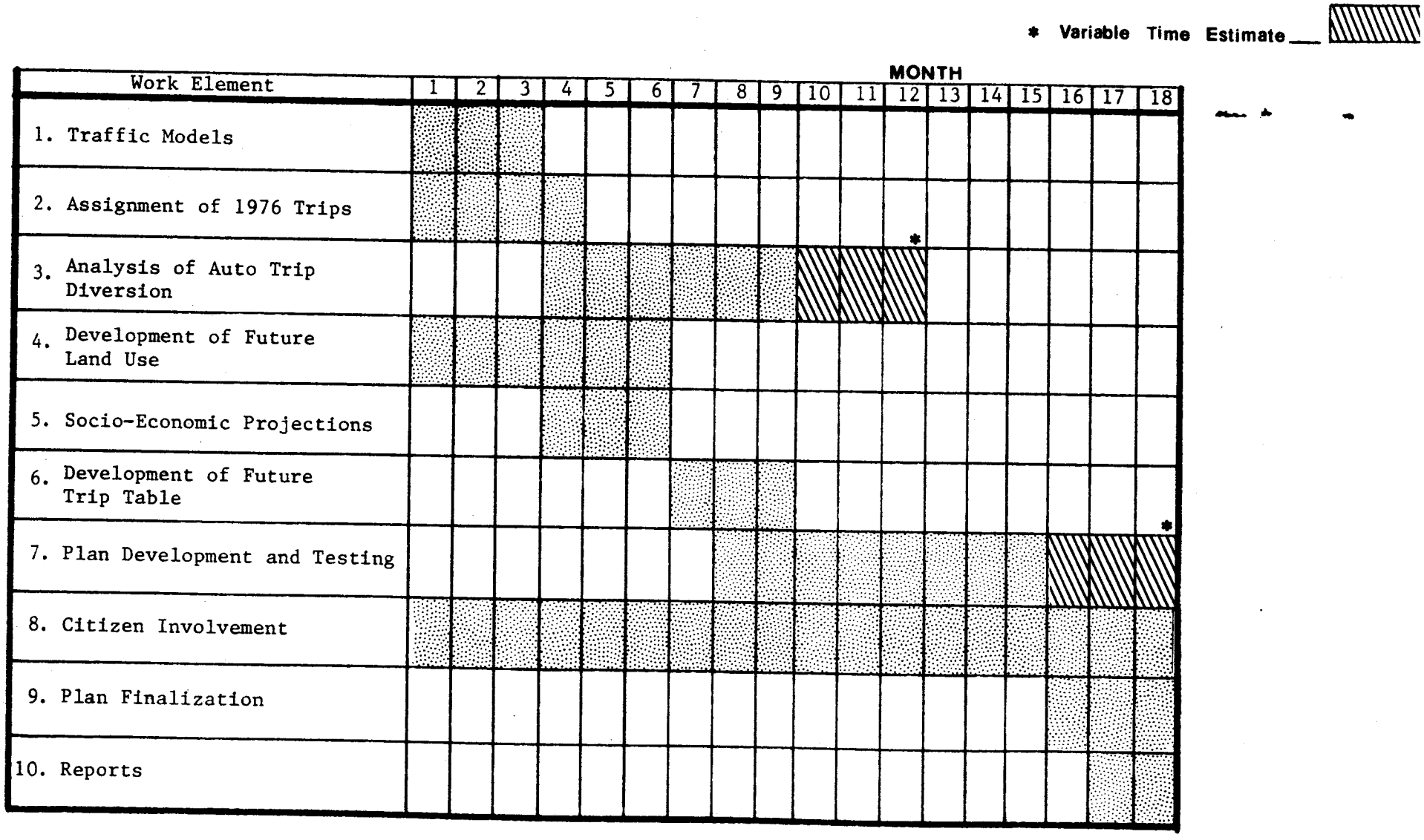
7. Plan Development and Testing - Using the future year trip table, traffic assignments will be made to the existing plus committed street and highway system and the approved transportation plan. On the basis of this analysis, further systems will be developed and tested. Estimates of potential transit diversion will be made in order to properly include transit alternatives in the test systems. These tests will be analyzed and evaluated on the basis of cost, traffic service, community impact, and compatibility with projected community development concepts. A part of the evaluation of each system will include a statement of transportation policy alternatives which must be implemented as a part of the plan. Input will be sought from COATS Study Team and Advisory Committee in both development and evaluation of systems. The Highway Department will be primarily responsible for the traffic assignment phase of systems testing, with both Highway Department and Planning Council sharing the responsibility for transit diversion as well as analysis and evaluation.

8. Citizen Involvement - Throughout the update, efforts will be made to achieve the involvement of citizens in the planning process. Citizen input will be sought in the development of alternate systems as well as in reaction to system evaluation. Efforts to achieve this will be made through the committee structure and by soliciting the cooperation of local political, governmental and civic leaders. The Planning Council and Highway Department will be responsible for the citizen involvement program.

9. Plan Finalization and Refinement - When a concept plan has been deemed acceptable by the COATS Committees, governmental units and participating agencies, the plan will be further refined as to specific recommendations for major new and improved facilities, short-range improvements, air quality analysis, and cost estimates. The Highway Department will be primarily responsible for plan refinement.

10. Reports • A report will be published for general distribution containing the updated plan, with explanation of its key elements and cost estimates. A technical report, documenting the procedures employed and detailing the analysis of test systems, will be prepared for limited distribution. The Highway Department and the Planning Council will be responsible for report preparation and publication.

## V. Schedule


* Variable Time Estimate
MONTH
Work Element
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
1. Traffic Models
2. Assignment of 1976 Trips
3. Analysis of Auto Trip Diversion
4. Development of Future Land Use
5. Socio-Economic Projections
6. Development of Future Trip Table
7. Plan Development and Testing
8. Citizen Involvement
9. Plan Finalization
10. Reports

ATTACHMENT 3

SCHEDULE FOR ANALYZING THE TRANSPORTATION CONTROL STRATEGIES FOR THE RICHLAND/LEXINGTON, S.C. NON-ATTAINMENT AREA*

| | Analysis of Air Quality Benefits | |
|---|---|---|
| Control Strategy | Responsible Agency | Expected Completion Date |
| Inspection/Maintenance Program | S.C.D.H.P.T. | Complete |
| Vapor Recovery | S.C.D.H.E.C. | July 1, 1979 |
| Carpool/Vanpool Program | CMRPC | June, 1979 |
| Flextime Program | CMRPC | June, 1979 |
| Private car restrictions; on street parking controls; pedestrian malls; road pricing to discourage single occupancy auto trips | CMRPC | September, 1979 |
| Alternative fuels or engines and other fleet vehicle controls | CMRPC | December, 1979 |
| Employer programs to encourage car, vanpooling, mass transit, bicycling and walking; exclusive bus and carpool lanes; park and ride and fringe parking lots | CMRPC | March, 1980 |
| Bicycle lanes and storage facilities | CMRPC | March, 1980 |
| Controls on extended vehicle idling | CMRPC | May, 1980 |
| Improved public transit; and long-range transit improvements | CMRPC | June, 1980 |
| Traffic flow improvements | CMRPC | June, 1980 |
| Other than light duty vehicle retrofit | S.C.D.H.P.T. | June, 1980 |
| Extreme Cold Start Emission Reduction Programs | Not applicable to Columbia's climate | |

* The level of analysis will depend on the availability of funding and the expeditious publication by EPA of evaluation methodology.

ATTACHMENT 4

# The Citizen Involvement Process For The Columbia Area Transportation Study Update

Technical Memorandum I

March 1978

Prepared By

Central Midlands Regional Planning Council

In Cooperation With

The South Carolina Department Of Highways And Public Transportation

And

The United States Department Of Transportation

March 1978

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# THE CITIZEN INVOLVEMENT PROCESS FOR THE COLUMBIA AREA TRANSPORTATION STUDY UPDATE

Technical Memorandum I

March 1978

## Introduction

The general public, through increased awareness of transportation impacts on the environment and community, demands a greater degree of participation in the transportation planning process. The future implementation of urban area transportation plans depends, in part, on the "success" of the community involvement program. For this reason the work program for the Columbia Area Transportation Study (COATS) Update contains an extensive citizen participation program.

The goals of the COATS citizen involvement program are as follows:

1. Provide information to the public
2. Obtain information and feedback from the public
3. Ensure that changing community goals, values and lifestyles are continually monitored
4. Establish trust and credibility for the COATS process

This technical memorandum is designed to document the first phase of citizen involvement for the COATS Update.

## Selecting the Appropriate Process for COATS

The public involvement process can be beneficial to the general public, professional planners, and the various committees charged with the responsibility of formulating a recommended transportation plan for the Columbia metropolitan area. The public gains an opportunity for receiving convenient, early information; for expressing their viewpoints and comments; for learning something of the evaluation, decision and design process; and for learning that the professionals can be

sincere, responsive, sensitive people who are trying to do a difficult job with the public's interest in mind. The professional planners benefit because they must do a more thorough preparation and analysis of alternatives in order to be responsive to comments; furthermore, it permits the professional to become more sensitive to local conditions and attitudes. The members of the various COATS committees gain valuable information concerning their community's attitudes toward Columbia's future transportation system. This information is a necessity for the decision maker to make an informed decision concerning the recommended transportation system for Columbia.

There are various techniques that are designed to receive citizen input into the transportation planning process. The technique an area uses will depend on the degree of citizen participation desired. In the case of the Columbia Area Transportation Study, the COATS Policy Committee (the Central Midlands Regional Planning Council Board) approved the COATS Transportation Planning Advisory Committee's suggested format for a citizen participation program. The suggested format would not give veto power to the citizens; however the citizens would be given more than token responsibilities. The citizens are to be used in an advisory and consultative role. The idea is to establish a "give and take" situation for an exchange of ideas, with the COATS Policy Committee retaining control over the final decision. By performing in an informing, consultative role, citizens can and often do ensure that their concerns are being considered. However, it's important to remember that even well designed and structured citizen participation programs can result in a lack of a consensus and disagreement. It's impossible to please everyone ; however, the COATS citizen participation program should ensure the development of a transportation system that will minimize disruptions and still provide adequate transportation service to the citizens of Columbia.

The COATS Transportation Planning Advisory Committee decided that the best method of involving citizens would require holding citizen meetings throughout the COATS area. Since each advisory committee member represents a particular section of the COATS area, the advisory committee decided to group the various sections of the COATS area into seven meeting areas. The following two pages (Figure 1) contain maps outlining these seven areas. The seven areas can be generally described as Downtown, Southeast, Northeast, North, St. Andrews, West Columbia-Cayce and Lexington. The idea was to have each advisory committee member attend the citizen meeting in his or her area and learn first hand the concerns and ideas their neighbors have for the future transportation system of the Columbia metro area.

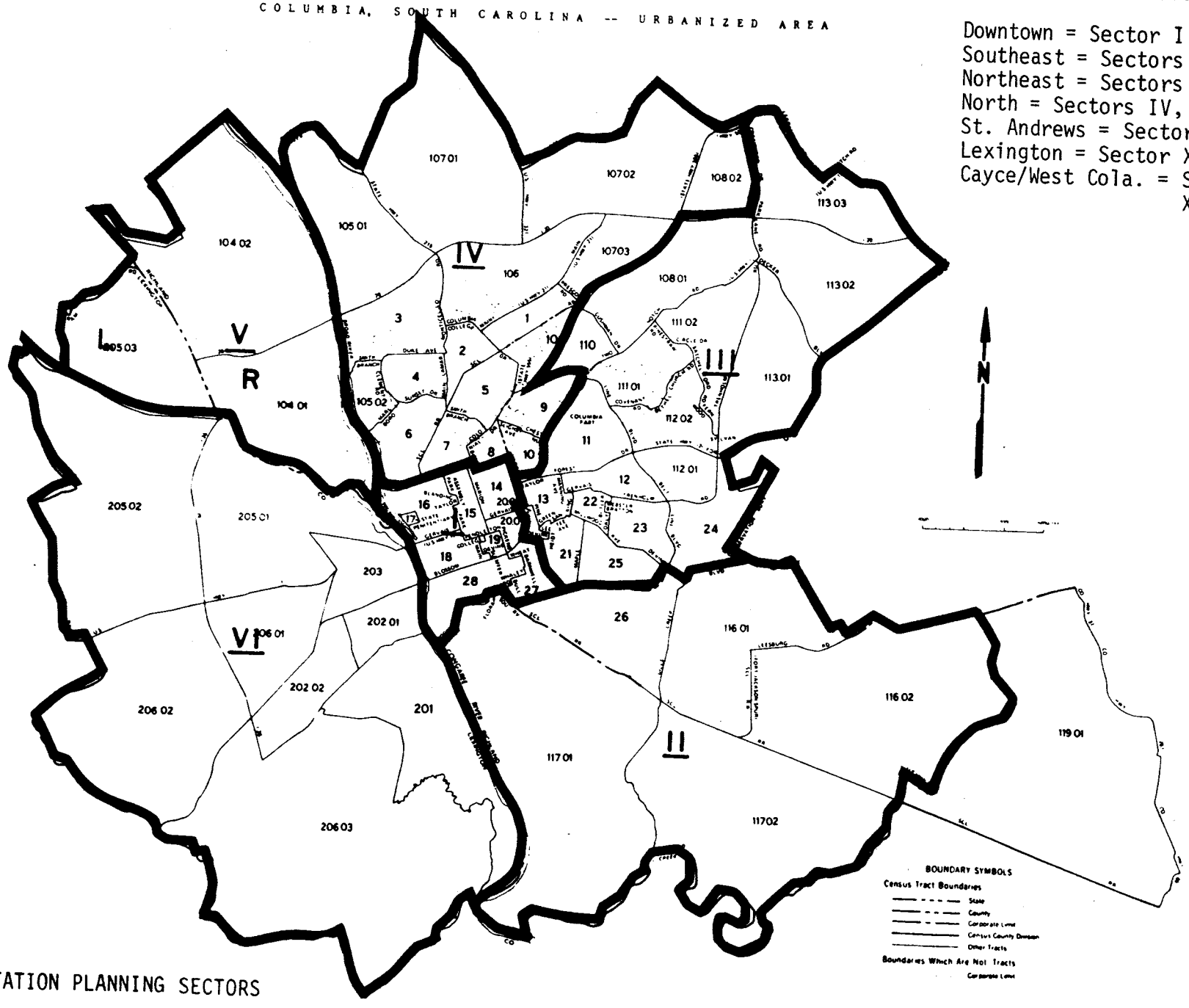
Techniques for the Citizen Meetings

Unfortunately, during most public meetings a great deal of time is spent hearing from government staffs, from engineers or other "authorities" working on a particular project. In other words, most public meetings hear from everyone but the public. The COATS Transportation Planning Advisory Committee evaluated various formats for public meetings and decided that a format used in the East-West Corridor Study for Columbia would be the most successful means of obtaining citizen ideas. A complete discussion of this system is contained in Appendix A of this report.

The most important feature of this system is the ability to break the public into small discussion groups in which each person will feel relaxed. Many citizens will not speak out in a large group and a few citizens wish to dominate the large group with their ideas. When small groups are uitlized each person has the opportunity to speak. Everyone is able to participate and thus a more wide variety of opinions and ideas are expressed. A staff member was present at each small group to record all comments.

Figure 1

COLUMBIA, SOUTH CAROLINA -- URBANIZED AREA




TRANSPORTATION PLANNING SECTORS

## Community Meeting Areas

Downtown = Sector I
Southeast = Sectors II, VII
Northeast = Sectors III, VI
North = Sectors IV, IX
St. Andrews = Sectors V, X
Lexington = Sector XI
Cayce/West Cola. = Sectors XII

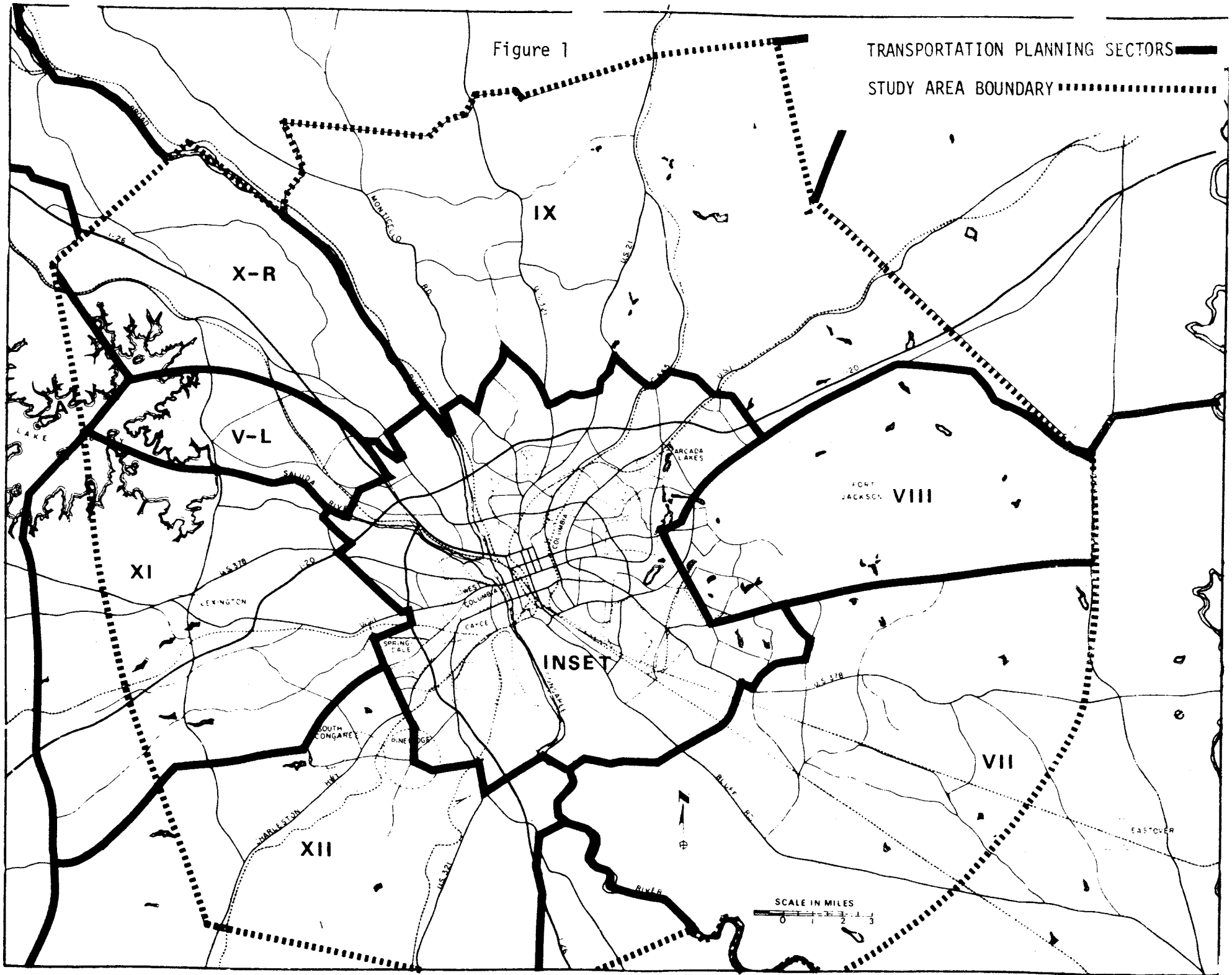

TRANSPORTATION PLANNING SECTORS
STUDY AREA BOUNDARY
IX
X-R
V-L
XI
XII
VII
VIII
INSET
LAKE
SALUDA RIVER
MONTICELLO RD.
U.S. 21
I-26
I-20
U.S. 378
LEXINGTON
WEST COLUMBIA
CAYCE
SPRING DALE
SOUTH CONGAREE
PINEWOOD
CHARLESTON HWY
U.S. 321
ARCADA LAKES
FORT JACKSON
COLUMBIA
CONGAREE
BLUFF RD.
RIVER
EASTOVER
SCALE IN MILES
0 1 2 3

Figure 1

## Sites and Dates of the Initial Citizen Meetings

A meeting site for each sector was chosen on the basis of convenience to a majority of the population within the sector. The meeting site also had to have the facilities to accommodate at least 100 people with sufficient space available to isolate six or seven small discussion groups. Table 1 gives the location, date and attendance of the initial citizen meetings for the COATS update.

TABLE 1

| Sector | Location | Date | Attendance |
|---|---|---|---|
| 1. Cayce-West Columbia | Lexington Co. Hospital Auditorium | Nov. 16, 1977 | 62 |
| 2. Southeast Columbia | Lower Richland High School | Nov. 17, 1977 | 26 |
| 3. Northeast Columbia | Dent Jr. High School | Nov. 28, 1977 | 95 |
| 4. North Columbia | Earlewood Park Community Meeting | Nov. 29, 1977 | 39 |
| 5. St. Andrews area | Seven Oaks Park Gym | Dec. 6, 1977 | 85 |
| 6. Lexington area | Lexington Memorial Building | Dec. 8, 1977 | 34 |
| 7. Downtown Columbia | Columbia Chamber of Commerce | Dec. 12, 1977 | 32 |

## Results of the Initial COATS Update Citizen Meetings

The following sections describe in detail the various ideas, concerns, opinions and complaints received at the initial citizen meetings for the COATS Update. The COATS Transportation Planning Advisory Committee will use the results of these meetings in formulating various transportation system alternatives for the Columbia area.

*Cayce/West Columbia Area* - The Hampton-Meeting Expressway was listed as priority number one by most of the citizens. The bottleneck that has been created at 12th Street and U.S. 1 is becoming a severe problem for this area. In addition, the citizens felt that providing a through connection on 9th Street, south of Meeting Street, would increase the utilization of the Hampton-Meeting Expressway.

The Southeastern Beltway was mentioned as a highly needed facility. It was pointed out that the construction of the Beltway would significantly reduce through truck traffic in the Cayce-West Columbia area. Some citizens mentioned that north-south travel in the Cayce-West Columbia area was very difficult. They suggested that 12th Street and its extension to the Southeastern Beltway would provide additional north-south access, while also providing additional access to the Beltway. They felt that the extension of 12th Street would also spur development in the area south of Cayce.

Several citizens felt that S.C. 215 from the airport to South Congaree should be widened. The Gervais Street bridge was also mentioned as needing improvement and it was suggested that additional lanes could be provided by removing the sidewalks.

The general attitude of the citizens in this area was one of concern that highway improvements for the Cayce-West Columbia area were not taking place fast enough. The citizens felt that this was due to several different reasons. The most frequently mentioned reason was the lack of money. The participants realized that the estimated expense of implementing all the needed highway improvements in the Columbia area far exceeded anticipated highway revenues. Several citizens voiced approval of an increase in the gasoline tax in order to finance a better highway system for the Columbia urban area. Other citizens felt that the Cayce-West Columbia area had been neglected as far as highway priorities were concerned. They felt that too much attention was given to such private developments as Columbia Mall. These citizens wanted to know why highways were not constructed according to COATS priorities.

Realizing the limitations on highway funds, the citizens also suggested low cost, short-range improvements that would aid traffic flow. Flextime, right turn on red, mass transit, auto disincentives, carpooling, elimination of railroad/highway at-grade crossings, reversible lanes and better public education were all

mentioned as possible avenues for improving traffic flow in the Columbia urban area.

When discussing transportation concerns, we sometimes forget that improvements can be very disruptive to citizens in the area. Several citizens in attendance believed that every attempt should be made to minimize the impacts new or improved highways have on residential areas.

*Southeast Columbia Area* - The completion of the Southeastern Beltway was mentioned as being one of the top priorities by citizens attending this meeting. Also discussed was the need for improvement to Rosewood Drive and the extension of Rosewood Drive to Garners Ferry Road.

A lot of the participants were concerned with the plans for the extension of Shop Road and the connector between Hallbrook and Pineview Streets. Most of the citizens felt that these two projects should be implemented to provide an alternative for travel to and from the Sumter Highway Corridor. The following projects were listed as needing improvement: Leesburg Road from Twin Lakes Road to Trotter Road, Bluff Road from Atlas Road to U.S. 601, Atlas Road from Bluff Road to the Sumter Highwa

The citizens in this area were concerned with the lack of adequate highways for Columbia. They believed more funds should be made available for highway construction. One citizen even suggested toll roads. Low cost short-range projects also received interest in this area. The computerized signal system for Columbia was endorsed as was the better utilization of the bus system. Some citizens felt that public transportation in the Bluff Road area should be extended and adequate bus shelters were needed for the whole system. One citizen suggested free public transportation be provided for senior citizens. Reversible lanes were suggested as a method of providing more highway capacity within an existing facility. It was also suggested that the railroads be relocated so as not to conflict with traffic flow.

Congestion along the Sumter Highway concerned some citizens at the meeting. It was suggested that the Sumter Freeway should be reexamined as a method to handle thru traffic and industrial related traffic.

*Northeast Columbia Area* - It was evident that citizens attending this meeting were more concerned with circulation problems in the Dentsville area, than the commute trip to the central business district. Congestion around the U.S. 1 and Decker Boulevard intersection headed the list of concerns. The citizens suggested various alternatives for alleviating this problem. An interchange at Parklane Road and I-20 was suggested along with the extension of Trenholm Road. Also suggested was the extension of O'Neil Court to U.S. 1. Even the possibility of a grade separation at Decker and U.S. 1 was suggested. Also proposed was a parallel road to Decker Boulevard that would run from U.S. 1 at O'Neil Court to Percival Road.

Further out from the Dentsville area, an interchange between Sparkleberry Lane and I-20 was suggested. This suggestion included implementing the Northern Arterial. Also in this area the possibility of a connector between Sparkleberry Lane and Polo Road was mentioned.

Most of the citizens agreed that the widening of Decker Boulevard should receive top priority. Improvements to Brickyard Road and Clemson Road, the implementation of the Southeastern Beltway, and the Assembly Street Extension were also suggested for future implementation.

Most of the citizens understood the problems created by the lack of sufficient highway funds to make all the needed improvements. In view of this fact, several citizens indicated the need for more intensive long range and short range transportation planning, to insure that our critically scarce highway funds are spent wisely. The citizens were frustrated because private development had been allowed to block or alter proposed transportation plans for the Columbia area. These citizens suggested a separate, revolving right-of-way fund that could be used to purchase land

before development takes place in a proposed highway corridor.

The citizens in attendance suggested numerous short term types of improvements that could greatly aid traffic flow in this area. The one way pair concept was suggested as a means of obtaining additional capacity. One citizen suggested making Laurel and Hampton Streets one way. Also recommended was flextime, the computerized signal system, additional signing for routes to Columbia Mall, better public education of traffic laws and driving techniques, better bus service and the improvement of intersections. Also of concern was the safety for school children in the area, with safer crossings and more sidewalks built. Some citizens felt a special study of this area's traffic congestion problems should be made. A suggestion was made that the Highway Department keep the public better informed on plans for construction in this area.

One citizen was concerned with maintaining residential character and expressed concern over the impacts that extending Trenholm Road into a residential area would create.

*North Columbia Area* - It was obvious that the majority of the citizens attending this meeting were concerned with maintaining the integrity of downtown residential areas. They felt that the implementation of the Anthony Street - Harden Street Connector would isolate the surrounding neighborhoods, thereby decreasing their residential value. The Confederate-Colonial Drive Connector was opposed for the same reason.

The North-South Freeway was generally considered a needed project that could be used to define the northern boundary of the Marion Street neighborhood. Some citizens indicated the need for a north-south connector between Bull Street Extension and Sunset Drive to serve traffic moving from the hospital and state offices to the Dutch Square area. One citizen expressed the need for implementing the Northern Arterial from Piney Grove Road to Percival Road.

The residents of north Columbia felt that providing more and wider highways for more cars was an endless cycle. They felt that a greater use of mass transit should be explored. Several citizens believed that mass transit had to be made more attractive while the use of the private automobile must be discouraged. The citizens attending this meeting questioned the private ownership of Columbia's bus system by the South Carolina Electric and Gas Company. Several citizens felt that public ownership of the bus system in Columbia would be able to produce a system that was responsive to the citizens of Columbia. The citizens said that the present buses are unattractive, pollute the air and are not routed to many of the locations citizens wish to go.

Another approach to Columbia's transportation problems dealt with reducing auto travel and making more efficient use of the highways already existing in Columbia. Such methods as an improved signal system, flextime, the elimination of railroad-highway grade crossings, one way streets and park and ride lots for carpooling and mass transit patrons were proposed. Concern was also expressed for the transportation of the elderly and handicapped.

The citizens attending this meeting were very interested in the transportation planning process. They wanted to know how they could provide input throughout the planning process. Several citizens realized the effects land use planning has on transportation planning and wanted to know how development could be controlled to minimize the need for new and wider highways in the downtown Columbia area.

*St. Andrews Area* - The top issues in this area centered around the tremendous growth that has taken place in this area and how all these people can travel to their place of work, shopping opportunities, schools, recreational areas, etc. in a reasonable amount of time. Three highway facilities lead the list as needing immediate attention. They were I-26/126, Bush River Road and St. Andrews Road. Most of the citizens agreed that these facilities must be widened and the

interchanges redesigned and reconstructed. There was a general feeling that the Highway Department had forgotten this area too long and that immediate attention should now be given to the congestion this area is experiencing.

In addition to improving these three facilities, methods of providing by-passes for these roads were mentioned. It was suggested that the improvement of S.C. 60 from Irmo to I-26 and constructing a full interchange at I-26 and S.C. 60 would persuade the Ballentine - Irmo residents to travel S.C. 60 to I-26 rather than using Bush River Road and St. Andrews Road. Some participants felt that through traffic on I-26 could be removed by providing a by-pass facility for the Spartanburg to Charleston traffic. Several citizens wanted to know the status of the fly-over project that would allow traffic from downtown to the Dutch Square area to exit I-126 before the Bush River Road interchange. They pointed out that traffic would also be able to return to the downtown area without utilizing the Bush River Road interchange. The citizens felt that this project would help alleviate some of the congestion the Bush River Road interchange is experiencing. The construction of and interchange at Bush River Road and I-20 was suggested as a method of alleviating the St. Andrews/I-26 interchange congestion. A careful study and evaluation of the impacts an I-26/Harbison interchange may have on the St. Andrews area was also recommended. While most of the citizens in attendance agreed that many highway improvements were needed for this area, there was the feeling that they should be planned and constructed with as little impact on residential areas as possible. Piney Grove Road was mentioned as needing improvement and the completion of the Southeastern Beltway was recommended as a facility that would help the entire Columbia urban area.

It was evident that the citizens attending this community meeting felt that improving only highways would not completely alleviate the congestion in the St. Andrews area. Mass transit was heavily suggested as a means of helping move

more people with less congestion. Even the possibility of a monorail system was suggested. Park and ride lots were mentioned as being needed to successfully implement mass transit in this corridor. One of the problems with the existing Columbia transit system, according to several citizens, is the lack of mobility once you are in the downtown area. It was suggested that smaller buses should be utilized with more frequent headways. Better promotion and advertising of the bus system was also recommended. One citizen recommended that a detailed study be made of possible management and ownership alternatives for Columbia's bus system.

Numerous suggestions concerning short range, low cost improvements were made by meeting participants. Flextime was mentioned frequently and one citizen even suggested staggering the starting times of schools. Better coordinated signals, reversible lanes, better driver education, ramp metering, better signing for Irmo, and eliminating the 1½ mile limit on school student busing were all mentioned as possible methods of reducing congestion.

Most of the citizens were in favor of controlling development through zoning and encroachment permits in order to minimize the adverse effects on the transportation system. Toll roads were suggested as a means of financing additional highway improvements. In addition, financing facilities for bicycles, joggers and walkers was suggested. Many of the citizens felt that the rural areas of South Carolina received more than their share of financial aid for highways. They felt more money should be spent in the urban areas.

*Lexington Area* - Most of the citizens that attended this meeting agreed on the need for a complete by-pass facility for the town of Lexington. Several citizens felt that the recommended by-pass to the west of Lexington should be located closer to town, while others felt that this segment should be a controlled access facility constructed as illustrated in the current COATS plan. The citizens felt that through traffic should be removed from U.S. 1 and 378 to alleviate the congestion

in the town of Lexington. There was also a difference of opinion over the widening of Columbia Avenue. Some citizens felt widening was needed but they also realized this might hurt businesses located near the right-of-way. Several citizens suggested resurfacing Columbia Avenue and making better use of the existing width of roadway.

S.C. 6 from U.S. 1 to I-20 was mentioned as a bottleneck and was suggested for improvement. S.C. 6 toward Lake Murray was also mentioned as needing improvement. Several citizens suggested that a crossing of the Saluda River between the dam and I-20 would alleviate this problem. A new interchange on I-20 between S.C. 6 and S.C. 204 was suggested. The Hampton-Meeting Expressway and the Southeastern Beltway were discussed as projects that will benefit the entire area.

The citizens felt that mass transit was not a feasible solution for the low density Lexington area. However, the citizens did feel that flextime was a good idea and one citizen suggested that the industrial area surrounding S.C. 6 and I-20 consider staggered working hours to help alleviate congestion in this area. Several citizens felt that the Lexington rural area had not received its fair share of highway funds. They indicated that more roads needed paving in the rural areas. A suggestion was made to remove parking on Main Street to allow additional traffic lanes. The citizens generally felt that better planning was needed around schools to improve traffic circulation.

*Downtown Columbia Area* - The majority of the citizens attending this meeting were opposed to the widening of Hampton Street. They preferred that Hampton Street between Harden and Millwood remain residential in character. They felt that widening Hampton would increase noise, decrease property values and force many residents to relocate. Several citizens suggested the removal of parking along Hampton Street instead of widening. However, most of the citizens felt that additional parking was needed in the area especially around the schools.

The general concern of this meeting centered around protecting the residential character of the Hampton Street area and the Blossom Street area east of Five Points. Two Notch Road was mentioned as needing improvements; however, most of the citizens felt that improvements other than highway widenings were needed for the downtown area.

Carpooling, a better bus system, reversible lanes, coordinated signals, the elimination of railroad/highway at-grade crossings and a downtown shuttle bus were all mentioned as methods of helping the downtown traffic flow. Transportation for the elderly was also mentioned as a major concern. The possibility of public management of the bus system was suggested for study. Most of the citizens felt that improving only a few blocks of Main Street would not be enough to save the downtown area. The citizens suggested that the whole downtown area needed to be revitalized.

TABLE I

LIST OF TRAFFIC SIGNALS, SECTIONS OF ROADWAY AND INTERSECTIONS SUGGESTED FOR IMPROVEMENT

Williams Street Extension adjacent to K-Mart, West Columbia

9th and U.S. 378

"L" Avenue and 12th Street

Hazelwood at Sumter Highway

Trotter and Leesburg

Sumter Highway and Trotter (channelize)

Sumter Highway and Dead Man's Curve

Pelham Drive and Garners Ferry Road at Richway*

Cedarwood, Colonial Villa and Fountain Lake at Sumter Highway

Leesburg and Greenlawn

U.S. 1 and Decker (double left turn suggested from Decker to U.S. 1)

Nates Road and I-20

Decker and Hunt Club (no left turn suggested)

Fontaine and Shakespeare (blind left)

U.S. 1 and K-Mart

U.S. 1 and I-20 (full clover leaf suggested)

Ashland and St. Andrews Road

Broad River Road at Bakersfield Road

Columbia Avenue at S.C. 6 (intersection confusing)

S.C. 6 and I-20 west bound ramp (poor design)

Oak and Hampton

* was suggested by one citizen and opposed by another

Summary - As was previously mentioned, the ideas, opinions, concerns and complaints that were expressed during these seven meetings will be used by the COATS Advisory Committee to formulate transportation system alternatives for the COATS Update. These alternatives will be evaluated from a technical standpoint and from an impact standpoint. Another round of citizen meetings will also be held to receive citizen reaction to these various alternatives. Ultimately, the COATS Advisory and Policy Committees will consider the advice of the professionals, citizens and elected officials to develop a final recommended transportation plan for the Columbia area. By involving as many people as possible and considering as many alternatives as practical, the COATS process should be able to produce an updated transportation plan that will receive a great deal of public support for implementation.

## APPENDIX A

## HEARING THE PUBLIC...
### A System Proving Successful For Central Midlands Regional Planning Council

For several years now, agencies like ours have been searching for ways to involve the public early in the planning process. Aside from getting as many as possible directly involved through membership on committees and task forces, the Public Meeting was seen as one of the best forums for collecting all those pearls of wisdom the general public was anxiously waiting to toss our way.

In the typical public meeting, however, we found we were hearing from government staffs, from engineers or other "authorities" working on a particular project or plan, from the organized group reading from a carefully prepared statement. In short, we were hearing everyone but the general public. John Q., if he attended al all, was sticking to his role as the silent majority. Apparently he felt crowded by all that expertise and was uncomfortable about expressing his views.

We needed a way to get John Q. out of that crowd. A method that would allow us to actually hear the silent majority along with the vocal minority, for the views of both are important.

We have recently been using a new approach to the traditional Public Meeting or Community Conference, which has dramatically improved the quality and quantity of information gathered from the public. The key is in small group discussion. With the idea that other agencies may find it useful, we present here a brief description of the process.

Be advised at the outset that this is an "information gathering" rather than an "information giving" format. Other than a brief introduction and backgrounding for the public of the subject to be under discussion (and the displays and handouts which set the stage) those conducting the meeting must avoid becoming the "answer man," the authority, the father figure. Resisting the urge to provide all the answers is one of the more difficult tasks of this process.

### Hearing the Public...A Three-Step Process

1. Before...Get The Word Out About The Meeting

   A. Reaching the "Identifiable" Public

      1. DEVELOP A MAILING LIST of persons and groups you know have an interest in the subject to be explored: individuals, organized special interest groups, governmental and business leaders, active neighborhood and community organizations, etc.

      2. PREPARE AN INVITATION or attention-getting direct mail piece that not only announces the meeting time and place, but provides in brief some background on the issue and how it relates to your target public and their well-being. If you need to know how many to prepare for, use a postage-paid, self-addressed reply card.

3. WORK WITH A COMMITTEE, if possible, whose members are representatives of your target public. They can play a vital role in not only planning a successful public meeting, but in actually conducting parts of it. Urge them to provide additional names and addresses of persons they know would be interested in receiving an invitation. Ask them to make 10 personal calls encouraging attendance. (A committee of 30 can provide a direct-link to 300 potential participants!).

B. Reaching the Mass Public

1. USE THE NEWS MEDIA to reach the larger public. Prepare newspaper, television and radio news releases announcing the public meeting and its purpose. Be aware of the publication deadlines you must meet in order to have your stories appear in the appropriate issue of daily and non-daily newspapers in advance of your meeting.

2. PREPARE PUBLIC SERVICE ANNOUNCEMENTS which radio and television stations serving your area will run free of charge. Keep them brief (10 to 30 seconds). Meet with the television public service staff to discuss the type of slides or visuals needed to produce a good spot. Stations generally will prepare title slides at a very nominal cost.

3. USE RADIO/TV TALK SHOWS, usually very receptive to booking a committee member or staff person to interview about the upcoming meeting.

4. POST MEETING NOTICE in public places such as county courthouses, city halls, shopping centers, etc. If you've developed an invitation or flyer announcing the meeting, this could be used for display.

II. <u>During...Create A "Listening" Atmosphere</u>

A. Physical Arrangements At Meeting Site

1. REGISTER GUESTS as they arrive, asking them to provide their name and mailing address so that they may be reached later (husbands and wives register individually). Number each guest on the registration list.

2. PROVIDE AN AGENDA, which you number correspondingly as the guest registers. The agenda should let the guest know what to expect at the meeting and set a time frame for the various phases of the session.

3. A "THOUGHT STARTER" should accompany the agenda. This can range from a simple printed handout providing brief facts on the topic to be explored, to a packet containing more detailed information. A list of committee members who represent the public on the issues may be attached.

4. DISPLAYS in the form of attractive, self-explanatory posters or maps should be available at the site to provide the interested participant additional information about the subject at hand. These will be used before and after the meeting.

5. A BROWSING TABLE, providing the opportunity for participants to see limited-supply documents/studies completed on the subject (used before and after the meeting).

6. A DISTRIBUTION TABLE where participants can pick up copies of materials relating to the topic at hand. It is suggested that this table be set up toward the end of the public meeting so as not to distract the public from taking an active part in the discussions.

7. A FACILITY LARGE ENOUGH to accommodate the entire group assembled theatre style for the opening and closing phases of the meeting; and space on the perimeter (or in adjacent rooms) for working tables around which groups of 10 - 12 can be seated for small group discussion.

B. Program Format: Three Phases

1. OPENING GENERAL ASSEMBLY to welcome guests, introduce committee members and provide participants a brief understanding of the topic under discussion and the purpose of the meeting. A brief slide presentation or other visual as part of this opening may be helpful and offer a change of pace. Remember to conserve time, using the bulk of the meeting to listen to participants and a minimum of time during which they are listening to you.

2. BREAK INTO SMALL GROUPS: Using the guest register as a guide, assign from eight to 10 guests to a discussion table referring them to the number written on their agenda sheet upon arrival. A "facilitator" and "recorder" (whose roles are discussed below) should report to each table to begin discussion. This phase should take approximately 40 minutes, with someone assigned to move from table to table to alert the facilitator to wind up the discussion about 35 minutes into this phase. This person should be alert to the activity taking place, and should conversation seem to dwindle sooner, this phase should be called to a close sooner. (You more likely will find yourself stretching the discussion time, however).

3. REPORT OUT: After calling the groups back into general session, begin immediately to call up the chosen "reporter" (discussed below) from each table to make a report of the findings of his group. Move rapidly from group to group, then proceed directly to closing remarks after thanking each for its valuable input. It is important to avoid reaching a general meeting consensus or taking a poll or vote since information gathered at such a public meeting is one ingredient among several to be considered in the final decision-making process. Conclude the meeting by expressing appreciation for the public taking its time to participate in the process and clearly explain what will happen with the information gathered. Give an indication of when decisions will likely be reached and how participants in the meeting will learn of the decisions made. Make staff available after the meeting to answer questions.

C. Staffing/Training

1. THE NUMBER OF PERSONS needed to conduct a meeting is determined by the number of participants you expect. In general, you will need a staff member responsible for registering guests and taking care of their assignment to small groups; a committee member to conduct the meeting; a staff member to provide background and assist in conducting the meeting; and two persons for each table used for small group discussion. Assigned to each table will be a "facilitator" (preferably a committee member) whose job it will be to keep discussion flowing among participants, and a "recorder" (a staff resource person) whose job it will be to make notes of key points or ideas expressed by participants during their discussions. Each table should have a "report-out" form.

2. TRAINING IS CRUCIAL to the success of this process. Some fairly simple techniques can be employed to stimulate discussion and keep it flowing. This training can generally be given in 15-30 minutes to all persons assigned to "work" the meeting. A single session held half an hour before the public meeting is sufficient.

3. TIPS FOR THE FACILITATOR: Open by introducing himself and the group's recorder. Explain that he will be taking notes on their ideas, and ask for a volunteer to use them in making a report back to the large group when it reassembles. Each facilitator is given a kit containing thought starters which he can toss out to get discussion started. Resource material on the subject may also be included (such as road maps if the subject under discussion is the transportation system). In the training session, facilitators are advised: Don't be afraid of silence, someone in the group will invariably break it by making a statement or asking a question. Answer a question with a question back to the group. When one guest is dominating the discussion, turn to another and ask him to comment on the man's ideas. When more than one participant talks at the same time, stress that your recorder wants to get all the ideas down, and is having difficulty with more than one conversation in progress. When one guest seems hesitant to speak, pointedly ask him to comment on some statement made in the group. When notified that the group should wind up its discussion, work with the recorder in trying to sum up ideas expressed. Settle on a group "reporter" who will carry your group's views to the reassembled audience.

4. TIPS FOR THE RECORDER: Take careful notes on the form provided, highlighting major positions taken. Work with the person volunteering as group "reporter" so that he can successfully use your notes in his report.

III. <u>After...Let The Public Know The Results</u>

A. It Is Vital That The Public Know It Has Been Heard

1. NEWS MEDIA will often cover such events. If they are present, they will report on the concerns expressed by participants in the public meeting. If they do not cover the session live, you may wish to prepare a news release touching on the ideas expressed by the public.

2. A MEETING REPORT, briefly touching on the issues discussed at the public meeting may be prepared for direct mail to participants. You have their names and addresses.

B. It Is Vital That The Public Know The Final Outcome

1. A FUTURE MEETING might be called to report to participants the results of both their input and other elements figuring into a final decision. You must be prepared to defend these decisions if some of them are contrary to views expressed by the public. You have a list of participants who can be notified of such a meeting.

2. NEWS MEDIA coverage of the final decision or adoption of a plan is anoth avenue for reaching the public with the final outcome.

3. A PUBLISHED REPORT detailing the decisions and how they were arrived at may also be furnished to participants as a means of learning the final outcome. In one case, we are using a newspaper advertisement, which we run as the annual report on our transportation planning process, to report results of our community meetings this year, and next year will feature the details of the master transportation plan which evolves from that process.

**********

For Further Information: Nancy C. Rampey, Central Midlands Regional Planning Council, Suite 155 Dutch Plaza, 800 Dutch Square Boulevard, Columbia, S.C., 29210

## Appendix J - ITEM 3

Charleston Area Transportation Control Schedule

Appendix J - Item 3

# 1979 SIP Transportation Planning Report
for
Berkeley and Charleston County, South Carolina

Berkeley-Charleston-Dorchester Council of Governments
1978

## A. Introduction

The Clean Air Act, as amended by Congress in 1977, requires that for those areas of a state which have not attained Federal oxidant or carbon monoxide standards, the State Air Quality Implementation Plan must include provisions for transportation control measures, in addition to stationary source controls. Berkeley and Charleston Counties in South Carolina have been designated as such a "non-attainment" area with respect to oxidants. This portion of the South Carolina SIP submittal will document the status of efforts, and the procedures for further efforts, to lower oxidant emission levels in Berkeley and Charleston Counties, through the use of transportation policies and actions.

The two-county non-attainment area is depicted in Figure 1. Transportation control measures discussed in this report will be directed to this area. The Charleston Area Transportation Study (CHATS), which is the urban transportation planning process, is concerned with the area shown in Figure 2. Local planning staff and coordination for CHATS is provided by the Berkeley-Charleston-Dorchester Council of Governments.

Transportation planning for the non-urbanized portions of Berkeley and Charleston Counties is performed directly by the Council of Governments, which serves the entirety of three counties (Figure 3).

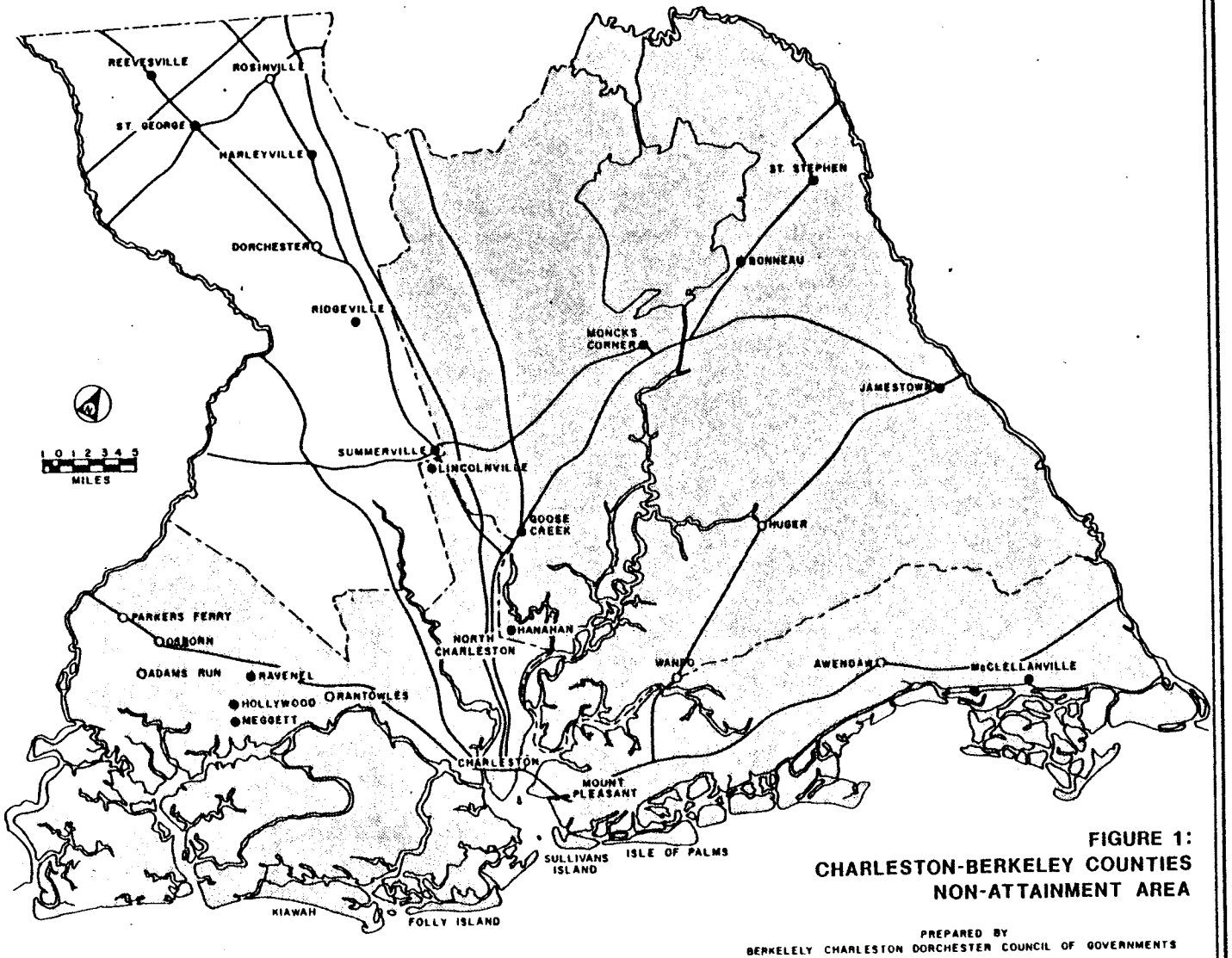



**FIGURE 1:**
**CHARLESTON-BERKELEY COUNTIES**
**NON-ATTAINMENT AREA**

PREPARED BY
BERKELELY CHARLESTON DORCHESTER COUNCIL OF GOVERNMENTS

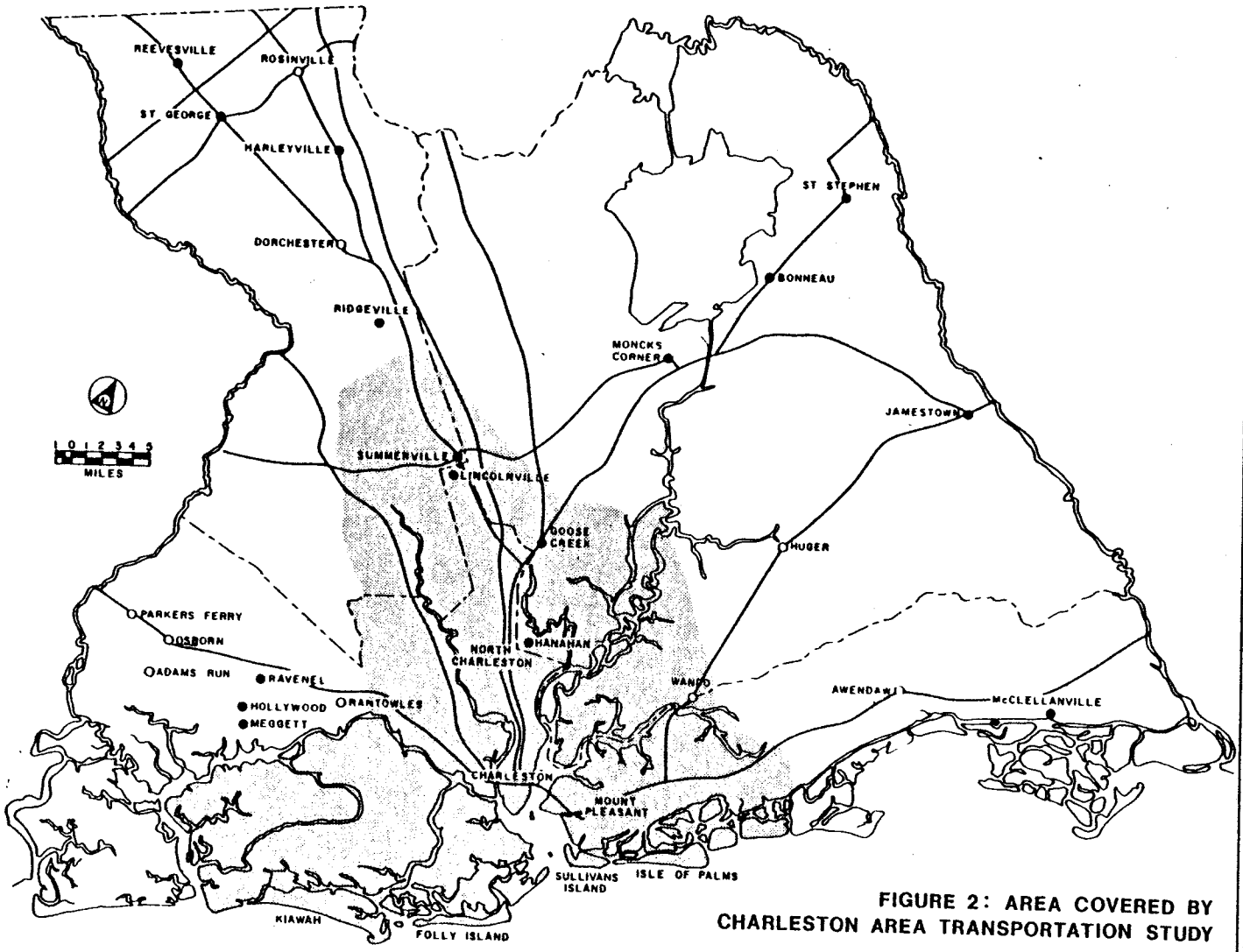



**FIGURE 2: AREA COVERED BY CHARLESTON AREA TRANSPORTATION STUDY**

PREPARED BY
BERKELELY CHARLESTON DORCHESTER COUNCIL OF GOVERNMENTS

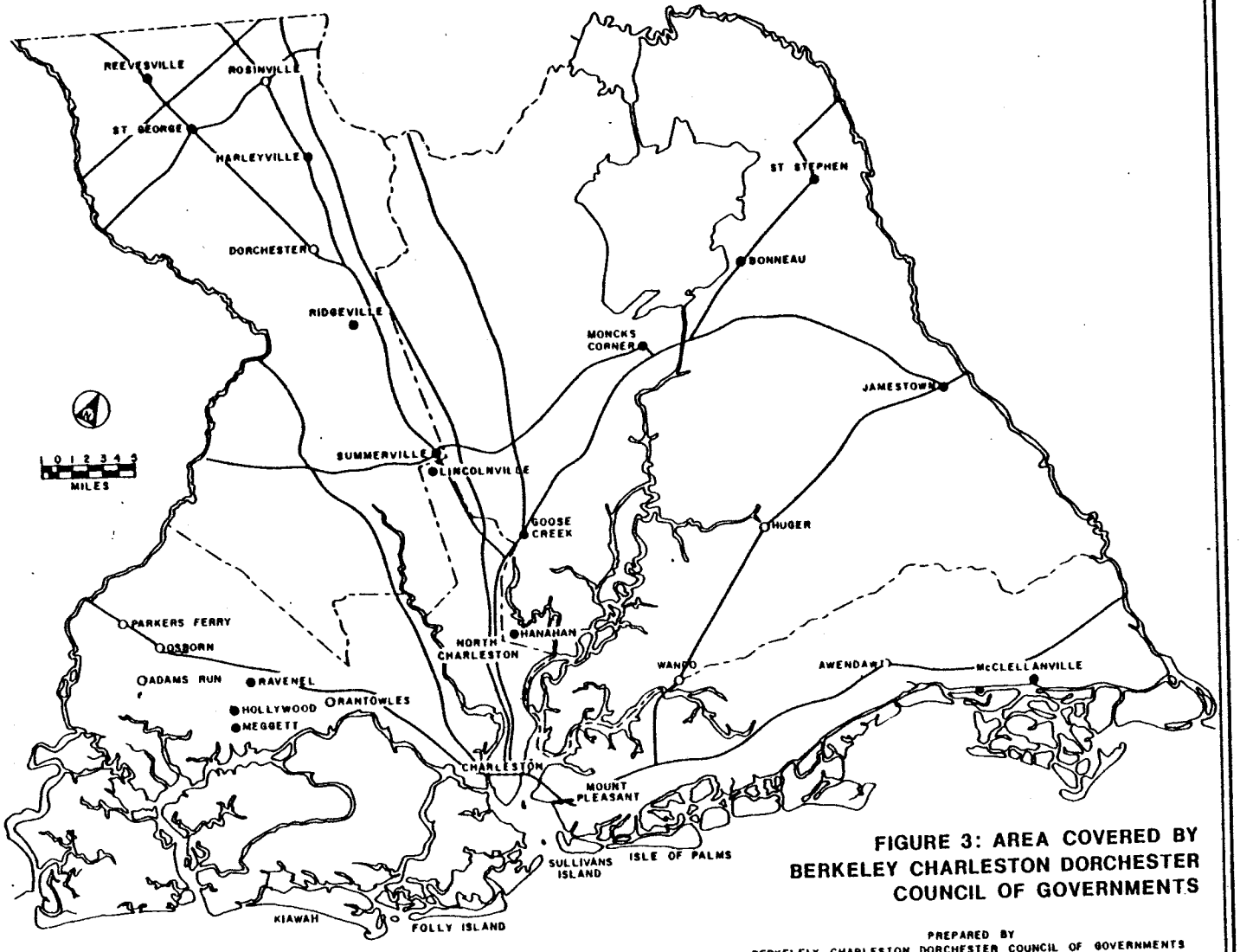



**FIGURE 3: AREA COVERED BY BERKELEY CHARLESTON DORCHESTER COUNCIL OF GOVERNMENTS**

PREPARED BY
BERKELELY CHARLESTON DORCHESTER COUNCIL OF GOVERNMENTS

B. Current Emissions Inventory

The current (base year) emissions inventories for the Charleston-Berkeley County non-attainment area are contained in Appendix E of the State Implementation Plan. Item 2 of Appendix E is the particulate inventory, Item 3 is the VOC Point/Area Source Inventory, and Item 4 is the VOC Mobile Source Inventory.

C. Estimate of Emission Reductions Needed

As estimated on page 4-83 of the State Implementation Plan, the Charleston-Berkeley Counties non-attainment area requires a reduction in volatile organic compounds (VOC) of 37.3% in order to comply with federal standards for oxidants. The S.C. Department of Health and Environmental Control has estimated that the regulation of stationary sources, plus the Federal new car standards, will account for a reduction in VOC of 22% by 1982. Since transportation control measures could further reduce emissions by no more than 5%, the goal of 37.3% cannot be reasonably achieved by 1982. Therefore, the Charleston-Berkeley non-attainment area requests that an extension be granted to 1987 to meet the oxidant standard.

The implementation of a mandatory Vehicle Inspection (Maintenance Program, together with the Federal new car regulations, is expected to reduce the 1987 emission level by a minimum of 37.6% (see Table IV - 18 in SIP). This is just barely above the amount required to meet the standard. In order to allow for growth, additional transportation control measures will be implemented in the Charleston-Berkeley area.

Documentation of the modeling process and parameters used by the Department of Health and Environmental Control, including current and projected VMT estimates, is contained in Appendix E, Item 4 of the State Implementation Plan.

D. Agency Tasks and Responsibilities

A letter dated March 30, 1978 to the Regional Administrator of the Environmental Protection Agency, from Governor James B. Edwards of South Carolina, documents the responsibilities of various agencies in developing the State Implementation Plan submission for 1979. This letter, which is reproduced on the next page, designates the Berkeley-Charleston-Dorchester Council of Governments as the agency responsible for the development of transportation control strategies in the Charleston-Berkeley area.

Initial emission reduction targets for stationary and mobile sources of oxidants are estimated in Table IV - 18 (page 4-78) of the SIP. These targets will be adjusted as better data is available, and as the Transportation Control Plan is developed.

State of South Carolina

JAMES B. EDWARDS
GOVERNOR

OFFICE OF THE GOVERNOR
POST OFFICE BOX 11450
COLUMBIA 29211

March 30, 1978

Mr. John C. White
Regional Administrator
Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Mr. White:

In accordance with the provisions of Section 174(a) of the Clean Air Act as amended, the State of South Carolina and elected local officials have designated agencies and responsibilities for planning and implementation in three areas of the State where national standards for carbon monoxide and/or photochemical oxidants will not be attained by July 1, 1979. This correspondence serves to certify to the Administrator, Environmental Protection Agency, the agencies selected and their responsibilities.

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for development of an accurate, comprehensive, and current emission inventory of mobile, stationary, and area sources of carbon monoxide and photochemical oxidants; and,

* The State of South Carolina through the Department of Health and Environmental Control and the Department of Highways and Public Transportation shall be responsible for analysis of existing air quality and determining through application of appropriate modeling techniques the level of control of stationary and mobile sources needed to demonstrate attainment and maintenance, by 1982, of the national standard for carbon monoxide and photochemical oxidants. The joint findings of these agencies shall be submitted to a task force composed of State agencies and affected local governments for review and approval; and,

* The State of South Carolina through the Department of Health and Environmental Control shall be responsible for developing control strategies for the necessary reduction of emissions from applicable new and existing stationary sources which would contribute to the carbon monoxide and/or photochemical oxidant levels; and,

* The Berkeley-Charleston-Dorchester Council of Governments, Catawba Regional Planning and Development Council, or Central Midlands Regional Planning and Development Council, as appropriate, shall be responsible for developing control strategies for the necessary reduction of emissions from mobile sources through transportation control measures that reduce in-use automobile emission rates and auto usage; and,

* The State of South Carolina through the Department of Highways and Public Transportation shall provide for development of an inspection and maintenance program designed to ensure continued and effective operation of automobile pollution control devices. The Department of Health and Environmental Control shall assist through provision of quality control services.

Both the Department of Health and Environmental Control and the Department of Highways and Public Transportation are agencies of State Government and, thus, exercise jurisdiction statewide. The Berkeley-Charleston-Dorchester Council of Governments includes all of Berkeley, Charleston, and Dorchester Counties. The Catawba Regional Planning and Development Council includes all of Chester, Lancaster, Union, and York Counties. The Central Midlands Regional Planning and Development Council includes all of Fairfield, Lexington, Newberry, and Richland Counties.

The Central Midlands Council is a metropolitan planning organization designated pursuant to Section 134 of Title 23, United States Code. The Berkeley-Charleston-Dorchester Council is contractually linked to the MPO for provision of necessary staff services. Other organizations jointly considered by State and local officials included County Planning Commissions and County Health Departments.

With warmest regards,

James B. Edwards

JBE/WMS

E. The Urban Transportation Planning Process -3-C

The Charleston Area Transportation Study (CHATS) is a comprehensive, continuing, and cooperative process designed for the effective planning of transportation facilities and policies in the urbanized area of Charleston, South Carolina. CHATS, which was created in 1965, provides a forum for cooperative decision-making and coordinated staff efforts. The operations are governed by an agreement between the CHATS Policy Committee, composed primarily of officials of local government; the Berkeley-Charleston-Dorchester Council of Governments, a regional planning agency; and the South Carolina Department of Highways and Public Transportation. CHATS is concerned with all modes and aspects of travel, and continuously strives to adapt its plans and programs to the changing needs and conditions of the Charleston area. The original CHATS Plan of 1968, and the updated Plan which was completed in 1975, were based on projected area travel needs and demographic characteristics, plus environmental, social, and economic considerations. Through the Council of Governments, CHATS efforts are coordinated with those of other regional planning programs.

The CHATS study area encompasses portions of Berkeley, Charleston, and Dorchester Counties. The boundaries conform to guidelines issued by FHWA and UMTA establishing area transportation study boundaries. Generally speaking, CHATS takes in the urbanized area of the Charleston SMSA

and that area expected to be urbanized by 1995. Within CHATS there are ten separate municipalities and three county governmental bodies. Much effort is expended in satisfying and coordinating the differing local goals and policies among these thirteen entities.

The CHATS Policy Committee was designated the "Metropolitan Planning Organization" for the Charleston area by the Governor of South Carolina on February 2, 1977. As such, the Policy Committee is responsible for all decisions made concerning the CHATS Program. Elected and appointed officials from all local governments and each mode of travel are represented on the Policy Committee. In this manner the Policy Committee acts as a forum for cooperative decision making by principal elected officials of general purpose local government. To assist it in carrying out its responsibilities, the Policy Committee relies heavily upon input from the CHATS Technical and Citizens Advisory Committees.

The Technical Committee is comprised of local engineers, planners, public administrators, and technical staff members of affected agencies. It is the duty of the Technical Committee to review important technical aspects of the Study and report their findings to the Policy Committee prior to Policy Committee decisions. The Technical Committee also is responsible for dissemination and coordination of Study information among affected agencies and to interested members of the general public.

The Citizens Advisory Committee is also responsible

for the distribution of information and the reflection of public attitudes concerning the transportation study. Citizens Committee opinions are expressed to the Policy Committee also prior to decision making. Representatives of each of the geographic areas within CHATS as well as representatives from many local civic organizations make up the Citizens Advisory Committee.

An agreement dated May 17, 1977 delineates the duties of the Berkeley-Charleston-Dorchester Council of Governments, the CHATS Policy Committee, and the South Carolina Department of Highways and Public Transportation (formerly State Highway Department) in the CHATS process. This agreement also satisfies requirements for the operation of the OMB A-95 Process. Since Charleston is not served by a publicly owned mass transit system, the transit operator is not a party to the agreement. A copy of the agreement can be found in Attachment A.

On October 27, 1975, the CHATS Policy Committee formally adopted the CHATS "Cost Feasible Plan" as being that transportation system which most closely satisfies the Charleston area's expected travel demands and is financially attainable by 1995. This action marked the completion of the first major update of the CHATS Program. Since that time, much effort has been devoted to prioritization of that plan to insure its orderly implementation. In light of funding restrictions, careful consideration is given each element of the plan to insure that the most needed segments are constructed first.

Another reappraisal of the CHATS Plan is scheduled to begin in 1979. Collection of current data and projection of future socio-economic conditions will be performed by the Council of Governments. The Department of Highways and Public Transportation will review the validity of their simulation models, and then use them to test the effects of alternative transportation system improvements. For the first time, mass transit will be incorporated into the modeling and testing process.

The CHATS Policy Committee annually adopts the Transportation Improvement Program (TIP) and Annual Element. These programming documents delineate each segment of the plan expected to be advanced within the next six years, and one year, respectively. These documents program work on CHATS projects according to the stages of preliminary engineering, right-of-way purchase, and construction. Federal funding for these three types of work are not available to implementing agencies for a project unless the Annual Element has programmed such funds for that particular project.

The Department of Highways and Public Transportation is the primary implementing agency for CHATS projects. The Department utilizes the TIP and Annual Element to help organize their efforts on highway projects, so that funds can be efficiently used as they become available. The current TIP and Annual Element, adopted by the Policy Committee on September 26, 1978, is displayed in Attachment B.

F. Current Plans and Documents Involving Transportation Control Strategies

This section summarizes the plans, studies, and reports which have been completed, or are underway, dealing with transportation control strategies for air quality in Berkeley and Charleston Counties.

Charleston Transit Operations and Marketing Study (1974) functions as the long-range planning guide to transit improvements in the Charleston area. Dealing with a broad spectrum of transit issues including public involvement, service level, route adjustment, fare structure, financing, marketing, and management, this report develops policies and actions which would increase transit usage and make the system more viable and suitable to the area's needs. The production of this study was the launching of efforts by the CHATS Transit Committee to improve transit service. A summary of the report is included in Attachment C.

Charleston Central Area Transit Study (underway) is an investigation of opportunities for transit improvements in connection with the City of Charleston's Downtown Revitalization Plan. This report will examine existing and potential transit markets in the lower Charleston Peninsula, and develop management, financial, and operational alternatives for improved service to this area. Particular emphasis will be on tourism, commercial, and institu-

tional-related activities which can be served by transit. Possibilities for a pedestrian/transit mall will be considered. Related aspects of pedestrian movement and parking policies in the Central Area are also part of the study. The final report will include a five-year capital and operating budget for the recommended transit system, as well as programming detail to feed directly into the CHATS TIP and a Transit Development Program.

Tourism Impact and Management Study (1978) was developed for the Charleston County Park, Recreation and Tourist Commission. This report emphasizes the management of tourism in order to minimize adverse impacts on the quality of life for Charleston residents, while maintaining a viable tourist economy. Major portions of the study deal with traffic and circulation, and with the impacts and regulation of sightseeing vehicles. A Short-Range Program recommended by the report (see Attachment D) involves policies and actions concerning parking, traffic circulation, bicycle and pedestrian travel, and public transportation.

Long Range Bikeways Program, Short Range Bikeways Program (1976). These documents provide a program and plan for implementing bikeways improvements in the CHATS area. Implementation has been proceeding according to the availability of funds. The Long-Range Plan envisions 161.7 miles of bicycle routes in the CHATS area, including Class I, II, and III type facilities.

Charleston Area Transportation Study 1979 Unified Work Program (1978). This document, which has been adopted by the CHATS Policy Committee, describes the transportation planning activities expected to be undertaken during 1979, along with the funding proposed for these activities. A copy of the Unified Work Program, which has not yet been approved by the U.S. Department of Transportation, is included as Attachment E. Items involving transportation control measures for air quality include:

31 - Special Areas Analysis

32 - Ridesharing Assistance

33 - Paratransit Planning

34 - Bridge Operations

42 - Transit Planning

44 - Plan Development and Testing

61 - Transit Management

62 - Air Quality Planning

G. Current Activities Involving Transportation Control Strategies

The Environmental Protection Agency has distributed a list of nineteen transportation control measures which should be analyzed for consideration in non-attainment areas. This section will examine the status, in the Charleston-Berkeley area, of efforts towards each of these approaches. Commitments to planning, adoption, or implementation of specific measures are noted.

1. Inspection/Maintenance

This program, dealing with the mandatory inspection of exhaust emissions in automobiles, is discussed in Appendix J, Item 1 of the State Implementation Plan. The South Carolina Department of Highways and Public Transportation has made a commitment toward implementation of the I/M program, and has applied to the Environmental Protection Agency for funding of a pilot project of voluntary inspection and maintenance, as a forerunner to the mandatory program.

2. Vapor Recovery

This measure deals with the emission control systems of automobiles, and is being approached at the manufacturing level by the Federal Government.

3. Improved Public Transit

The South Carolina Electric and Gas Company (SCE&G), through a franchise agreement with the City

of Charleston, operates a mass transportation system in the CHATS urbanized area. The system consists of approximately 45 buses, running on ten routes in and around the city, and has been operating at a substantial deficit (currently over $1 million annually). Because of this financial situation, SCE&G has not made any major changes in the service in many years.

The CHATS Policy Committee, concerned with the plight of the system, and aware of the probable increased need for transit service in the future, created a subcommittee to address the issues of mass transit. In 1974, a consulting firm developed the Charleston Transit Operations and Marketing Study (see Chapter 4). The plan addressed improvements in route structure, service characteristics, equipment and facilities, and public relations. It recommended that, to help finance these changes, UMTA funds be channelled through the City of Charleston to SCE&G.

This latter proposal was rejected by SCE&G in 1976, due to the labor-related stipulations of the UMTA grant, and to tax disadvantages of the arrangement. Since then, the CHATS Transit Committee has been working towards the possibility of public ownership of the system. A general proposal for the financing arrangements of the take-over has been accepted, in principle, by SCE&G. The Committee is presently investigating alternative governmental formats for a public system, and is discussing various means of

creating the local matching funds for federal grants. During 1978, a consultant firm investigated the operating costs of the SCE&G system, in order to help the Transit Committee determine the financing needs of a proposed public system.

The CHATS 1979 Unified Work Program contains funding for a Transit Management Study. This is in anticipation of progress towards the implementation of public transit, and the need to work out the details of acquiring the system and setting up a new management arrangement.

The Tourism Impact and Management Study, produced in 1978, examined particularly the potential of transit use in connection with Charleston's large tourist industry. A major recommendation was to design and establish a demonstration shuttle service during the peak tourist months, to test the feasibility of a permanent service of this type. This idea is being incorporated into the Central Area study which is currently underway. This Charleston Central Area Transit Study will examine transit system alternatives on the lower peninsula of Charleston, emphasizing the commercial, tourist, and institutional markets for transit service. This study is part of the City of Charleston's Downtown Revitalization Program, which has already involved substantial amounts of public investment.

4. Exclusive Bus and Carpool Lanes

Little work on this approach has been accomplished in the Charleston-Berkeley area due to several factors. First, the low level of transit usage would discourage this type of measure. Secondly, the area has few roads with more than four lanes, and Charleston's many bridges mean that most major travel routes would be very costly to widen. Thirdly, commuting travel patterns are relatively diffuse due to the unconcentrated pattern of employment in the region. Possibilities for exclusive bus and carpool lanes will be examined, however, during the CHATS Plan Reappraisal which starts in 1979.

5. Area-Wide Carpool Programs

In the initial months of 1973, the Council of Governments established a carpool information service which was offered to employees of the City of Charleston, Charleston County, the Medical University of South Carolina and the College of Charleston, as well as several local employers. Initial responses indicated a sufficient interest in the carpool program by the County and City employees. However, as the gasoline shortage eased, interest in the carpooling program declined, and the service has been inactive for several years.

However, in 1978 the CHATS Policy Committee created a Ridesharing Subcommittee to investigate new possibilities in this area. Although plans are still

tentative, discussions currently center around the establishment of a pilot carpooling project in the James Island area, involving suburban parking facilities as well as door-to-door ridesharing. The effort will likely be aimed at large employers and also at the general public in the pilot project area. If this first program succeeds, the ridesharing effort may be expanded to other areas, or to an area-wide program.

6. Private Car Restrictions

The Charleston Central Area Transit Study, which is underway currently, is examining the possibility of a pedestrian-transit mall, or other types of auto-restricted zones, in the King Street corridor of downtown Charleston. This would be a part of the City of Charleston's Downtown Revitalization Plan.

7. Long-Range Transit Improvements

The CHATS Plan Update, which begins in 1979, will incorporate alternatives for long-range transit improvements into the CHATS process, as provided for in Item 42 of the 1979 Unified Work Program. The Charleston Transit Operations and Marketing Study provides a basis for developing these alternatives. Any long-range improvements to the transit system in Charleston, however, are dependent upon the public acquisition of the system from the South Carolina Electric and Gas Company.

8. On-Street Parking Controls

The Tourist Impact and Management Study of 1978 recommended additional controls and policies on parking in the downtown area of the City of Charleston (see Attachment D ). The City has performed inventories of parking in critical areas, and is in the process of developing and implementing new policies concerning parking. Consideration is currently being given to a residential parking permit ordinance.

9. Park-and-Ride and Fringe Parking Lots

The CHATS Ridesharing Subcommittee, as discussed above (item #5), is considering the establishment of a pilot project on James Island which would combine carpooling with the use of suburban parking lots. Proposals have also been made to provide fringe parking as part of a tourist management program.

10. Pedestrian Malls

The Charleston Central Area Transit Study, as discussed above, will investigate the idea of some type of auto-restricted zone in the King Street commercial area of the City of Charleston.

11. Employer Programs to Encourage Car and Van Pooling, Mass Transit, Bicycling, and Walking

The pilot project currently being developed by the CHATS Ridesharing Subcommittee, as described in item #5 above, is envisioned to be aimed at large employers as well as at the general public. Planning

funds for this effort are provided for in item 32 of the 1979 Unified Work Program. In another area, the Transportation Task Force of Trident 2000 (a citizen-based group) has been working with the Medical University of South Carolina, in an effort to establish a pilot vanpooling program for the employees at that site.

12. Bicycle Lanes and Storage Facilities

Implementation of the Long Range Bikeways Program for the region has been very gradual due to a lack of funding for this purpose. A recent development is the approval, by the CHATS Policy Committee, of the use of right-of-way for the proposed "Citadel Parkway" as a bicycle path. The City of Charleston proposed to construct a bicycle facility on the site in West Ashley until such time as the land is required for highway construction.

13. Staggered Work Hours

A recent survey in the major industrial area around Hanahan and Goose Creek showed that work hours for the employees of the area were staggered to a surprising extent. Employers of one large industrial park had worked out an arrangement of staggered hours among themselves. The large military employment also appears to be operating on a staggered basis. A system of staggered work hours on the Charleston Peninsula appears to be difficult to arrange, however,

because the area contains numerous employers with moderate size work forces, rather than a few large employers.

14. Road Pricing to Discourage Single Occupancy Auto Trips

This strategy has not yet been analyzed or proposed in the Charleston-Berkeley area.

15. Controls on Extended Vehicle Idling

This strategy has not yet been analyzed or proposed in the Charleston-Berkeley area.

16. Traffic Flow Improvements

One of the most significant devices to improve traffic/flow in the Charleston urban area is the computerized traffic signal system operated by the City of Charleston. During 1978, the system has been expanded to include portions of James Island. Further expansion in future years is expected.

A comprehensive approach to traffic flow improvements is being undertaken by staff of the Council of Governments, with input from staff personnel from other agencies. This is the Transportation Systems Management (TSM) Evaluation which was conceived in the 1978 CHATS Unified Work Program. It entails the collection from each local community in the region of perceived transportation problems. The areas are subsequently studied, one at a time, to discover low-cost transportation improvements which would help alleviate these problems. In 1978, the City of Hanahan was the

target of such an investigation, with several low-capital alternatives for improvement recommended in the report (currently in draft form). Item 31 of the 1979 Unified Work Program ("Special Areas Analysis") provides for the continuation of this process, with the in-depth study of additional specific localities.

The CHATS Bridge Operations Committee deals with a rather unusual traffic flow problem: the interference of drawbridges with automobile traffic. The Committee has been studying data on four area drawbridges, and has recommended changes in operating policies for two of them. These changes have been forwarded as requests to the U.S. Coast Guard.

17. Alternative Fuels or Engines and Other Fleet Vehicle Controls

This strategy has not yet been analyzed or proposed in the Charleston-Berkeley area.

18. Other Than Light Duty Vehicle Retrofit

This strategy has not yet been analyzed or proposed in the Charleston-Berkeley area.

19. Extreme Cold Start Emission Reduction Programs

Due to the warm climate of the Charleston-Berkeley area, this strategy is not considered as suitable to local conditions.

H. Alternative Analysis

Item 62 of the CHATS 1979 Unified Work Program provides for the process of air quality planning. If approved by the Intermodal Planning Group (IPG) in Atlanta, this will provide $12,500 during calendar year 1979, in order to proceed with the development of a Transportation Control Plan. The Berkeley-Charleston-Dorchester Council of Governments anticipates additional funding for this work in the form of a grant from the Environmental Protection Agency.

The alternative analysis will include an in-depth study and evaluation of all nineteen control measures listed above. The various actions being taken in these areas will be welded together and coordinated as strategies for the reduction of VOC emissions from automobiles.

In the urbanized area, the update of the CHATS Plan will evaluate the air quality implications of alternative system configurations. The transit element of the update is expected to be quite significant in this respect. Meanwhile, additional areas of Berkeley and Charleston Counties will receive in-depth analysis for TSM-type improvements as the Special Areas Analyses continue.

Assuming that CHATS and EPA funding are not withheld, the Berkeley-Charleston-Dorchester Council of Governments will be able to complete the analysis of the nineteen transportation control measures, and devise a Transportation Control Plan for the Charleston-Berkeley non-attainment

area, by July 30, 1980. This date allows for completion of the CHATS Plan Update process, so that transit and other options can be adequately analyzed. The study and evaluation of each alternative will produce either a recommendation to implement measures or a justification not to implement. Each decision not to adopt difficult but reasonably available measures will be justified. A procedure for reporting progress on these studies will be negotiated with the Environmental Protection Agency.

As an important part of its efforts to help improve the air quality of the non-attainment area, the Berkeley-Charleston-Dorchester Council of Governments is committed to the use of available grants and funds to improve the mass transportation system of the area, to meet basic transportation needs as expeditiously as practicable.

I. Involvement of Elected Officials, Public, and Interest Groups in the Planning Process

Elected officials comprise eighty-five percent of the membership of the Berkeley-Charleston-Dorchester Council of Governments. This insures that local mayors and council members will have a strong voice in determining the policies of air quality control in the Charleston-Berkeley non-attainment area. In addition, all but four of the voting members of the CHATS Policy Committee are elected officials, so that any changes in the Unified Work Program, Transportation Improvement Program, or Annual Element will also be made by the mayors, councilmembers, and legislators of the area.

For the purposes of air quality planning, the Berkeley-Charleston-Dorchester Council of Governments intends to supplement the CHATS citizen involvement mechanisms with additional public participation efforts. CHATS generally receives input via its Citizens Advisory Committee and at official public hearings for proposed projects. The Council of Governments will host a series of public workshops concerning the nineteen transportation control measures, during the analysis phase. After recommendations for all measures have been developed, a second series of public meetings will be held, in order to review the recommendations.

These two sets of meetings will be held in various locations within Berkeley and Charleston Counties to

facilitate attendance by the public. Ample notice of the dates, locations, and nature of the meetings will be placed in the local media. These meetings will also afford an opportunity for interest group involvement in the transportation control planning process.

The A-95 Project Review process will be employed as a final means of soliciting comments and distributing information concerning the proposed transportation control measures to be undertaken in the Charleston-Berkeley area.

J. Amending the Unified Work Program

By January 1, 1979 the Berkeley-Charleston-Dorchester Council of Governments will request the CHATS Policy Committee to amend the 1979 Unified Work Program. The requested amendment will consist of a revision of Item 62 (Air Quality Planning) to reflect the work as has been outlined here. Specifically, this item will be revised to include: a description of the planning process, involving analysis of all nineteen control measures specified by EPA; a commitment to a public involvement process, as described above; a delineation of the role of CHATS in the process; a description of the end products of the planning effort; provisions for progress reporting; and information concerning funding sources and the funding split among various agencies. The Council of Governments will also request that Item 44 (Plan Development and Testing) of the 1979 Unified Work Program be revised to provide specifically for the consideration of air quality effects in the analysis of alternatives.

## K. Consideration of Social, Economic, and Environmental Effects

The nature of the Council of Governments as an agency involved in comprehensive planning will greatly facilitate the consideration of social, economic, and environmental factors in the development of transportation control strategies for air quality. Staff expertise in the fields of historic preservation, land use, housing, waste treatment, water quality, recreation, economic development, and energy conservation will be available for consultation, and will review all outputs while in draft form. Recent studies performed by staff on the transportation needs of the elderly, handicapped, and the poor will be taken into consideration.

In addition, staff from the counties and municipalities in the non-attainment area will be involved in the planning process, to help consider the effects of various proposed measures in each community.

Finally, alternative actions in the urbanized area will be reviewed by the CHATS Technical Advisory Committee and Citizens Advisory Committee. This will provide for input from additional specialized staff personnel and from interest groups with social, economic, and environmental expertise.

L. Public Hearing and A-95 Review of this Document

A public hearing on the 1979 SIP is to be held in the Charleston-Berkeley area on November 21, 1978. Copies of publicity for this hearing and comments received during the hearing are contained within this SIP. The A-95 review process on the transportation portion of the SIP has been initiated by the Council of Governments. Comments and clearance forms will be attached to this document when received.

Attachment A

Memorandum of Agreement Concerning
Charleston Area Transportation Study
May 17, 1977

MEMORANDUM OF AGREEMENT

BETWEEN

THE BERKELEY-CHARLESTON-DORCHESTER
COUNCIL OF GOVERNMENTS ("BCDCOG"),

CHATS POLICY COMMITTEE ("CHATS PC")

AND

THE SOUTH CAROLINA STATE HIGHWAY DEPARTMENT ("SCHD")

Relative to the Charleston Area Transportation Study,

By this agreement dated this 17th day of May 1977, the above named parties agree as follows:

A. Preamble

1. The Charleston Area Transportation Study ("CHATS") was established, as a joint SCHD-Charleston County Planning Board ("CCPB") responsibility, by a February 8, 1965 SCHD-CCPB agreement. CHATS is a continuing, cooperative, comprehensive transportation planning process for carrying out 23 USC 134 in both the Charleston urbanized area and the surrounding area likely to become urbanized during the planning period.

2. On 9 September 1971, pursuant to FHWA Instructional Memorandum 50-3-71, the CHATS Policy Committee was established to provide guidance and direction for CHATS. A clear majority of the members of this committee are principal elected officials of those units of general purpose local government wholly or partially within the CHATS area.

3. The Berkeley-Charleston-Dorchester Council of Governments (formerly Regional Planning Council) was subsequently established to plan for the orderly growth and development of its three-county region and, through a May 26, 1973 SCHD-BCD Regional Planning Council agreement, assumed CCPB responsibility in CHATS.

4. BCDCOG is responsible for the comprehensive planning of development throughout the Charleston urbanized area and the rest of Berkeley, Charleston and Dorchester Counties.

5. By formal resolution, each unit of general purpose local government in the CHATS area has requested and authorized BCDCOG to act in its behalf in the conduct of CHATS planning.

6. BCDCOG is the A-95 regional clearinghouse for its three-county region and is also the agency designated to receive 23 USC 104 (f) planning (PL) funds and UMTA Section 9 (49 USC 1607a) planning funds.

7. A May 13, 1974 SCHD-BCDRPC agreement covers the use of PL funds for CHATS.

8. Pursuant to Volume 4, Chapter 4, Sections 2 and 6 of the Federal-aid Highway Program Manual ("FAHPM 4-4-2&6") which contain provisions applicable to transportation planning processes and cooperatively developed transportation improvements programs in urbanized areas, the Governor on February 2, 1977 designated CHATS PC as the Metropolitan Planning Organization ("MPO") for CHATS.

9. In the CHATS area there is no publicly owned operator of mass transportation services.

B. Responsibilities and Functions

In accord with the foregoing preamble, BCDCOG, CHATS PC, and SCHD agree as follows for carrying out the provisions of FAHPM 4-4-2&6, and any other applicable Federal Highway Administration ("FHWA") or Urban Mass Transportation Administration ("UMTA") directives (including any modifications to any of these) as they apply to transportation planning and program development in the CHATS area:

1. SCHD-BCDCOG agreements dated May 26, 1973 and May 13, 1974 are, to the extent not inconsistent herewith, hereby ratified and confirmed.

2. CHATS Policy Committee will be responsible for the Policy functions of the MPO as defined in Paragraph 8C of FAHPM 4-4-2.

3. The majority of the members of the CHATS Policy Committee shall be principal elected officials of general purpose local government wholly or partially within the CHATS area; every such unit of general purpose local government shall be represented on the CHATS Policy Committee; and, the chairman of the BCDCOG shall be a member of the CHATS Policy Committee.

4. The professional staffs of the BCDCOG and SCHD will perform the technical functions of the MPO and all CHATS PL funds and all UMTA Section 9 (49 U.S.C. 1607a) funds for CHATS, will continue to flow directly to BCDCOG.

5. The Executive Director of the BCDCOG shall continue to serve as the Local Study Coordinator for the CHATS Program and be responsible to the Chairman of the BCDCOG for the staff services provided to the CHATS Policy Committee.

6. The offices of the BCDCOG shall continue to serve as the primary local focal point for the storage and distribution of current CHATS plan and program information to the advisory committees to the CHATS Policy Committee and the general public. All planning information generated by either SCHD or BCDCOG shall be available to both SCHD and BCDCOG.

7. The BCDCOG shall be responsible for providing the social and economic data and projections necessary for the continuation of the CHATS program.

8. SCHD will continue to perform the functions of the "State" and "State Highway Agency" as identified in legislation and planning documents originating out of the CHATS program.

9. The allocation of the local funding required to support the CHATS unified planning work program shall be subject to approval by the BCDCOG.

10. Copies of the following documents will be furnished to BCDCOG for review and comment before they are sent to SCHD, FHWA, and UMTA:

    a. Prospectus

    b. Unified planning work program

    c. Transportation plan, including transportation systems management element and long range element

    d. Transportation improvement program & annual element

Any written comments from BCDCOG on these documents will be sent to SCHD, FHWA, and UMTA.

11. Unless otherwise specifically provided by written agreement (e.g. see A-7 above) no party is required to reimburse any other party for any work performed pursuant to this agreement.

12. All work covered herein will be performed in accordance with Title VI of the Civil Rights Act of 1964.

13. The BCDCOG shall continue to perform the functions required by Office of Management and Budget ("OMB") Circular A-95.

C. Execution

Berkeley-Charleston-Dorchester
Council of Governments

By: _____
Chairman
Title

Attest: _____

Director
Title

South Carolina State Highway Department

By: _____
State Highway Engineer
Title

Approved: _____

Chief Highway Commissioner
Title

Attest: _____

Secretary-Treasurer
Title

CHATS Policy Committee

By: _____
Chairman
Title

Attest: _____

Title

Attachment B

Charleston Area Transportation Study
Transportation Improvement Program (TIP)
and Annual Element

Approved September 26, 1978

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | NOTE: UW - CONTINUE PE COST AND/OR ROW COST IN ANNUAL ELEMENT AND TIP | | | |
| | | CHATS TIP AND ANNUAL ELEMENT<br>TIP PERIOD 7/1/78 TO 9/30/84 AE PERIOD 7/1/78 TO 9/30/79<br>REVIEWED AND APPROVED BY CHATS POLICY COMM 9/26/78 | | | | | | | |
| 01 | MARK CLARK EXPWY (SC 31)<br>SC 61 TO LEEDS AVE EXT (RD 475) | NEW FREEWAY | 2.00 | 01 U | M | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $4,140 | $4,140 | $2,700 |
| | | | | | | TOTAL | $4,140 | $4,140 | $2,700 |
| | | PRIMARILY BRIDGE COMPLETION INCLUDES BRIDGE OVER LEEDS AVE GRADE AND DRAINAGE ALMOST COMPLETED SOME BRIDGE CONTRACTS HAVE BEEN LET ROW IS NEARLY COMPLETED | | | | | | | |
| 02 | MARK CLARK EXPWY (SC 31)<br>US 17 AT SC7 TO SC61 | NEW FREEWAY | 1.68 | 01 U | M | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $7,256 | $7,256 | $4,200 |
| | | | | | | TOTAL | $7,256 | $7,256 | $4,200 |
| | | ROW IS NEARLY COMPLETED<br>DRAINAGE AND GRADE CONTRACT TO BE LET 9/78 (MONEY REFLECTED IN AE) | | | | | | | |
| 03 | SC 7<br>SC 61 (ASHLEY RIVER RD) TO US 17 SOUTH | WIDEN AND RELOCATE | 1.69 | 04 U | M | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $1,050 | $1,050 | $1,050 |
| | | | | | | TOTAL | $1,050 | $1,050 | $1,050 |
| | | WIDEN TO 4-LANES INCLUDES RELOCATION AT MARK CLARK EXPWY AND INTERSECTION IMPROVEMENTS AT US 17 SOUTH ROW IS NEARLY COMPLETED CONTRACT SCHEDULED TO BE LET 9/78 | | | | | | | |
| 04 | EAST BAY ST- MORRISON DR (US 52 SPUR)<br>COLUMBUS ST (RD 887) TO HUGER ST (RD 99) | WIDEN-REALIGN-CHANNELIZE | .69 | 05 U | M | PE | $10 | $10 | $10 |
| | | | | | | ROW | $50 | $50 | $50 |
| | | | | | | CONST | $390 | $390 | $390 |
| | | | | | | TOTAL | $450 | $450 | $450 |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| 05 | LADSON-GOOSE CREEK CONNECTOR RD 62 AND I-26 | NEW INTERCHANGE | .00 | 06 R | RS | PE | $36 | $36 | $36 |
| | | | | | | ROW | $75 | $75 | $75 |
| | | | | | | CONST | $1,339 | $1,339 | $1,339 |
| | | | | | | TOTAL | $1,450 | $1,450 | $1,450 |
| | | CONTRACT TO BE LET APPROX 2/79 | | | | | | | |
| 06 | US 17 BYPASS IMPROVEMENTS | INTERSECTION & FRONTAGE | .00 | 07 U | A | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $500 | $500 | $500 |
| | | | | | | TOTAL | $500 | $500 | $500 |
| | | ROW IS NEARLY COMPLETE INCLUDES RELOCATION OF MATHIS FERRY ROAD FRONTAGE ROAD NEAR BOWMAN ROAD | | | | | | | |
| 07 | I-26 AND MONTAGUE AVE(S-62) INTERCHANGE | INTERCHANGE IMPROVEMENTS UPGRADING INTERCHANGE | .00 | I | I | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $1,019 | $1,019 | $1,019 |
| | | | | | | TOTAL | $1,019 | $1,019 | $1,019 |
| | | ROW IS BEING ACQUIRED CONTRACT TO BE LET 11/78 | | | | | | | |
| 08 | MONTAGUE AVE & MALL DR (S-790) ADJACENT TO I-26 | UPGRADING | .00 | I | M | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $100 | $100 | $100 |
| | | | | | | TOTAL | $100 | $100 | $100 |
| 09 | GOER AVE (S-464) | UPGRADING FRONTAGE RD | .00 | 08 U | A | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $42 | $42 | $42 |
| | | | | | | TOTAL | $42 | $42 | $42 |
| | | CONTRACT TO BE LET 11/78 | | | | | | | |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| 10 | GOOSE CREEK RD (S-43) US 78 TO US 52 | (ANTLERS INTERCHANGE) 4-LANE W/ INTERSEC IMPS | .60 | 07 R | RF | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $308 | $308 | $308 |
| | | | | | | TOTAL | $308 | $308 | $308 |
| | | ROW IS VIRTUALLY COMPLETE | | | | | | | |
| 11 | GOOSE CREEK ROAD US 52 TO RESERVOIR | 4-LANE W/RR OVERPASS | .06 | 07 R | SAF | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $907 | $907 | $907 |
| | | | | | | TOTAL | $907 | $907 | $907 |
| | | PROJECT ENTAILS A RR SAFETY ITEM CONNECTS S-43 WITH ROAD 29 | | | | | | | |
| 12 | GOOSE CREEK ROAD RESERVOIR- RD 29/287 | WIDENING & RECONSTRUCTION | .03 | 07 R | RS | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $451 | $451 | $451 |
| | | | | | | TOTAL | $451 | $451 | $451 |
| 13 | MARK CLARK EXPWY (SC 31) LEEDS AVE EXT (RD475 TO MONTAGUE AVE (RD 2) | NEW FREEWAY | 1.55 | 01 U | M | PE | UW | UW | UW |
| | | | | | | ROW | UW | UW | UW |
| | | | | | | CONST | $5,840 | $5,840 | $0 |
| | | | | | | TOTAL | $5,840 | $5,840 | $0 |
| | | ROW IS NEARLY COMPLETED | | | | | | | |
| 14 | MARK CLARK EXPWY (SC 31) MONTAGUE AVE (RD 62) TO I-26 | NEW FREEWAY | 1.59 | 01 U | M | PE | $250 | $250 | $250 |
| | | | | | | ROW | $1,000 | $1,000 | $1,000 |
| | | | | | | CONST | $11,190 | $0 | $0 |
| | | | | | | TOTAL | $12,440 | $1,250 | $1,250 |
| | | ROW PLANS ARE COMPLETED | | | | | | | |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AF |
|---|---|---|---|---|---|---|---|---|---|
| 15 | MARK CLARK EXPWY (SC 31) MAYBANK HWY (SC 700) TO US 17 & SC 7 | NEW FREEWAY | 2.83 | 01 U | M | PE | $301 | $301 | $301 |
| | | | | | | ROW | $1,500 | $750 | $750 |
| | | | | | | CONST | $11,341 | $0 | $0 |
| | | | | | | TOTAL | $13,142 | $1,051 | $1,051 |
| 16 | MARK CLARK EXPWY (SC 31) FOLLY RD (SC 171) TO MAYBANK HWY (SC 700) | NEW FREEWAY | 4.10 | 01 U | M | PE | $336 | $336 | $50 |
| | | | | | | ROW | $1,800 | $1,800 | $0 |
| | | | | | | CONST | $12,654 | $0 | $0 |
| | | | | | | TOTAL | $14,790 | $2,136 | $50 |
| | | ADVANCE ROW PROTECTION | | | | | | | |
| 17 | SC 61 EXPWY NEAR SAVAGE RD (RD 1168) TO MARK CLARK EXPRESSWAYSC31 | NEW 4-LANE | .81 | 02 U | UF | PE | $10 | $10 | $10 |
| | | | | | | ROW | $250 | $250 | $250 |
| | | | | | | CONST | $346 | $346 | $0 |
| | | | | | | TOTAL | $606 | $606 | $260 |
| | | PE UNDERWAY | | | | | | | |
| 18 | JAMES ISLAND EXPWY AND BRIDGE WITH SC 61 CONNECTOR FOLLY RD (SC 171) TO LOCKWOOD DR(RD 1194) AND SC 61 AT US17 | NEW EXPRESSWAY | 4.30 | 03 U | M | PE | $1,610 | $1,200 | $1,200 |
| | | | | | | ROW | $1,000 | $0 | $0 |
| | | | | | | CONST | $40,000 | $0 | $0 |
| | | | | | | TOTAL | $42,610 | $1,200 | $1,200 |
| | | CONSULTANT CONTRACT FOR DESIGN FROM HARBOR VIEW RD TO LOCKWOOD BLVD IS EXPECTED TO BE COMPLETED IN 79 | | | | | | | |
| 19 | SC 61 (ASHLEY RIVER RD) WALLACE SCHOOL RD(RD 521)TO PAST SAVAGE ( RD 1168) | WIDEN TO 5-LANES | .34 | 06 U | UF | PE | $10 | $10 | $10 |
| | | | | | | ROW | $150 | $150 | $150 |
| | | | | | | CONST | $191 | $191 | $0 |
| | | | | | | TOTAL | $351 | $351 | $160 |
| | | PE UNDERWAY | | | | | | | |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AF |
|---|---|---|---|---|---|---|---|---|---|
| 20 | SAWMILL BRANCH PARKWAY US 17A NEAR I-26 TO SC 165 CAROLINA AVE | NEW 4-LANE | 2.78 | 02 R | RF | PE | $86 | $86 | $86 |
| | | | | | | ROW | $150 | $150 | $150 |
| | | | | | | CONST | $3,228 | $3,228 | $0 |
| | | | | | | TOTAL | $3,464 | $3,464 | $236 |
| | | SHOULDER TYPE CONST | | | | | | | |
| 21 | GUM STREET EXTENSION MAGNOLIA AT 6TH ST TO NEAR SAWMILL BRANCH PARKWAY | NEW 2-LANE | 1.30 | 03 R | RS | PE | $13 | $13 | $13 |
| | | | | | | ROW | $50 | $50 | $50 |
| | | | | | | CONST | $419 | $419 | $0 |
| | | | | | | TOTAL | $482 | $482 | $63 |
| | | NEW 2-LANE CONNECTOR AND BRIDGE WITH MINOR IMPROVEMENTS TO PRESENT GUM STREET | | | | | | | |
| 22 | US 78 I-26 TO NORTH OF RD 62 | WIDE TO 5-LANES | 1.40 | 04 R | RF | PE | $50 | $50 | $50 |
| | | | | | | ROW | $100 | $100 | $100 |
| | | | | | | CONST | $1,115 | $1,115 | $0 |
| | | | | | | TOTAL | $1,265 | $1,265 | $150 |
| 23 | US 78 NORTH OF RD 62 TO MAIN ST IN SUMMERVILLE | WIDE TO 5-LANES | 4.70 | 04 R | RF | PE | $55 | $55 | $55 |
| | | | | | | ROW | $350 | $350 | $350 |
| | | | | | | CONST | $2,055 | $2,055 | $0 |
| | | | | | | TOTAL | $2,460 | $2,460 | $405 |
| 24 | LADSON-GOOSE CREEK CONNECTOR LADSON RD(RD 76) TO PRESENT RD 62 NEAR I-26 | RELOCATION-LADSON RD-RD62 | 1.13 | 08 R | RS | PE | $12 | $12 | $12 |
| | | | | | | ROW | $400 | $400 | $400 |
| | | | | | | CONST | $448 | $448 | $0 |
| | | | | | | TOTAL | $860 | $860 | $412 |
| 25 | LADSON-GOOSE CREEK CONNECTOR RD 62 TO US 176 AT RD 45 | NEW 2-LANE | 3.06 | 08 R | RS | PE | $18 | $18 | $18 |
| | | | | | | ROW | $130 | $130 | $130 |
| | | | | | | CONST | $601 | $0 | $0 |
| | | | | | | TOTAL | $749 | $148 | $148 |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| 26 | CAROLINA AVE (SC 165) MAIN ST (US 17A) TO TROLLEY RD (RD 199) | WIDE TO 5-LANES | .60 | 09 R | RF | PE | $14 | $14 | $14 |
| | | | | | | ROW | $20 | $20 | $20 |
| | | | | | | CONST | $521 | $521 | $0 |
| | | | | | | TOTAL | $555 | $555 | $34 |
| | | PLANS ARE UNDERWAY ON DEVELOPMENT OF 0.50MI. SECTION BETWEEN MAGNOLIA RD (TWIN OAKS)-RD 208 AND LOWER ENTRANCE TO SUMMERVILLE MALL AS POSSIBLE SAFETY PROJECT | | | | | | | |
| 27 | SC 61 EXPRESSWAY MARK CLARK EXPWY (SC 31) TO BEES FERRY RD (RD 57) | NEW 4-LANE | 2.00 | 10 R | RF | PE | $25 | $25 | $25 |
| | | | | | | ROW | $575 | $575 | $275 |
| | | | | | | CONST | $2,446 | $0 | $0 |
| | | | | | | TOTAL | $3,046 | $600 | $300 |
| | | PE UNDERWAY | | | | | | | |
| 28 | I-26 AND MARK CLARK EXPWY (SC 31) INTERCHANGE MONTAGUE AVE (S-62) TO AVIATION AVE (RD 1342) | NEW INTERCHANGE-WIDENING | .00 | I | I | PE | $21 | $21 | $21 |
| | | | | | | ROW | $959 | $959 | $959 |
| | | | | | | CONST | $6,660 | $6,660 | $0 |
| | | | | | | TOTAL | $7,640 | $7,640 | $980 |
| | | PE UNDERWAY PROPOSED INTERSTATE ESTIMATED COST OF COMPLETE INTERCHANGE AND WIDENING OF I-26 BETWEEN MONTAGUE AND AVIATION | | | | | | | |
| 29 | MARK CLARK EXPWY I-526 TO US 17 | NEW FREEWAY | 3.10 | 10 R | RF | PE | $420 | $210 | $100 |
| | | | | | | ROW | $1,800 | $900 | $0 |
| | | | | | | CONST | $11,780 | $5,890 | $0 |
| | | | | | | TOTAL | $14,000 | $7,000 | $100 |
| 30 | ISLE OF PALMS CONNECTOR 14TH STREET ISLE OF PALMS TO US 17 NORTH | NEW 2-LANE | 3.86 | 01 R | RF | PE | $75 | $75 | $75 |
| | | | | | | ROW | $200 | $200 | $0 |
| | | | | | | CONST | $13,920 | $0 | $0 |
| | | | | | | TOTAL | $14,195 | $275 | $75 |

TRANSPORTATION IMPROVEMENT [illegible]
DATE 10/17/78 [illegible]RLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (. $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| 31 | SAWMILL BRANCH PARKWAY SC 165 CAROLINA AVE BACONS BRIDGE RD TO US17A SOUTH NEARRD22 | NEW 2-LANE | 3.13 | 02 R | RF | PE | $37 | $37 | $37 |
| | | | | | | ROW | $0 | $0 | $0 |
| | | | | | | CONST | $1,387 | $1,387 | $0 |
| | | | | | | TOTAL | $1,424 | $1,424 | $37 |
| | | SHOULDER TYPE CONST | | | | | | | |
| 32 | DORCHESTER ROAD (SC 642) ASHLEY PHOSPHATE RD (RD 62) TO TROLLEY RD (RD 199) | WIDE TO 4L DIVIDED | 4.21 | 05 R | RS | PE | $33 | $33 | $33 |
| | | | | | | ROW | $200 | $200 | $0 |
| | | | | | | CONST | $1,254 | $1,254 | $0 |
| | | | | | | TOTAL | $1,487 | $1,487 | $33 |
| 33 | US 78 (UNIVERSITY BLVD) US 52 ANTLERS INTER TO I-26 | WIDEN TO 5-LANES | 1.99 | 06 R | RF | PE | $18 | $18 | $18 |
| | | | | | | ROW | $100 | $100 | $0 |
| | | | | | | CONST | $669 | $669 | $0 |
| | | | | | | TOTAL | $787 | $787 | $18 |
| 34 | BACONS BRIDGE RD (SC 165) TROLLEY RD (RD 199) TO DORCHESTER CREEK | WIDEN TO 5-LANES | 2.00 | 09 R | RF | PE | $34 | $34 | $34 |
| | | | | | | ROW | $3 | $3 | $0 |
| | | | | | | CONST | $1,123 | $1,123 | $0 |
| | | | | | | TOTAL | $1,160 | $1,160 | $34 |
| 35 | MARK CLARK EXPWY (I-526) I-26 TO E. OF WANDO | NEW FREEWAY | 8.70 | I | I | PE | $5,356 | $5,356 | $250 |
| | | | | | | ROW | $4,746 | $4,746 | $0 |
| | | | | | | CONST | $136,993 | $136,993 | $0 |
| | | | | | | TOTAL | $147,095 | $147,095 | $250 |
| 36 | RED BANK ROAD CONN 29/287 - RED BANK RD | WIDEN & PCSS RELOCATION | .04 | 11 R | RS | PE | $10 | $10 | $10 |
| | | | | | | ROW | $10 | $0 | $0 |
| | | | | | | CONST | $160 | $0 | $0 |
| | | | | | | TOTAL | $180 | $10 | $10 |

TRANSPORTATION IMPROVEMENT PROGRAM AND ANNUAL ELEMENT
DATE 10/17/78 CHARLESTON URBAN AREA

| | NAME AND ROUTE OR ROAD TERMINI | IMPROVEMENT PROPOSED | DIST. | LOCAL PRIORITY | FUNDING CATEGORY | ESTIMATED UNOBLIGATED COST (IN $1,000) | TOTAL | TIP | AE |
|---|---|---|---|---|---|---|---|---|---|
| 37 | SMITH ST (RD 1307) EXTENSION (LINCOLNVILLE) CHAS COUNTY-MILES RD (RD377) | NEW 2-LANE EXTENSION | .40 | L2 R | 0 | PE | $5 | $5 | $0 |
| | | | | | | ROW | $20 | $20 | $0 |
| | | | | | | CONST | $100 | $100 | $0 |
| | | | | | | TOTAL | $125 | $125 | $0 |

DOES NOT QUALIFY FOR FAS FUNDS

NEXT THREE PROJECTS PROPOSED AS DEFENSE ACCESS PROJECTS
AS RECOMMEND IN 1995 CHATS TRANSPORTATION PLAN

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 38 | RED BANK ROAD (S-29) | | .00 | | DA | PE | | | |
| | | | | | | ROW | | | |
| | | | | | | CONST | | | |
| | | | | | | TOTAL | | | |
| 39 | NORTH RHETT EXTENSION (S-136)-DEFENSE ACCESS ROAD | | .00 | | DA | PE | | | |
| | | | | | | ROW | | | |
| | | | | | | CONST | | | |
| | | | | | | TOTAL | | | |
| 40 | ASHLEY PHOSPHATE ROAD EXTENSION US 52 AT (S-75) TO N RHETT EXT (S-136) | | .00 | | DA | PE | | | |
| | | | | | | ROW | | | |
| | | | | | | CONST | | | |
| | | | | | | TOTAL | | | |

CHARLESTON

10/17/78

SUMMARY OF PROGRAM COST

| CATEGORIES | COST ($1,000) TOTAL | TIP | AE | FUNDING FOR ANNUAL ELEMENT FED. SHARE | STATE SHARE | IMPL. AGENCY |
|---|---|---|---|---|---|---|
| URBAN SYSTEM (M) | $101,818 | $24,473 | $12,051 | $8,435 | $3,616 | DHPT |
| URBAN PRIMARY (UF) | $957 | $957 | $420 | $294 | $126 | DHPT |
| RURAL PRIMARY (RF) | $42,664 | $19,298 | $1,697 | $1,188 | $509 | DHPT |
| RURAL SECONDARY (RS) | $5,659 | $4,888 | $2,567 | $1,797 | $770 | DHPT |
| SUBTOTAL | $151,098 | $49,616 | $16,760 | | | |
| INTERSTATE (I) | $155,754 | $155,754 | $2,249 | $2,024 | $225 | DHPT |
| STATE (A) | $542 | $542 | $542 | $0 | $542 | DHPT |
| SAFETY (SAF) | $907 | $907 | $907 | Variable Funding Ratios | | DHPT |
| OTHER | $125 | $125 | $0 | Variable Funding Ratios | | DHPT |
| SUBTOTAL | $157,328 | $157,328 | $3,698 | | | |
| SUBTOTAL | $308,426 | $206,944 | $20,433 | | | |

URBAN SYSTEM
GUIDE SHARE - $5,500

AIR POLLUTION CONTROL REGULATIONS

REGULATION NO. 62.1

DEFINITIONS AND PERMIT REQUIREMENTS

SECTION I - DEFINITIONS

The following words and phrases when used in the Regulations and Standards shall for the purpose of these regulations have the meanings respectively ascribed to them in this section, unless a different meaning is clearly indicated. This section augments Section 1 of the South Carolina Pollution Control Act.

1. Acid Mist - Mist or droplets of sulfuric or other strong acids.

2. Add - Additions to a process which will increase size, scope or emissions from such process.

3. Alter - Alter means modification or change in a process or processes which would affect emissions to the atmosphere.

4. Ambient Air Quality Standards - That standard for the quality of ambient air at or beyond a property line on which a source of pollution is emitting.

5. Application - Means a form provided by the Department which is prescribed to provide the information required to grant approval to construct and operate a source or an incinerator; or to report an existing incinerator.

6. Board - Board means Board of Health and Environmental Control.

7. Commissioner - Commissioner means the Commissioner of the Department of Health and Environmental Control.

8. Department - Department means the Department of Health and Environmental Control.

9. Environmental Location - Location of human, plant, or animal life or property.

10. Fuel Burning Operation - Use of furnace, boiler, device or mechanism used principally but not exclusively, to burn any fuel for the purpose of indirect heating in which the material being heated is not contacted by and adds no substance to the products of combustion.

11. Fugitive Dust - Solid airborne particulate matter emitted at or near ground level from any source other than a flue.

12. Garbage - Animal and vegetable waste resulting from the handling, preparation, cooking and serving of foods.

13. Hazardous Air Pollutant - Those pollutants which are the subject of National Emission Standards for Hazardous Air Pollutants promulgated by the United States Environmental Protection Agency by publication in the Federal Register.

14. Incinerator - Means an engineered apparatus and all appurtenances thereto, designed to reduce combustible solid, semi-solid, liquid, or gaseous waste by high temperature burning.

15. Mass Emission Rate - The weight discharged per unit of time.

16. Opacity - The degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

17. Open Burning - Any fire or smoke-producing process which is not conducted in any boiler plant, furnace, high-temperature processing unit, incinerator or flare, or in any other such equipment primarily designed for the combustion of fuel or waste material.

18. Particulate Matter - Any materials, except uncombined water, that exists in a finely divided form as a liquid or solid at standard conditions.

19. Process Industry - Any source engaged in the manufacture, processing, handling, treatment, forming, storing or any other action upon materials except fuel-burning operations.

20. Process Weight - The total weight of all materials introduced into a source operation, including air and water where these materials become an integral part of the product, and solids used as fuels but excluding liquids and gases used solely as fuels.

21. Process Weight Rate - A rate established as follows:

(a) For continuous or long-run steady-state source operations, the total process weight for the entire period of continuous operation or for a typical portion thereof, divided by the number of hours of such period or portion thereof.

(b) For cyclical or batch unit operations, or unit processes, the total process weight for a period that covers a complete operation or an integral number of cycles, divided by the hours of actual process operation during such a period.

Where the nature of any process or operation or the design of any equipment is such as to permit more than one interpretation of this definition, the interpretation that results in the minimum value for allowable emission shall apply.

22. Refuse - Garbage, rubbish and/or trade waste.

23. Ringelmann Chart - The chart published and described in the U.S. Bureau of Mines Information Circular 7718, on which is illustrated graduated shades of gray to black for use in estimating the light obscuring capacity of smoke.

24. Rubbish - Solid wastes from residences and dwellings, commercial establishments, and institutions.

25. Salvage Operations - Any operation of a business, trade, or industry engaged in whole or in part in salvaging or reclaiming any product or material including, but not limited to, metals, chemicals, shipping containers, drums or automobiles.

26. Smoke - Small gas-borne and airborne particles arising from a process of combustion in sufficient number to be observable by a person of normal vision under normal conditions.

27. Solid Fuel - A fuel which is fired as a solid such as coal, lignite and wood.

28. Stack - Any flue, conduit, duct, chimney, or opening arranged to conduct an effluent into the open air.

29. Stack Height - The vertical distance measured in feet between the point of discharge from the stack or chimney into the outdoor atmosphere and the elevation of the land thereunder.

30. Standard Conditions - 760 millimeters of mercury at 25° Centigrade.

31. Trade Waste - All solid, liquid or gaseous material or rubbish resulting from construction, building operations, or the prosecution of any business, trade or industry including, but not limited to, plastic products, cartons, paint, grease, oil and other petroleum products, chemicals and cinders.

SECTION II - PERMIT REQUIREMENTS

A. Construction Permit

Any person who plans to construct, alter or add to a source of air contaminants, including the installation of any device for the control of air contaminant discharges, shall first obtain a construction permit from the Department. The Department may grant permission to proceed with minor alterations or additions without issuance of a permit when the Department determines that the alteration or addition will not affect the quantity or character of the source emission.

B. Operating Permit

Any person who plans to place into operation a new source of air contaminants, including any device for the control of air contaminant discharges, shall first obtain an operating permit from the Department. Any person who plans to continue operation of any existing source for which he possesses a valid operating permit shall renew such permit prior to expiration. Operating permits will be issued for a specified period of time, but in no case to exceed five (5) years. The Department may issue temporary permits to newly constructed, enlarged or altered sources to provide additional time for adequate evaluation of such sources and to existing sources not presently in compliance with these regulations and standards if acceptable compliance schedules are placed as conditions of the permit.

C. Permit Application

1. Construction permit applications shall be prepared and submitted by a professional engineer registered to practice in the State of South Carolina and shall provide, as a minimum, the following information:

   a. The name and location of the facility and its planned operating schedules;

b. Sufficient description, including physical and chemical properties, of materials and processes necessary for the Department to determine actual and potential emissions;

c. Identification of all emission points;

d. A description, including physical and chemical properties of all emissions;

e. A complete description including engineering design and operating characteristics of any air pollution control device or system that is to be installed; and

f. Other information as may be necessary for proper evaluation of the proposed source as determined by the Department.

2. Operating permit applications shall be submitted to the Department no later than fifteen (15) days prior to placing any new, increased or altered source into operation and no later than sixty (60) days prior to the expiration date for a source already possessing a valid operating permit.

D. Special Permit Conditions

All permits shall contain, in addition to such special conditions as the Department finds appropriate, the following standard conditions:

1. No applicable law, regulation or standard will be contravened;

2. All official correspondence, plans, permit application forms and written statements are an integral part of the permit; and

3. Any malfunction of air pollution control equipment or system, process upset or other equipment failure which results in greater discharges of air contaminants than were described for normal operation in the permit application shall be reported to the Department within twenty-four hours after the beginning of the occurrence and a written report submitted to the Department within 30 days. The written report shall include, as a minimum, the following:

a. The identity of the stack and/or other emission point where the excess emissions occurred;

b. The magnitude of the excess emissions expressed in the units of the applicable emission limitation and the operating data and calculations used in determining the magnitude of the excess emissions;

c. The time and duration of the excess emissions;

d. The identity of the equipment causing the excess emission;

e. The nature and cause of such excess emissions;

f. The steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunction;

g. The steps taken to limit the excess emissions; and

h. Documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions.

E. Exemptions

1. No permits shall be required for the following sources constructed prior to February 11, 1971:

a. Natural gas boilers;

b. Oil fired boilers of 50,000,000 BTU/HR rated capacity or smaller; and

c. Coal fired boilers of 20,000,000 BTU/HR rated capacity or smaller.

2. No permits shall be required for the following sources:

a. Boilers and space heating systems of less than 1,500,000 BTU/HR rated capacity;

b. Comfort air conditioning or ventilation systems;

c. Motor vehicles;

d. Laboratory hoods;

e. Emergency power generators of less than 150 KW rated capacity; and

f. Sources emitting only steam, air, nitrogen, oxygen, carbon dioxide, or any physical combination of these. When such sources are found to be in violation of the visible emission standards, the Department may require operating permits to assure compliance with the standards.

3. Package-type incinerators of 750 pounds per hour rated capacity or smaller which burn types 0 and 1 wastes as defined by the Incinerator Institute of America and package-type boilers of 100,000,000 BTU/HR rated capacity or smaller which burn natural gas or oil as fuel are exempt from the requirement that the construction permit applications be prepared and submitted by a registered professional engineer provided the proposed unit is identical to a proto-type model which has been previously designed or otherwise certified by a professional engineer.

## REGULATION NO. 62.2

## PROHIBITION OF OPEN BURNING

Open burning may be conducted in certain situations if no undesirable levels are or will be created. The authority to conduct open burning under this Regulation does not exempt or excuse the person responsible for the burning from the consequences of or the damages or injuries resulting from the burning and does not exempt or excuse anyone from complying with other applicable laws and with ordinances, regulations, and orders of governmental entities having jurisdiction, even though the burning is otherwise conducted in compliance with this Regulation. The Department reserves the right to impose other or different restrictions and exemptions on open burning in addition to those enumerated below, whenever in the judgement of the Department such is necessary to realize the purpose of this Regulation. Open burning is prohibited except as provided below:

A. Open burning of leaves, tree branches or yard trimmings originating on the premises of private residences or dwellings of four families or less, and burned on those premises.

B. Open burning in connection with the preparation of food for immediate consumption.

C. Campfires and fires used solely for recreational purposes or for ceremonial occasions.

D. Fires purposely set to forest lands for specific management practices in accordance with guidelines acceptable to the Department. Such practices shall include:

   1. Prescribed burning under existing standards for various management objectives and

   2. Site preparation burning for purposes of clearing an area for regeneration.

E. Fires purposely set for agricultural control of diseases, weeds, pests, and for other specific agricultural purposes in accordance with practices acceptable to the Department of Health and Environmental Control.

F. Open burning of trees, brush, grass and other vegetable matter for game management purposes in accordance with practices acceptable to the Department of Health and Environmental Control.

G. Open burning in other than predominantly residential area for the purpose of land clearing or right-of-way maintenance. This will be exempt only if the following conditions are met:

1. Prevailing winds at the time of the burning are away from any city or town, the ambient air of which may be significantly affected by smoke from the burning;

2. The location of the burning is at least one thousand (1,000) feet from all residential, commercial and industrial facilities other than a dwelling or structure located on the property on which the burning is conducted;

3. The amount of dirt on the material being burned is minimized;

4. Heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any materials other than plant growth which produces smoke in excess of forty (40) percent opacity are not a part of the material burned;

5. The initial burning may be commenced only between the hours of 9:00 a.m. and 3:00 p.m.; no combustible material is added to the fire between 3:00 p.m. of one day and 9:00 a.m. the following day;

6. No more than one pile 60' x 60' or equivalent will be burned within a six-acre area at one time;

7. In the case of land clearing, all salvageable timber and pulpwood must be removed; and

8. A written report or warning to a person of a violation at one site shall be considered adequate notice of the Regulation and subsequent observed violations at the same or different site will result in immediate appropriate legal action by the Board.

H. Fires set for the purposes of training public fire-fighting personnel when authorized by the appropriate governmental entity, and fires set by a private industry as a part of an organized program of drills for the training of industrial fire-fighting personnel. These will be exempt only if the drills are solely for the purpose of fire-fighting training and the duration of the burning held to the minimum required for such purposes.

I. Open burning of rubbish and garbage on the premises of and originating from private residences or dwellings of four families or less where services for the disposal of such materials are not available; and open burning on the property where it occurs of trade waste from building and construction operations will be exempt only if the following conditions are met:

1. The location of the burning is at least five hundred (500) feet from any dwelling located in a predominantly residential area other than a dwelling or structure located on the property on which the burning is conducted;

2. Heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any other trade waste which produce amounts of smoke in excess of forty (40) percent opacity are not burned; and

3. The initial burning is commenced only between the hours of 9:00 a.m. and 3:00 p.m.; no additional fuel shall be added before 9:00 a.m. of the following day.

J. Open burning, in remote or specified areas:

1. Of such trade waste as constitutes rubbish as defined in this Regulation provided smoke in excess of forty (40) percent opacity is not emitted except for a reasonable period to get the fire started, and the burning is conducted in accordance with Paragraph G of this regulation.

2. Of highly explosive or other dangerous material for which there is no other feasible method of disposal.

3. For non-recurring unusual circumstances.

4. For experimental burning for purposes of data gathering and research.

However, a written permit for these types of burning (in sub-paragraph J above) must be obtained in advance from the Department.

REGULATION NO. 62.3

AIR POLLUTION EPISODES

SECTION I - EPISODE CRITERIA

Conditions justifying the proclamation of any stage of an air pollution episode shall be deemed to exist whenever the Commissioner determines that the accumulation of air pollutants in any place is attaining or has attained levels which could, if such levels are sustained or exceeded, lead to substantial threat to the health of persons. The appropriate episode stage will be declared on a regional basis, as dictated by air quality monitoring. Adverse air quality need not be regionwide to trigger control actions; the appropriate episode stage will be declared for an entire Air Quality Control Region when any monitoring site within the region records ambient air quality in excess of that designated in the criteria. In making this determination, the Commissioner will be guided by the criteria listed below:

1. FORECAST - This level will normally be activated when an Air Stagnation Advisory (ASA) is issued for any part of South Carolina by the Columbia Forecast Office of the National Weather Service. If continuous air monitoring equipment indicates an upward trend in pollutant concentrations, the Commissioner may request that the National Weather Service issue an ASA, even though meteorological factors do not appear critical. In the absence of an ASA, the Commissioner may, at his discretion, declare this level when it is in the best interest of public health and welfare.

2. WATCH - This level will be activated when continuous air quality monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 400 ug/m$^3$ (0.15 p.p.m.), 24-hour average;
   Particulate - 375 ug/m$^3$, 24-hour average;
   $SO_2$ and particulate combined - Product of $SO_2$ ug/m$^3$, 24-hour average, and particulate ug/m$^3$, 24-hour average equal to 49 x 10$^3$;
   $O_3$ (Oxidant) - 200 ug/m$^3$ (0.1 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

   and meteorological conditions are such that the pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

3. ALERT - This level indicates that air quality is continuing to deteriorate and that additional control actions are necessary. An alert will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 800 ug/m$^3$ (0.3 p.p.m.), 24-hour average;
   Particulate - 500 ug/m$^3$, 24-hour average;
   $SO_2$ and particulate combined - product of $SO_2$ ug/m$^3$, 24-hour average and particulate ug/m$^3$, 24-hour average equal to 229 x 10$^3$;
   $O_3$ (Oxidant) - 800 ug/m$^3$ (0.4 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

and meteorological conditions are such that pollutant concentrations can be expected to remain at the above levels for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

4. EMERGENCY - The primary objective of this plan is to prevent this level from ever being reached; however, should this level be reached the most stringent control actions are necessary. An emergency will be declared when monitoring indicates that one of the following pollutant concentrations has been reached:

   $SO_2$ - 1600 ug/$m^3$ (0.6 p.p.m.), 24-hour average;
   Particulate - 750 ug/$m^3$, 24-hour average;
   $SO_2$ and particulate combined - product of $SO_2$ ug/$m^3$, 24-hour average and particulate ug/$m^3$, 24-hour average equal to 425 x $10^3$;
   $O_3$ (Oxidant) - 1000 ug/$m^3$ (0.5 p.p.m.), 1-hour average (Metropolitan Charlotte AQCR only);

   and meteorological conditions are such that this condition can be expected to continue for twelve (12) hours or more, or increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

5. TERMINATION - Once delcared, any level reached by application of these criteria will remain in effect until the criteria for that level are no longer met. At such time, the next lower level will be assumed.

SECTION II - EMISSION REDUCTION REQUIREMENTS

Persons responsible for the operation of a source of air pollutants as listed in Tables 1, 2 and 3 below are required to plan for and may be required to implement emission reduction as indicated.

TABLE 1 - EMISSION REDUCTION PLANS
WATCH LEVEL

PART A. GENERAL

When a Watch Level is declared, the following voluntary actions will be requested:

1. There should be no open burning by any persons of tree waste, vegetation, refuse, or debris in any form.

2. The use of incinerators for the disposal of any form of solid waste should be limited to the hours between 12 noon and 4 p.m.

3. Persons operating fuel-burning equipment which requires boiler lancing or soot blowing should perform such operations between the hours of 12 noon and 4 p.m.

4. Persons operating motor vehicles should eliminate all unnecessary operations.

## PART B. SOURCE CURTAILMENT

Persons responsible for the operation of a source of air pollutants listed below shall be advised of existing conditions and be advised to review their emission reduction plans:

1. Coal or oil-fired electric power generating facilities.

2. Coal or oil-fired process steam generating facilities.

3. Manufacturing industries of the following classifications:

| | |
|---|---|
| Primary Metals Industry | Mineral Processing Industries |
| Petroleum Refining Operations | Paper and Allied Products |
| Chemical Industries | Grain Industry |

## TABLE 2 - EMISSION REDUCTION PLANS
## ALERT LEVEL

## PART A. GENERAL

Upon declaration of an Alert Level the following will apply:

1. There shall be no open burning by any persons of tree waste, vegetation, refuse, or debris in any form.

2. The use of incinerators for the disposal of any form of solid waste or liquid waste shall be prohibited.

3. Persons operating fuel-burning equipment which requires boiler lancing or soot blowing shall perform such operations only between the hours of 12 noon and 4 p.m.

4. Persons operating motor vehicles are requested to reduce operations by the use of car pools and increased use of public transportation and elimination of unnecessary operation.

## PART B. SOURCE CURTAILMENT

Any person responsible for the operation of a source of air pollutants listed below shall take all required control actions for this Alert Level to include the following:

1. Coal or oil-fired electric power generating facilities:

   a. Maximum reduction by utilization of fuels having lowest ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Maximum reduction by diverting electric power generation to facilities outside of Alert Area.

2. Coal and Oil-fired process steam generating facilities:

   a. Maximum reduction by utilization of fuels having the lowest available ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Making ready for use a plan of action to be taken if an emergency develops.

3. Manufacturing industries including petroleum refining, chemical, primary metals, glass, paper and allied products which require considerable lead time for shut-down:

   a. Maximum reduction of air contaminants from manufacturing operations by, if necessary, assuming reasonable economic hardships by postponing production and allied operations.

   b. Maximum reduction by deferring trade waste disposal operations which emit solid particles, gases, vapors or any malodorous substances.

   c. Maximum reduction of heat load demands for processing.

   d. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

4. Manufacturing industries including primary metals, chemical, mineral processing and grain which require relatively short lead times for shut-down:

   a. Elimination of air pollutants from manufacturing operations by ceasing, curtailing, postponing or deferring production and allied operations to the extent possible without causing injury to persons or damage to equipment.

   b. Elimination of air pollutants from trade waste disposal processes which emit solid particles, gases, vapors or malodorous substances.

   c. Maximum utilization of heat load demands for processing.

   d. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

TABLE 3 - EMISSION REDUCTION PLANS
EMERGENCY LEVEL

PART A. GENERAL

Upon declaration of Emergency Level the following will apply:

1. There shall be no open burning by any persons of tree waste, vegetation, refuse or debris in any form.

2. The use of incinerators for the disposal of any form of solid or liquid waste shall be prohibited.

3. All places of employment described below shall immediately cease operations:

   a. Mining and quarrying of nonmetallic minerals.

   b. All construction work except that which must proceed to avoid emergency physical harm.

   c. All manufacturing establishments except those required to have in force an air pollution emergency plan.

   d. All wholesale trade establishments, i.e., places of business primarily engaged in selling merchandise to retailers, or industrial, commercial, institutional or professional users, or to other wholesalers or acting as agents in buying merchandise for or selling merchandise to such persons or companies except those engaged in the distribution of drugs, surgical supplies and food.

   e. All offices of local, county and State government including authorities, joint meetings and other public bodies except such agencies which are determined by the chief administrative officer of local, county, or state government,authorities, joint meetings and other public bodies to be vital for public safety and welfare and the enforcement of the provisions of this order.

   f. All retail trade establishments except pharmacies, surgical supply distributors, and stores primarily engaged in the sale of food.

   g. Banks, credit agencies other than banks, securities and commodities brokers, dealers, exchangers and services; offices of insurance carriers; agents and brokers, real estate offices.

   h. Wholesale and retail laundries, laundry services and cleaning and dyeing establishments; photographic studios; beauty shops, barber shops, shoe repair shops.

   i. Advertising offices; consumer credit reporting, adjustment and collection agencies; duplicating, addressing, blueprinting; photocopying, mailing, mailing list and stenographic services; equipment rental services, commercial testing laboratories.

   j. Automobile repair, automobile services, garages.

   k. Establishments rendering amusement and recreational services including motion picture theaters.

1. Elementary and secondary schools, colleges, universities, professional schools, junior colleges, vocational schools, and public and private libraries.

4. All commercial and manufacturing establishments not included in this order will institute such actions as will result in maximum reduction of air pollutants from their operation by ceasing, curtailing, or postponing operations which emit air pollutants to the extent possible without causing injury to persons or damage to equipment.

5. The use of motor vehicles is prohibited except in emergencies with the approval of local or state police.

PART B. SOURCE CURTAILMENT

Any person responsible for the operation of a source of air pollutants listed below shall take all required control actions for this Emergency Level to include the following:

1. Coal or oil-fired electric power generating facilities:

   a. Maximum reduction by utilization of fuels having lowest ash and sulfur content.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

   c. Maximum reduction by diverting electric power generation to facilities outside of Emergency Area.

2. Coal and oil-fired process steam generating facilities:

   a. Maximum reduction by reducing heat and steam demands to absolute necessities consistent with preventing equipment damage.

   b. Maximum utilization of mid-day (12 noon to 4 p.m.) atmospheric turbulence for boiler lancing and soot blowing.

   c. Take the action called for in the emergency plan.

3. Primary metals, petroleum refining, chemical, mineral processing, grain, paper and allied products industries shall take the following control actions:

   a. Elimination of air pollutants from manufacturing operations by ceasing, curtailing, postponing or deferring production and operations to the extent possible without causing injury to persons or damage to equipment.

   b. Elimination of air pollutants from trade waste disposal processes which emit solid particles, gases, vapors, or malodorous substances.

   c. Maximum reduction of heat load demands for processing.

   d. Maximum utilization of mid-day (12noon to 4 p.m.) atmospheric turbulence for boiler lancing or soot blowing.

## REGULATION NO. 62.4

## HAZARDOUS AIR POLLUTION CONDITIONS

### A. Definitions

The following words and phrases when used in this regulation shall have the meanings respectively ascribed to them:

1. Hazardous Conditions (or hazardous levels) - Conditions created by the release or discharge into the ambient air of one or more air contaminants which because of the characteristic and/or quantity of material involved may pose an imminent threat to the health of anyone who might come in contact with the material through this release as well as involving substantial risk of injury, to include injury to property or plant and animal life. This includes the indirect threat to human life and property by the creation of traffic hazards.

2. Traffic Hazards - Impairment of visibility whenever the concentration of dust, fumes, condensed vapor, or any other substance is such that the horizontal visibility at or near ground level is reduced to 2400 feet or less.

### B. General

The owner or operator of any source, in addition to complying with all applicable regulations and standards, shall take all steps necessary to protect human health and welfare and otherwise minimize the effects of unintended, short-term or other releases of air contaminants and other substances which produce unintended hazardous conditions.

### C. Traffic Hazards

The emission of smoke, dust, fumes, condensed vapor, or any other substance which creates a traffic hazard on public roads by impairment of visibility, or intensifies an existing condition to the extent that a traffic hazard is created is prohibited.

### D. Emergency Actions

In the event that releases of dust, fumes, smoke, gases, mists, vapors or other substances occur in such quantity as to create imminently hazardous levels, the owner or operator of the source shall take all necessary emergency acts to cause the release to cease, to notify nearby residents and occupants, to assist in evacuation if deemed necessary, to notify the Department immediately and to take such other action as responsible officials deem advisable.

### E. Cleanup

If releases to the atmosphere of air contaminants result from spillage and cause such concentrations as to produce an imminently hazardous level, clean up activities shall begin as soon as possible and shall be completed to the satisfaction of the Commissioner.

F. Notification

The affected public, the Department, the South Carolina Disaster Preparedness Agency, and all law enforcement officials having jurisdiction shall be notified promptly by the owner or operator of the source in the event of releases of material which may cause imminently hazardous levels. If traffic hazards are created, notification shall be made to appropriate state or local agencies of the possible existence of such a condition and of the corresponding need for posting of appropriate signs, warning devices or flagmen. When the concentrations of materials are reduced sufficiently as to no longer present an imminent hazard, public announcement will be made, and normal operations may resume.

REGULATION 62.5

AIR POLLUTION CONTROL STANDARDS

STANDARD NO. 1
EMISSIONS FROM FUEL BURNING OPERATIONS

SECTION I - VISIBLE EMISSIONS

A. Existing Sources

No one shall discharge to the ambient air from any existing source constructed prior to February 11, 1971, smoke which exceeds an opacity of forty (40) percent. For a total of six (6) minutes in one hour or twenty-four (24) minutes in a twenty-four (24) hour period, forty (40) percent opacity may be exceeded for soot blowing; but shall in no case exceed an opacity of sixty (60) percent.

B. New Sources

No one shall discharge to the ambient air from any source constructed on or after February 11, 1971, smoke which exceeds an opacity of twenty (20) percent. For a total of six (6) minutes in one hour or twenty-four (24) minutes in a twenty-four (24) hour period, twenty (20) percent opacity may be exceeded for soot blowing; but shall in no case exceed an opacity of sixty (60) percent.

C. Special Provisions

Allowances may be granted for visible emissions in excess of that permitted in Paragraphs A and B above which occur during periods of start-up and shut-down of fuel burning equipment. As a conditional requirement the owner or operator shall maintain a current record of the time, magnitude, duration and any other information necessary to prove that these excess emissions were a result of a start-up or shut-down operation. These records shall be made available to the Department upon request. Different soot blowing provisions for a single stack serving multiple boilers may be allowed as conditions of the operating permit.

SECTION II - PARTICULATE EMISSIONS

A. Allowable Discharge

The allowable discharge of particulate matter resulting from fuel burning operations shall be limited to the values obtained by use of Figure 1 and/or Part B. (For the purpose of determining heat input, total equipment capacity refers to total equipment capacity discharging through each stack. If a boiler has more than one (1) stack the total rated capacity will be the boiler rated capacity discharging to these stacks). Interpolation of Figure 1 for fuel burning operations of 1300 million BTU per hour heat input and larger shall be accomplished by use of the equation:

$$E = 57.84\ P^{-0.637}$$

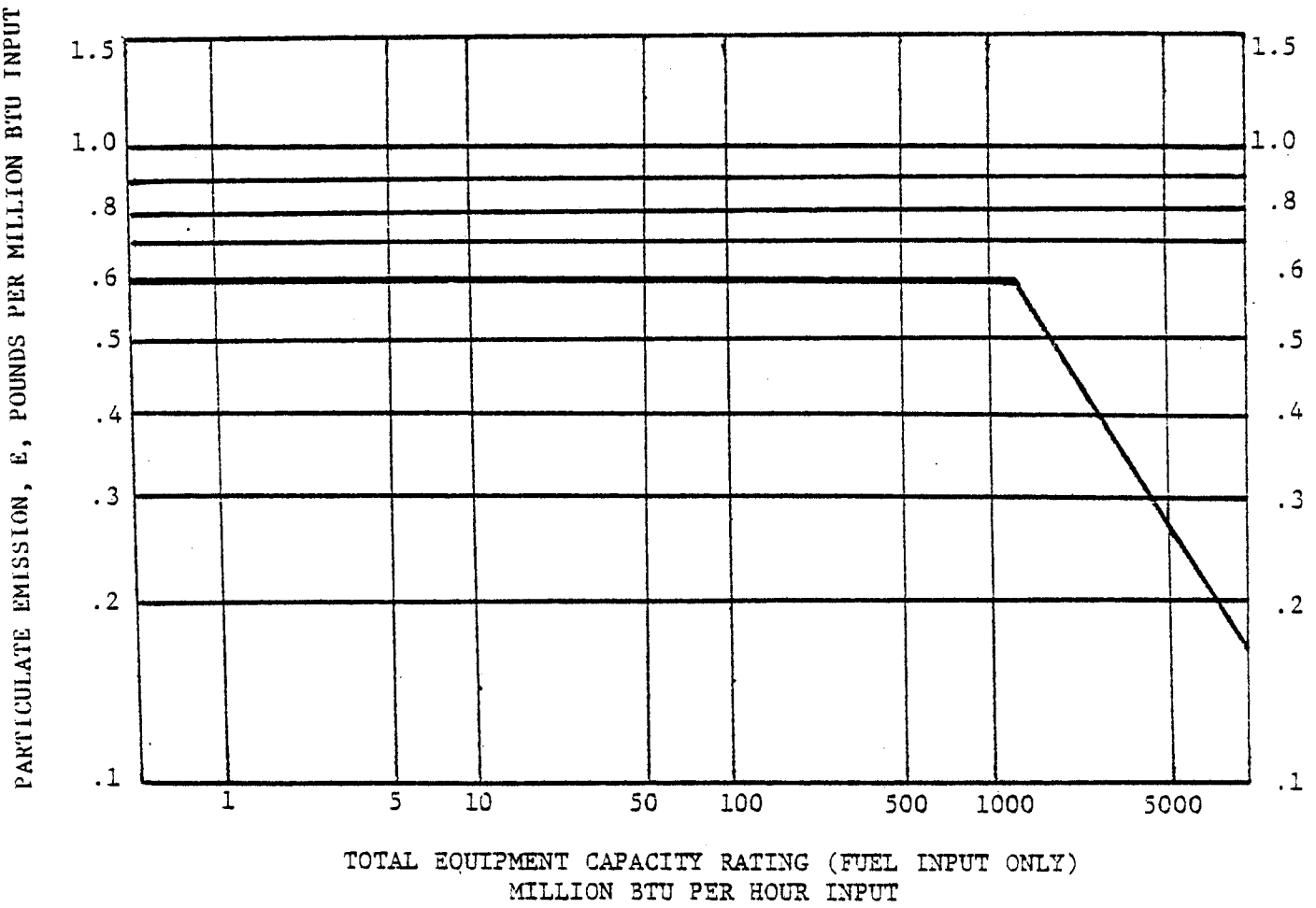
where $E$ = the allowable emission rate in pounds per million BTU heat input,

and $P$ = million BTU heat input per hour

B. Special Provisions

All fuel burning operations of 10 million BTU per hour heat input and smaller constructed prior to February 11, 1971 shall be allowed 0.8 pounds per million BTU input.

Figure 1



## SECTION III - SULFUR DIOXIDE EMISSIONS

### A. General

The maximum allowable discharge of sulfur dioxide ($SO_2$) from fuel burning operations shall be in accordance with a system of priorities as specified hereinafter in paragraph B. The classifications shall be delineated on a county basis. The maximum allowable discharge for the various classes is specified in paragraph C of this Section.

### B. Classifications

1. The class into which a given county falls has been determined by mathematical atmospheric diffusion models and other methods which evaluate those factors which necessitates limits on sulfur dioxide emissions. These factors included but were not limited to: (1) total sulfur dioxide emissions; (2) spatial distribution of sulfur dioxide sources; (3) effects of single, large sources; (4) existing, measured air quality; (5) topographical features of the county; (6) contributions to background levels due to sources outside the county being considered; (7) population density.

2. The assigned classifications will be reviewed periodically at intervals not to exceed three years, and changes will be made as required. When a county is assigned to a more restrictive class, individual compliance schedules will be established in such a way that reasonable time will be allowed for the sources to make necessary changes in equipment and/or fuel contracts.

3. The following classifications are assigned:

   Class I - Charleston County

   Class II - Aiken County - Anderson County

   Class III - All others

### C. Allowable Discharges

Sulfur dioxide emissions from fuel burning sources located in various counties will not exceed the following limits:

1. Counties in Class I

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/ million BTU Input) |
|---|---|
| Up to and including 10 million BTU/hr | 3.5 |
| Greater than 10 million BTU/hr | 2.3 |

2. Counties in Class II

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/million BTU Input) |
|---|---|
| Up to 1000 million BTU/hr | 3.5 |
| 1000 million BTU/hr and larger | 2.3 |

3. Counties in Class III

| Rated Source Size | Maximum Allowable Emissions (lb $SO_2$/million BTU Input) |
|---|---|
| All | 3.5 |

D. Special Provisions

If it can be demonstrated to the satisfaction of the Board that ambient air standards will not be contravened by a source, alone or in combination with other sources, a greater allowance for sulfur dioxide discharges may be made on a case by case(s) basis.

SECTION IV - MONITORING REQUIREMENTS

A. Applicable Sources

The owner or operator of any fossil fuel-fired steam generator of more than 250 million BTU per hour heat input capacity shall install, calibrate, operate, and maintain no later than June 14, 1978, continuous monitoring system(s) for the measurement of opacity which meets the performance specifications of Paragraph E of this Section except where:

1. Gaseous fuel is the only fuel burned;

2. Oil or a mixture of gas and oil are the only fuels burned and the steam generator is able to comply with the provisions of Sections I and II of this Standard without utilization of particulate matter collection equipment, and where the steam generator has never been found, through any administrative or judicial proceedings,to be in violation of Section I of this Standard.

3. The steam generator operates with an annual average capacity factor of 30 percent or less, as reported to the Federal Power Commission for calendar year 1974 or otherwise adequately demonstrated to the Department; and has not subsequently increased this factor to more than 30 percent; or

4. The steam generator is scheduled for retirement on or before October 6, 1980, and provided adequate evidence and guarantees are submitted to the Department which clearly show that the generator will cease operations no later than this date.

B. Time Extensions

Reasonable extensions of time beyond June 14, 1978 may be granted if the owner or operator demonstrates that good faith efforts have been made to obtain and install such systems by this date.

C. Reporting Requirements

The owner or operator of any steam generator subject to the provisions of Paragraph A of this Section shall submit a written report to the Department at least quarterly, or more often if requested. This report shall include, as a minimum, all integrated six minute opacity measurements for the periods during which the applicable provisions of Section I have been exceeded; the date and time identifying each period during which the monitoring system was inoperative, except for zero and span checks; the nature of monitoring system repairs or adjustments; and proof of opacity monitoring system performance whenever system repairs or adjustments have been made. During periods when no excess opacity measurements are recorded and the monitoring system(s) have not been inoperative, repaired or adjusted, the report shall include information to this effect. Alternate data reporting procedures may be allowed if the owner or operator shows, to the satisfaction of the Department, that these procedures are at least as accurate as those described. The owner or operator shall maintain a file of all information contained in the quarterly reports; calibration data for the opacity monitoring system(s); relevant records of adjustments and maintenance performed on such system(s); and all other data collected by the continuous opacity monitoring system(s) for a minimum of two years from the date of submission of such reports or collection of such data.

D. Exemption from Reporting Requirements

A temporary exemption from the opacity monitoring and reporting requirements of this Section may be granted during any period of monitoring system(s) malfunction, provided the owner or operator shows, to the satisfaction of the Department, that the malfunction was unavoidable and is being repaired as expeditiously as possible.

E. Equipment Performance Specifications

The continuous opacity monitoring system(s) required by Paragraph A of this Section shall conform with the performance specifications set forth in 40 CFR, Part 60, Appendix B, Performance Specification 1 which is incorporated by reference as a part of this Standard except that where the term "Administrator" is used the term "Department" shall be substituted. In addition, the opacity monitoring system(s) shall complete a minimum of one cycle of operation for each successive 10-second period; be installed such that representative measurements of opacity from the affected steam generator are obtained; and have an instrument span of approximately 80 percent opacity. Any owner or operator who has purchased opacity monitoring system(s) prior to September 11, 1974, shall be exempt from meeting such test procedures prescribed in 40 CFR, Part 60, Appendix B, Performance Specification 1 until December 14, 1981.

The owner or operator shall record the zero and span drift in accordance with method prescribed by the manufacturer of such opacity monitoring system(s); subject the system(s) to the manufacturer's recommended zero and span check at least once daily unless the manufacturer has recommended adjustments at shorter intervals, in which case such recommendations shall be followed; adjust the zero and span whenever the 24-hour zero drift or 24-hour calibration drift limits of 40 CFR, Part 60, Appendix B, Performance Specification 1 are exceeded; adjust the opacity monitoring system(s) purchased prior to September 11, 1974 whenever the 24-hour zero drift or 24-hour calibration drift exceeds 4 percent opacity for those generators constructed prior to February 11, 1971 and 2 percent opacity for those generators constructed after February 11, 1971.

F. Monitor Location

When the effluents from two or more affected steam generators of similar design and operating characteristics are combined before being released to the atmosphere, the opacity monitoring system(s) shall be installed on the combined effluent. When the affected steam generators are not of similar design and operating characteristics, or when the effluent from one affected steam generator is released to the atmosphere through more than one point, the owner or operator shall apply for an alternate procedure to comply with the requirements of this Section.

G. Exemptions from Monitoring Requirements

Whenever the requirements for continuous opacity monitoring cannot be implemented by the owner or operator due to physical plant limitations, extreme economic burden, or infrequent steam generator operation of less than 30 days per year, or when the specified monitoring procedure would not provide accurate opacity determinations, alternate monitoring and reporting requirements may be approved on a case-by-case basis provided the owner or operator submits a written request to the Department which includes, but not limited to:

1. The basis or reason(s) that alternate requirements are necessary;

2. A proposal of the alternate monitoring and reporting requirements; and

3. Any other information needed by the Department to make a determination that the alternate requirements are adequate to meet the intent of this Section.

SECTION V - EXEMPTIONS

Residences or dwellings of four families or less and ocean-going vessels actually engaged in the physical process of national or international trade or defense shall be exempt from the provisions of this Standard.

STANDARD NO. 2

AMBIENT AIR QUALITY STANDARDS

The following table constitutes the ambient air quality standards for the State of South Carolina. The analytical methods to be used will be those applicable Federal Reference Methods published in 40 CFR 51, Appendices A-F. In the case of fluorides either the double paper tape sampler methods (ASTMD-3266-73T) or the

sodium bicarbonate-coated glass tube and particulate filter method (ASTM-3268-73T) may be used.

| POLLUTANT | MEASURING INTERVAL | MICROGRAMS/CUBIC METER* ** |
|---|---|---|
| Sulfur Dioxide | 3 hour | 1300**** |
| | 24 hours | 365**** |
| | annual | 80 |
| Suspended Particulates | 24 hours | 250 |
| | annual G.M.*** | 60 |
| Carbon Monoxide | 1 hour | 40,000 |
| | 8 hour | 10,000 |
| Ozone | 1 hour | 235***** |
| Non-methane hydrocarbons | 3 hour | 160 |
| Gaseous Fluorides (as HF) | 12 hr. avg. | 3.7 |
| | 24 hr. avg. | 2.9 |
| | 1 wk. avg. | 1.6 |
| | 1 mo. avg. | 0.8 |
| Nitrogen Dioxide | annual | 100 |
| Lead | Calendar Quarterly Mean | 1.5 |

* Arithmetic Average except in case of suspended particulates
** At 25° C and 760 mm Hg.
*** Geometric Mean
**** Not to be exceeded more than once a year
***** Not to be exceeded more than one day per year

## STANDARD NO. 3
## EMISSIONS FROM INCINERATORS

All incinerators shall operate within the following minimum emission limitations:

A. Particulates in the flue gas discharged into the atmosphere shall not exceed 0.5 pounds per million BTU of heat input to the incinerator, excluding auxiliary fuel.

B. Emissions shall not produce smoke which exceeds twenty(20) percent opacity for an aggregate of more than three (3) minutes in any one hour or fifteen (15) minutes in a twenty-four hour period.

C. Odors from the incinerator shall be reduced to such a level as not to create an undesirable level.

D. Emissions shall not contain individual particles which are sufficiently large as to be visible as individual particles at the emission point or are of such size and nature as to be visible individually as incandescent particles. This requirement shall only apply if such particles fall on real property other than that of the person responsible for the emission.

STANDARD NO. 4

EMISSIONS FROM PROCESS INDUSTRIES

SECTION I - SULFURIC ACID MANUFACTURING PLANTS

The rate of emission of sulfur dioxide from sulfuric acid manufacturing plants shall be limited to no more than 4 pounds of sulfur dioxide per ton of 100% sulfuric acid produced and emissions of acid mist to 0.5 pounds of sulfuric acid per ton of 100% acid produced.

SECTION II - PULP AND PAPER MANUFACTURING PLANTS

The rate of particulate emission from pulp and paper manufacturing plants shall be limited to the following:

| | Maximum allowable emission of particulates in pounds/equivalent ton of air dried, unbleached pulp produced. |
|---|---|
| Recovery Furnace Stack..... | 2.75 |
| Dissolving Tank Vents..... | 1.0 |
| Lime Kiln Stack..... | 1.0 |

SECTION III- PORTLAND CEMENT MANUFACTURING PLANTS

The rate of emission of particulate matter from Portland cement plants shall be limited to the following:

| Production Rate Per Kiln (Tons per Hour) | Maximum Allowable Emissions of Particulate Matter Per Kiln (Pounds per Hour) |
|---|---|
| 10 | 14 |
| 15 | 18 |
| 20 | 22 |
| 25 | 25 |
| 30 | 29 |
| 50 | 40 |
| 60 | 42 |
| 80 | 45 |
| 100 | 47 |
| 120 | 48 |

SECTION IV - COTTON GINS

The particulate emission from a cotton ginning operation shall be limited to the maximum rate specified in the table below for the process rate allocated to such process.

| Production Rate (Output) (Bales* per Hour) | Maximum Allowable Rate of Particulate (Pounds per Hour) |
|---|---|
| 4 | 12.3 |
| 5 | 14.4 |
| 6 | 16.2 |
| 7 | 18.0 |
| 8 | 19.5 |
| 9 | 21.2 |
| 10 | 22.8 |
| 11 | 24.2 |
| 12 | 25.8 |
| 13 | 27.1 |
| 14 | 28.5 |
| 15 | 29.9 |
| 16 and above | 31.2 |

*For the purpose of this standard a bale is defined as a finished bale weighing 500 pounds

SECTION V - HOT MIX ASPHALT PLANTS

A. The rate of emission of particulate matter from hot mix asphalt plants shall be limited to the following:

| Aggregate Process Weight (Tons per Hour) | Maximum Allowable Emission Rate (Pounds per Hour) |
|---|---|
| 20 | 22 |
| 50 | 31 |
| 100 | 38 |
| 150 | 45 |
| 200 | 51 |
| 250 | 56 |
| 300 | 61 |
| 350 and above | 65 |

B. All hot mix asphalt plants shall be equipped with a fugitive dust control system which shall be operated and maintained in such a manner as to reduce to a minimum the emission of particulate matter from any point other than the stack outlet.

SECTION VI - OTHER PROCESS INDUSTRIES

A. The particulate emissions from all other process industries shall be limited to the rate specified in Table A for the process weight rate allocated to such process, and modified using the effect factors of Table B.

B. Interpolation of the data in this table for process weights up to 30 tons per hour shall be accomplished by use of the equation:

$$E = 4.10\ P^{0.67}$$

and interpolation and extrapolation of the data for process weight rates greater than 30 tons per hour shall be accomplished by using the equation:

$$E = 55.0\ P^{0.11} - 40$$

where E = the allowable emission rate in pounds per hour,
and P = process weight rate in tons per hour.

TABLE A

ALLOWABLE RATE OF EMISSION BASED ON PROCESS WEIGHT RATE

| PROCESS WEIGHT RATE (Tons/Hour) | RATE OF EMISSION (Pounds/Hour) | PROCESS WEIGHT RATE (Tons/Hour) | RATE OF EMISSION (Pounds/Hour) |
|---|---|---|---|
| 0.05 | 0.551 | 8 | 16.5 |
| 0.10 | 0.877 | 9 | 17.9 |
| 0.20 | 1.40 | 10 | 19.2 |
| 0.30 | 1.83 | 15 | 25.2 |
| 0.40 | 2.22 | 20 | 30.5 |
| 0.50 | 2.58 | 25 | 35.4 |
| 0.75 | 3.38 | 30 | 40.0 |
| 1.00 | 4.10 | 35 | 41.3 |
| 1.25 | 4.75 | 40 | 42.5 |
| 1.50 | 5.38 | 45 | 43.6 |
| 1.75 | 5.96 | 50 | 44.6 |
| 2.00 | 6.52 | 60 | 46.3 |
| 2.50 | 7.58 | 70 | 47.8 |
| 3.00 | 8.56 | 80 | 49.0 |
| 3.50 | 9.49 | 100 | 51.2 |
| 4.00 | 10.4 | 500 | 69.0 |
| 4.50 | 11.2 | 1000 | 77.6 |
| 5.00 | 12.0 | 3000 | 92.7 |

TABLE B

EFFECT FACTOR FOR PARTICULATE EMISSIONS*

(TO BE USED WITH STANDARD 4 - SECTION VI)

| MATERIAL | EFFECT FACTOR |
|---|---|
| a. All materials not specifically listed hereunder | 1.0 |
| b. Elements and their compounds on the basis of the element contained therein** | none assigned |
| c. Specific Materials: | |
| Acid Mists | 0.25 |

* The Board will make additions to this table as required from time to time to preserve public health and property in South Carolina.

** When a material contains two or more elements, the effect factor of the element having the lowest effect factor shall apply.

SECTION VII - NON-ENCLOSED OPERATIONS

A. All non-enclosed sources shall be operated in such a manner that a minimum of particulate matter becomes airborne. In no case shall established ambient air quality standards be exceeded at or beyond the property line.

B. The owner or operator of all sources shall maintain dust control of the premises and access roads by paving, oil treatment or other suitable measures.

C. All crushing, drying, classification and like operations shall employ a suitable control device acceptable to the Department, and shall discharge no more particulate matter than that specified in Section VI of this Standard.

1/12/79

REGULATION 62.5

AIR POLLUTION CONTROL STANDARDS

STANDARD NO. 5
VOLATILE ORGANIC COMPOUNDS

Section I - General Provisions

Part A. Definitions. Unless specifically defined elsewhere in this Standard, the definitions below and those contained in the South Carolina Pollution Control Act and Regulation 62.1, Section I will apply to this Standard.

1. "Major urban county" refers to Charleston, Berkeley, Lexington and Richland counties.

2. "Non-urban county" refers to any county not previously classified as a major urban county.

3. "Capture system" means the equipment (including hoods, ducts, fans, etc.) used to contain, capture, or transport a pollutant to a control device.

4. "Coating line" means one or more apparatus or operations which include a coating applicator, flash-off area, and oven wherein a surface coating is applied, dried, and/or cured.

5. "Commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a binding contractural obligation to undertake and complete, within a reasonable time a continuous program of construction or modification.

6. "Construction" means commencement of on-site fabrication, erection, or installation of an emission source, air pollution control equipment, or a facility.

7. "Control device" means equipment (incinerator, adsorber, or the like) used to destroy, contain, or remove air pollutant(s) prior to discharge to the ambient air.

8. "Continuous vapor control system" means a vapor control system that treats vapors dispaced from tanks during filling on a demand basis without intermediate accumulation.

9. "Emission" means the release or discharge, whether directly or indirectly, of any air pollutant into the ambient air from any source.

10. "Existing process" is any process in existence or having a valid construction permit prior to July 1, 1979.

11. "Facility" means any building, structure, installation, activity, or combination thereof which contains one or more stationary sources of air contaminants and which is located on one or more contiguous or adjacent properties and owned or operated by the same person or persons under common control.

12. "Flashoff area" means the space between the application area and the oven.

13. "Intermittent vapor control system" means a vapor control system that employs an intermediate vapor holder to accumulate vapors displaced from tanks during filling. The control device treats the accumulated vapors only during automatically controlled cycles.

14. "Loading rack" means an aggregation or combination of petroleum loading equipment arranged so that all loading outlets in the combination can be connected to a tank truck or trailer parked in a specified loading space.

15. "Non-attainment area" means an area which is determined by the Department to exceed any National ambient air quality standard.

16. "Organic material" means a chemical compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate.

17. "Oven" means a chamber within which heat is used to bake, cure, polymerize, and/or dry a surface coating.

18. "Owner or operator" means any person who owns, leases, controls, operates or supervises a facility, emission source, or air pollution control equipment.

19. "Prime coat" means the first film of coating applied in a multi-coat operation.

20. "Reid vapor pressure" means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases as determined by American Society for Treating and Materials, Part 17, 1973, D-323-72 (Reapproved 1977).

21. "Solvent" means organic materials which are liquid at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

22. "Standard conditions" for this Standard mean a temperature of 20°C (68°F) and pressure of 760 millimeters of mercury (29.92 inches of mercury).

23. "Stationary source" means any article, machine, process equipment, or other contrivance from which air pollutants emanate or are emitted to the ambient air, either directly or indirectly, from a fixed location.

24. "Topcoat" means the final film of coating applied in a multiple coat operation.

25. "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From Floating Roof Tanks," 1962.

26. "Vapor collection system" means a vapor transport system which uses direct displacement by the liquid loaded to force vapors from the tank into a vapor control system.

27. "Volatile organic compound" (also denoted as VOC) means any compound of carbon that has a vapor pressure greater than 0.5 millimeters of mercury at standard conditions excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. The following compounds will not be considered volatile organic compounds: methane,ethane, 1,1,1-trichloroethane (methyl chloroform), acetonitrile, and trichlorotrifluoroethane (Freon 113).

Part B. General Applicability

1. Unless otherwise stated this Standard will not apply:

a. in major urban counties, to existing stationary sources whose total potential emissions of volatile organic compounds are not more than 15 lb 55 pounds (25 kilograms) in any one day, nor more than 5.5 3 lb pounds (2.5 1.4 kilograms) in any one hour, provided the emission rates are determined and certified before October 1, 1979 in a manner approved by the Department.

b. in non-urban counties, to existing facilities whose total potential emissions of volatile organic compounds are not more than 550 pounds (250 160 TPY kilograms) in any one day, nor more than 150 pounds (68 kilograms) in any one hour, provided the emission rates are determined and certified before October 1, 1979 in a manner approved by the Department.

2. The effective date of this Standard is July 1, 1979.

Part C. Recordkeeping, Reporting, Monitoring

1. The owner or operator of any volatile organic compound emission source or control equipment shall maintain, as a minimum: records detailing all activities relating to any compliance schedule under Section III; records of all compliance testing conducted under Part F below, and records of all monitoring conducted under paragraphs 3.a. and 3.b. below.

2. The owner or operator of any applicable volatile organic compound emission source or control equipment shall, on request, make available to the Department, reports detailing the nature, specific sources, and total annual quantities of all volatile organic compound emissions.

3. The owner or operator of any volatile organic compound emission source or control equipment shall:

a. install, operate, and maintain process and/or control equipment monitoring instruments or procedures as necessary to comply with paragraphs 1 and 2 above; and,

b. maintain, in writing, data and/or reports relating to monitoring instruments or procedures which will, upon review, document the compliance status of the volatile organic compound emission source or control equipment to the satisfaction of the Department.

4. Copies of all records and reports under paragraphs 1, 2, and 3 above, shall be retained by the owner or operator for two years after the date on which the record was made or the reports submitted.

5. Copies of all records and reports required under this Part shall be available for inspection during normal working hours and furthermore, copies of the required records and reports shall be furnished within ten working days after receipt of a written request from the Department.

Part D. Petition for Alternative Controls

1. If the owner or operator of a source of volatile organic compounds regulated by this Standard can demonstrate that compliance with Section II below would not be feasible, he may petition the Department to allow the use of alternative operational and/or equipment controls for the reduction of volatile organic compound emissions of such source. Petition must be made for each source within a given facility and nothing herein should be in-

interpreted as permitting a source regulated by this Standard to exceed emission limits for that source as given in Section II below. The petition must be submitted in writing to the Department and must contain:

a. the name and address of the company and the name, address and telephone number of a company officer over whose signature the petition is submitted; and,

b. a description of all operations conducted at the location to which the petition applies and the purpose that the volatile organic compounds emitting equipment serves within the operations; and,

c. reference to the specific operational and/or equipment controls under Section II below which alternative operational and/or equipment controls are proposed; and,

d. a detailed description of the proposed alternative operational and/or equipment controls, the magnitude of volatile organic compound emission reduction which will be achieved, and the quantity and composition of volatile organic compounds which will be emitted if the alternative operational and/or equipment controls are instituted; and,

e. a schedule for the installation and/or institution of the alternative operational and/or equipment controls in conformance with Section III below.

2. The Department may approve a Petition for Alternative Control if:

a. the petition is submitted in accordance with paragraph 1 above; and,

b. the Department determines that the petitioner cannot comply with Section II below because of technological infeasibility (considering costs); and,

c. the petition contains a schedule for achieving and maintaining reduction of volatile organic compound emissions to the maximum extent feasible and as expeditiously as practicable; and,

d. a nuisance condition will not result from operation of the source as proposed in the Petition; and,

e. the alternative control system will have efficiencies at least as

good as the controls listed in the appropriate part of Section II below.

Part E.

1. The owner or operator of a facility which contains more than one source regulated by this standard may petition the Department for permission to control the emissions of volatile organic compounds from the separate sources to varying degrees, provided the combined resultant emissions do not exceed the total emissions that would result from the application of this standard to each source separately.

Petitions will be accepted only for those sources to which this standard applies and nothing herein should be interpreted as permitting the averaging of emissions from sources not subject to this standard with the emissions from sources which are subject to this standard. The petition shall be submitted in writing to the Department, and must contain:

a. the name and address of the company, the name, address and telephone number of a company officer over whose signature the petition is submitted, and the location of the facility which is the subject of the petition; and

b. a description of all sources the emissions from which are proposed for averaging; and

c. the reasons why the plant averaging method is necessary or desirable including cost analyses; and

d. a description of the method of determining the weighted average from all of the sources which are the subject of the petition.

2. The Department may approve a Petition for Alternative Compliance Method if:

a. the petition is submitted in accordance with paragraph 1 above; and

b. the petition contains a valid method for averaging emissions from the separate sources on a weighted basis; and

c. the reasons given for the alternative compliance method are reasonable and valid; and

d. the emissions of volatile organic compounds from the separate sources are quantifiable, and the total of such emissions will not exceed the emissions that would result from the application of this standard to each source separately.

Part F. Case by Case Exceptions to Provisions of Section II

1. If the owner or operator of a source of volatile organic compounds regulated by this standard can demonstrate that compliance with applicable portions of Section II below would not be economically feasible, the Department may, on a case-by-case basis, allow emission limitations less stringent than those required by applicable parts of Section 2 below.

All data pertinent to the showing of economic infeasibility must accompany a petition for this relief; and shall include a present value analysis showing economic infeasibility.

2. The Department may approve less stringent requirements, determined on a case-by-case basis if the preponderance of evidence justifies such approval.

3. No such approval shall be construed as granting exemptions from any of the steps in compliance schedules contained in Section III below, until approval is granted. Adjustments in compliance schedules as the result of this approval shall not extend, in any case, beyond December 31, 1982.

Part G. Circumvention

No owner or operator subject to this Standard may build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable Regulation. This includes, but is not limited to, the use of gaseous

dilutants to achieve compliance and the piecemeal carrying out of an operation to avoid coverage by this Standard that applies only to operations larger than a specified size.

Part H. Volatile Organic Compound Compliance Testing

1. The owner or operator of any volatile organic compound source required to comply with Section II below shall, at his own expense, conduct such tests as required by the Department in order to demonstrate complete compliance. Further, the test methods and procedures shall be those either specified by the Department or such alternative methods approved by the Department. All tests shall be made by, or under the direction of, a person qualified by training and/or experience in the field of air pollution testing.

2. No volatile organic compound emissions compliance testing will be allowed, nor the results accepted, unless prior notification has been supplied to the Department as required under paragraphs 3. and 4. below and the Department has granted approval.

3. Any person proposing to conduct a volatile organic compound emissions compliance test shall notify the Department, in the manner set forth under paragraph 4. below of the intent to test, not less than 15 days before the proposed initiation of the tests so the Department may at its option observe the test.

4. Any person notifying the Department of a proposed volatile organic compound emissions compliance test shall include, as part of notification, the following minimum information:

a. a statement indicating the purpose of the proposed test;

b. a description of the source to be tested;

c. a description of the test procedures, equipment, and sampling sites; and,

d. a timetable, setting forth the dates on which;

(i) the testing will be conducted; and,

(ii) a letter of preliminary results, containing, as a minimum, the process weight rates, % isokinetics, and the average emission rate (not later than 30 days after completion of on-site sampling).

(iii) the final test reports will be submitted (not later than 60 days after completion of on-site sampling).

5. For compliance testing, the owner or operator of any volatile organic compound emissions source shall be responsible for providing;

a. sampling ports, pipes, lines, or appurtenances for the collection of samples and data required by the test procedure;

b. safe access to the sample and data collection locations; and,

c. light, electricity, and other utilities required for sample and data collection.

Section II - Provisions for Specific Sources

Part A. Coating Industry

1. For the purpose of this Part, the following definitions apply:

a. "Coil coating" means the coating of any flat metal sheet or strip that comes in rolls or coils.

b. "Paper coating" means coatings put on paper and pressure sensitive tapes regardless of substrate. Related web coating processes on plastic film and decorative coatings on metal foil are included in this definition.

c. "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is picked up in these recessed areas and is transferred to the substance.

d. "Magnet wire coating" means the process of applying a coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

2. This Part will apply, in accordance with Sections I, above, and III, below, to:

a. coating applicator(s) and oven(s) of sheet, can or end coating lines involved in sheet basecoat (exterior and interior) and overvarnish; two-piece can exterior (basecoat and overvarnish); two and three-piece can interior body spray; two-piece can exterior end (spray or roll coat); three-piece can side-seam spray and end sealing compound operations. No owner or operator of a can coating line subject to this Part may cause, allow, or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 2.8 pounds per gallon (0.34 kilograms per liter of coating, excluding water, delivered to the coating applicator from sheet basecoat (exterior and interior) and overvarnish or two-piece can exterior (basecoat and overvarnish) operations.

(ii) 4.2 pounds per gallon (0.51 kilograms per liter) of coating, excluding water, delivered to the coating applicator from two and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

(iii) 5.5 pounds per gallons (0.66 kilograms per liter) of coating, excluding water, delivered to the coating applicator from three-piece can side-seam spray operations.

(iv) 3.7 pounds per gallon (0.44 kilograms per liter) of coating, excluding water, delivered to the coating applicator from end sealing compound operations.

b. coating applicator(s), oven(s) and quench area(s) of coil coating lines involved in prime and top coat or single coat operations. No owner or operator of a coil coating line subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 2.6 pounds per gallon (0.31 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime and topcoat or single coat operations.

c. roll knife or rotogravure coater(s) and drying oven(s) of fabric, paper and vinyl coating lines. No owner or operator of a fabric coating line or a vinyl coating line or a paper coating line subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 2.9 pounds per gallon (0.35 kilograms per liter) of coating, excluding water, delivered to the coating applicator from a fabric coating line or a paper coating line.

(ii) 3.8 pounds per gallon (0.45 kilograms per liter) of coating, excluding water, delivered to the coating applicator from a vinyl coating line.

d. the application area(s), flashoff area(s), and oven(s) of metal furniture coating lines or large applicance coating lines or components thereof involved in prime and topcoat or single coating operations. No owner or operator of a metal furniture coating line or a large applicance coating line or components thereof subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of the following levels;

(i) 3.0 pounds per gallon (0.36 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime and topcoat or single cost operations from a metal furniture coating line.

(ii) 2.8 pounds per gallon (0.34 kilograms per liter) of coating, excluding water, delivered to the coating applicator from prime, single or topcoat coating operations from a large appliance coating line or components thereof. This emission limit will not apply to the use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 1 quart (0.95 liters) in any one 8-hour period.

e. the oven(s) of magnet wire coating operations. No owner or operator of a magnet wire coating oven subject to this Part may cause, allow or permit the discharge into the atmosphere of any volatile organic compounds in excess of 1.7 pounds per gallons (0.20 kilograms per liter) of coating, excluding water, delivered to the coating applicator from magnet wire coating operations.

3. The emission limits under paragraph 2 above shall be achieved by:

(i) the application of low solvent content coating technology; or,

(ii) incineration, provided that 90 percent of the nonmethane volatile organic compounds (VOC measured as total combustible carbon) which enter the incinerator are oxidized to carbon dioxide and water; or,

(iii) carbon bed solvent recovery system; or,

(iv) alternative controls as allowed under Section I, Part D.

Part B. Petroleum Liquid Storage

1. For the purpose of this Part, the following definitions apply:

a. "Condensate" means hydrocarbon liquid separated from natural gas which condenses due to changes in the temperature and/or pressure and remains liquid at standard conditions.

b. "Custody transfer" means the transfer of produced crude oil and/or condensate, after processing and/or treating in the producing operations, from storage tanks or automatic transfer facilities to pipelines or any other forms of transportation.

c. "External floating roof" means a storage vessel cover in an open top tank consisting of a double deck or pontoon single deck which rests upon and is supported by the petroleum liquid being contained and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

d. "Internal floating roof" means a cover or roof in a fixed roof tank which rests upon or is floated upon the petroleum liquid being contained, and is equipped with a closure seal or seals to close the space between the roof edge and tank shell.

e. "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oils, or through redistillation, cracking, extraction, or reforming unfinished petroleum derivatives.

f. "Petroleum liquids" means petroleum, condensate, and any finished or intermediate products manufactured in a petroleum refinery but does not mean Number 2 through Number 6 fuel oils as specified in A.S.T.M. D396-69, gas turbine fuel oils Numbers 2-GT through 4-GT as specified in A.S.T.M. D2880-71, or diesel fuel oils Numbers 2-D and 4-D as specified in A.S.T.M. D975-68.

g. "True vapor pressure" means the equilibrium partial pressure exerted by a petroleum liquid as determined in accordance with methods described in American Petroleum Institute Bulletin 2517, "Evaporation Loss From Floating Roof Tanks," 1962.

2. Notwithstanding Section I, Part B, above, this Part will apply, in accordance with Section III, below, to all fixed roof storage vessels with capacities greater than 42,000 gallons (151,412 liters) containing volatile petroleum liquids whose true vapor pressure is greater than 1.52 psia (10.5 kilo Pascals).

3. This Part will not apply to volatile petroleum liquid storage vessels;

a. equipped with external floating roofs before July 1, 1979; or,

b. having capacities less than 420,000 gallons (1,600,000 liters) used to store produced crude oil and condensate prior to lease custody transfer.

4. No owner or operator shall permit the use of a non-exempt source unless;

a. the source has been retrofitted with an internal floating roof equipped with a closure seal, or seals, to close the space between the roof edge and tank wall; or,

b. the source has been retrofitted with equally effective alternative control approved by the Department; and,

c. the source is maintained such that there are no visible holes, tears, or other openings in the seal or any seal fabric or materials; and,

d. all openings except stub drains are equipped with covers, lids, or seals such that;

(i) the cover, lid, or seal is in the closed position at all times except when in actual use; and,

(ii) automatic bleeder vents are closed at all times except when the roof is floated off or landed on the roof leg supports; and,

(iii) rim vents, if provided, are set to open when the roof is being floated off the roof leg supports or at the manufacturer's recommended setting; and,

e. routine inspections are conducted through roof hatches once per month; and,

f. a complete inspection of cover and seal is conducted whenever the tank is emptied for nonoperational reasons or once per year; and,

g. records are maintained in accordance with Section I, Part C above that shall include;

(i) reports of the results of inspections conducted under subparagraphs 4.e. and 4.f. above; and,

(ii) a record of the average monthly storage temperatures and true vapor pressures of volatile petroleum liquids stored; and,

(iii) records of the throughput quantities and types of volatile petroleum liquids for each storage vessel.

Part C. Bulk Gasoline Plants

1. For the purpose of this Part, the following definitions apply:

a. "Bottom filling" means the filling of a tank truck or stationary storage tank through an opening that is flush with the tank bottom.

b. "Bulk gasoline plant" means a gasoline storage and distribution facility with an average daily throughput of less than 20,000 gallons (76,000 liters) which received gasoline from bulk terminals by trailer transport, stores it in tanks, and subsequently dispenses it via account trucks to local farms, businesses, and service stations.

c. "Bulk gasoline terminal" means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has a daily throughput of more than 20,000 gallons (76,000 liters) of gasoline.

d. "Gasoline" means any petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

e. "Splash filling" means the filling of a tank truck or stationary storage tank through a pipe or hose whose discharge opening is above the surface level of the liquid in the tank being filled.

f. "Submerged filling" means the filling of a tank truck or stationary tank through a pipe or hose whose discharge opening is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

g. "Vapor balance system" means a combination of pipes or hoses which create a closed system between the vapor spaces of an unloading tank and a receiving tank such that vapors displaced from the receiving tank are transferred to the tank being unloaded.

2. Notwithstanding Section I, Part B., above, this Part will apply, in accordance with Section III, below, to the unloading, loading, and storage facilities of all bulk gasoline plants and all tank trucks or trailers delivering or receiving gasoline at bulk gasoline plants.

3. No owner or operator of a bulk gasoline plant may permit stationary storage tanks of more than 528 gallons (2,000 liters) capacity to load or unload gasoline unless each tank is equipped with a vapor balance system as described under paragraph 6, below, and approved by the Department; and,

a. each tank is equipped with a submerged fill pipe, approved by the Department; or,

b. each tank is equipped with a fill line whose discharge opening is flush with the bottom of the tank.

4. No owner or operator of a bulk gasoline plant, tank truck or trailer may permit the loading or unloading of tank trucks or trailers to a stationary storage tank of more than 528 gallons (2,000 liters) capacity at a bulk gasoline plant unless each tank truck or trailer is equipped with a vapor balance system as described under paragraph 6, below, and approved by the Department; and,

a. equipment is available at the bulk gasoline plant to provide for the submerged filling of each tank truck or trailer; or,

b. each tank truck or trailer is equipped for bottom filling.

5. No owner or operator of a bulk gasoline plant, tank truck or trailer may permit the transfer of gasoline between tank truck or trailer and stationary storage tank unless:

a. the transfer is conducted in accordance with paragraphs 3. and 4., above; and,

b. the vapor balance system is in good working order and is connected and operating; and,

c. tank truck or trailer hatches are closed at all times during loading operations; and,

d. there are no leaks in the tank trucks' or trailers' pressure/vacuum relief valves and hatch covers, nor the truck tanks or storage tanks associated vapor and liquid lines during loading or unloading and,

e. the pressure relief valves on storage vessels and tank trucks or trailers are set to release at no less than 0.7 psi (4.8 kPa) or the highest possible pressure (in accordance with state or local fire codes, or the National Fire Prevention Association guidelines).

6. Vapor balance systems required under paragraphs 3. and 4., above, shall consist of the following major components;

a. a vapor space connection on the stationary storage tank equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

b. a connecting pipe or hose equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material; and,

c. a vapor space connection on the tank truck or trailer equipped with fittings which are vapor tight and will automatically and immediately close upon disconnection so as to prevent release of organic material.

7. Notwithstanding Section I, Part B.2., no owner or operator of a bulk gasoline plant may permit gasoline to be spilled, discharged in sewers, stored in open containers or handled in any other manner that would result in evaporation.

Part D. Bulk Gasoline Terminals

1. For the purpose of this Part the following definitions apply:

a. "Bulk gasoline terminal" means a gasoline storage facility which receives gasoline from refineries primarily by pipeline, ship, or barge, and delivers gasoline to bulk gasoline plants or to commercial or retail accounts primarily by tank truck; and has a daily throughput of more than 20,000 gallons (76,000 liters) of gasoline.

b. "Gasoline means a petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

2. Notwithstanding Section I, Part B., above, this part will apply in accordance with Section III, below, to bulk gasoline terminals and the appurtenant equipment necessary to load the tank truck or trailer compartments.

3. No person may load gasoline into any tank trucks or trailers from any bulk gasoline terminal unless:

a. the bulk gasoline terminal is equipped with a vapor control system, capable of complying with paragraph 4., below,properly installed, in good working order, in operation and consisting of one of the following;

(i) an adsorber or condensation system which may not allow mass emissions of VOC's to exceed 4.7 grains per gallon (30 milograms per liter) of gasoline loaded; or

4.67

80 Mg

g/L to GR/gal

g/L x 58.42

Milligram/l

(ii) a vapor collection system which directs all vapors to a fuel gas system; or,

(iii) alternative controls as allows under Section I, Part D.

b. all displaced vapors and gases are vented only to the vapor control system; and,

c. a means is provided to prevent liquid drainage from the loading device when it is not in use or to accomplish complete drainage before the loading device is disconnected; and,

d. all loading and vapor lines are equipped with fittings which make vapor-tight connections and which close automatically when disconnected.

5. Sources affected under paragraph 2., above, may not;

a. allow gasoline to be discarded in sewers or stored in open containers or handled in any manner that would result in evaporation; nor,

b. allow the pressure in the vapor collection system to exceed the tank truck or trailer pressure relief settings.

Part E. Gasoline Service Stations - Stage 1.

1. For the purpose of this Part, the following definitions apply:

a. "Gasoline" means a petroleum distillate having a Reid vapor pressure of 4 psi (27.6 kPa) or greater.

b. "Submerged Fill Pipe" means any fill pipe with a discharge opening which is entirely submerged when the pipe normally used to withdraw liquid from the tank can no longer withdraw any liquid.

c. "Owner" means any person who has legal or equitable title to the gasoline storage tank at a facility.

d. "Operator" means any person who leases, operates, controls or supervises a facility at which gasoline is dispersed.

e. "Gasoline Dispensing Facility" means any site where gasoline is dispersed to motor vehicle gasoline tanks from stationary storage tanks.

2. Notwithstanding Section I, Part B., above, this Part will apply in accordance with Section III, below, to all gasoline dispensing facilities, except:

a. transfers made to storage tanks of gasoline dispensing facilities equipped with floating roofs or their equivalent which have been approved by the Department.

b. stationary gasoline storage containers of less than 550 gallons (2,085 liters) capacity used exclusively for the fueling of implements of husbandry, provided the containers are equipped with submerged fill pipes.

3. No owner or operator subject to this Part may transfer or cause or allow the transfer of gasoline from any gasoline tank truck or trailer into any stationary storage tank described below unless the tank is equipped with a submerged fill pipe and the vapors displaced from the storage tank during filling are processed by a vapor control system in accordance with a paragraph 4., below;

a. any stationary storage tank located at a gasoline dispensing facility, with a capacity of 2,000 gallons (7,580 liters) or more which is in place before June 30, 1979; and,

b. any stationary storage tank located at a gasoline dispensing facility, with a capacity of 250 gallons (948 liters) or more, which is installed after June 30, 1979.

4. The vapor control system required by paragraph 3., above, shall include one or more of the following:

a. a vapor-tight line from the storage tank to the delivery vessel and a system that will ensure the vapor line is connected before the gasoline can be transferred into the tank; or,

b. a refrigeration-condensation system or equivalent designed to recover at least 90 percent by weight of the volatile organic compounds in the displaced vapor; or,

c. a system demonstrated to have control efficiency equivalent to or greater than provided under subparagraph a. or b., above, and approved by the Department.

5. The vapor-laden gasoline tank truck or trailer shall be subject to the following conditions;

a. the tank truck or trailer must be designed and maintained to be vapor tight at all times; and

b. the vapor-laden tank truck or trailer may be refilled only at;

(i) bulk gasoline plants complying with Part C., above,

(ii) bulk gasoline terminals complying with Part D., above.

6. Each owner of a gasoline storage tank covered by paragraphs 2. and 3., above, shall;

a. purchase and install all necessary control systems and make all necessary process modifications in accordance with paragraphs 3, 4, and 5, above; and,

b. in accordance with Section I, Part C and Section I, Part D provide instructions to the operator of the gasoline dispensing facility describing necessary maintenance operations and procedures for prompt notification of the owner in case of any malfunctions of the control system; and,

c. repair, replace or modify any worn out or malfunctioning component or element of design and keep records, in accordance with Section I, Part C, above, of the repair, replacement or modification of any component or element of design of the control system.

7. Each operator of a gasoline dispensing facility covered by paragraphs 2. and 3., above, shall;

a. maintain and operate the control system in accordance with the specifications and the operating and maintenance procedures specified by the owner; and,

b. promptly notify the owner of the control system of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system; and,

c. maintain records, in accordance with Section I, Part C, above, of all maintenance performed by the operator and of all notifications to the owner of any scheduled maintenance or malfunction requiring replacement or repair of major components of the system and the action taken by the owner. Such records shall at a minimum include;

(i) the scheduled date for maintenance or the date a malfunction was detected; and,

(ii) the date the need for maintenance or malfunction of major system components was reported to the owner; and,

(iii) the date the maintenance was performed or the malfunction corrected by either the operator or the owner; and,

d. maintain gauges, meters, or other specified testing devices in proper working order.

Part F. Solvent Metal Cleaning

1. For the purpose of this section the following definitions apply:

a. "Cold cleaning" means the batch process of cleaning and removing soils from metal surfaces by spraying, brushing, flushing or immersion while maintaining the solvent below its boiling point. Wipe cleaning is not included in this definition.

b. "Conveyorized degreasing" means the continuous process of cleaning and removing soils from metal surfaces by operating with either cold or vaporized solvents.

c. "Freeboard height" means the distance from the top of the vapor zone to the top of the degreaser tank.

d. "Freeboard ratio" means the freeboard height divided by the width of the degreaser.

e. "Open top vapor degreasing" means the batch process of cleaning and removing soils from metal surfaces by condensing hot solvent vapor on the colder metal parts.

f. "Solvent metal cleaning" means the process of cleaning soils from metal surfaces by cold cleaning or open top vapor degreasing or conveyorized degreasing.

2. Notwithstanding Section I, Part B, above, this Part applies in accordance with Section III, below, in the following manner:

a. Control System A shall apply to cold cleaning, open top vapor degreasing and conveyorized degreasing operations; if,

(i) the facility is located in a non-urban county and uses more than 100 tons per year of solvents on a facility-wide basis based upon annual solvent purchase records,

(ii) the facility is located in an urban county and is not exempted by 4(a) or 4(b).

b. Control System B shall apply to cold cleaning, open top vapor degreasing and conveyorized degreasing operations, if the facility is located in

an urban county and uses more than 100 tons per year of solvents on a facility-wide basis based upon annual solvent purchase records.

3. In lieu of meeting the requirements of 2(a)(i), a facility in a non-urban county may choose to retain all solvent purchase and return records, including, making them available to the Department and if the potential loss to the ambient air, by evaporation or by other means, of solvent is less than 100 tons/year, then the facility is exempted from control system A requirements. Potential loss for this purpose shall be determined by subtracting returned solvent from purchased solvent.

4. The provisions of this section shall apply with the following exceptions:

a. open top vapor degreasers with an open area smaller than one square meter (10.8 square feet) shall be exempt from paragraphs 6(b)(iii) b and 6(b)(iii)d of this section,

b. conveyorized degreasers with an air/vapor interface smaller than 2.0 square meters (21.6 square feet) shall be exempt from paragraphs 7(b)(iii) of this section,

c. sources exempted under Section I, Part B.

5. Except as provided under paragraph (4) of this section, the owner or operator of a cold cleaning facility shall;

a. for Control System A;

(i) equip the cleaner with a cover; and,

(ii) equip the cleaner with a facility for draining cleaned parts; and,

(iii) provide a permanent, conspicuous label, summarizing the operating requirements; as such,

(iv) drain the cleaned parts for at least 15 seconds or until dripping ceases; and,

(v) close degreaser cover whenever parts are not handled in the cleaner; and,

(vi) store waste solvent only in covered containers; and,

(vii) do not dispose of waste solvent nor transfer it to another party, such that greater than 20 percent of the waste (by weight) can evaporate into the atmosphere.

b. For Control System B;

(i) equip the cleaner with a cover and the cover shall be so designed that it can be easily operated with one hand; if,

(a) the solvent volatility is greater than 2 kilo Pascals (15 millimeters of mercury or 0.3 pounds per square inch) measured at 38°C (100°F); or,

(b) the solvent is agitated; or,

(c) the solvent is heated; and,

(ii) equip the cleaner with a facility for draining cleaned parts and the drainage facility shall be constructed internally so that parts are enclosed under the cover while draining if the solvents volatility is greater than 4.3 kilo Pascals (32 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), except that the drainage facility may be external for applications where an internal type cannot fit into the cleaning system; and,

(iii) install one of the following control devices if the solvent volatility is greater than 4.3 kilo Pascals (33 millimeters of mercury or 0.6 pounds per square inch) measured at 38°C (100°F), or if the solvent is heated above 50°C (120°F);

(a) freeboard that gives a freeboard ratio greater than or equal to 0.7; or,

(b) water cover (solvent must insoluble in and heavier than water); or,

(c) other systems of equivalent control, such as refrigerated chiller or carbon adsorption, approved by the Department; and,

(iv) provide a permanent, conspicuous label, summarizing the operating requirements; and,

(v) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(vi) close the cover whenever parts are not being handled in the cleaner; and,

(vii) drain the cleaned parts for at least 15 seconds or until dripping ceases; and,

(viii) if used, supply a solvent spray that is a solid fluid stream (not a fine, atomized or shower type spray) at a pressure which does not cause excessive splashing.

6. Except as provided under paragraph (4) of this section, the owner or operator of an open top vapor degreaser shall;

a. For Control System A;

(i) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and,

(ii) keep the cover closed at all times except when processing work loads through the degreaser; and,

(iii) minimize solvent carryout by:

(a) racking parts to allow complete drainage; and,

(b) moving parts in and out of the degreaser at less than 3.3 meters per second (11 feet per minute); and,

(c) holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and,

(d) tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and,

(e) allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and,

(iv) not degrease porous or absorbent materials, such as cloth, leather, wood, or rope; and,

(v) not occupy more than half of the degreaser's open top area with a workload; and,

(vi) not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is removed from the vapor zone; and,

(vii) always spray below the vapor level; and,

(viii) repair solvent leaks immediately, or shutdown the degreaser; and,

(ix) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(x) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xii) not use ventilation fans near the degreaser opening, not provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degrease open area, unless necessary to meet OSHA requirements; and,

b. for Control System B;

(i) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone; and,

(ii) provide the following safety switches;

(a) a condenser flow switch and thermostat which shut off the pump heat if the condenser coolant is either not circulating or too warm; and,

(b) a spray safety switch which shuts off the spray pump if the vapor level drops more than 10 centimeters (4 inches); and,

(iii) install one of the following control devices;

(a) powered cover, if the freeboard ratio is greater than or equal to 0.75, and if the degreaser opening is greater than 1 square meter (10 square feet); or,

(b) refrigerated chiller; or,

(c) enclosed design (cover or door opens only when the dry part is actually entering or exiting the degreaser); or,

(d) carbon adsorption system with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when cover is open), and exhausting less than 25 parts per million of solvent averaged over one complete adsorption cycle; or,

(e) a control system, demonstrated to have control efficiency equivalent to or greater than any of the above, and approved by the Director; and,

(iv) permanent, conspicuous label, summarizing operating procedures (v) to (x).

(v) keep the cover closed at all times except when processing work loads through the degreaser; and,

(vi) minimize solvent carryout by;

(a) racking parts to allow complete drainage; and,

(b) moving parts in and out of the degreaser at less than 3.3 meters per second (11 feet per minute); and,

(c) holding the parts in the vapor zone at least 30 seconds or until condensation ceases; and,

(d) tipping out any pools of solvent on the cleaned parts before removal from the vapor zone; and,

(e) allowing parts to dry within the degreaser for at least 15 seconds or until visually dry; and,

(vii) not degrease porous or absorbent materials, such as cloth, leather, wood or rope; and,

(viii) not occupy more than half of the degreaser's open top area with a workload; and,

(ix) not load the degreaser to the point where the vapor level would drop more than 10 centimeters (4 inches) when the workload is removed from the vapor zone; and,

(x) always spray below the vapor level; and,

(xi) repair solvent leaks immediately, or shutdown the degreaser; and,

(xii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(xiii) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xiv) not use ventilation fans near the degreaser opening, nor provide exhuast ventilation excedding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser open area, unless necessary to meet OSHA requirements; and,

7. Except as provided under paragraph (4) of this section the owner or operator of a conveyorized degreaser shall;

a. For Control System A;

(i) not use workplace fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser opening, unless necessary to meet OSHA requirements; and,

(ii) minimize carryout emissions by;

(a) racking parts for best drainage; and,

(b) maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and,

(iii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(iv) repair solvent leaks immediately, or shutdown the degreaser; and,

(v) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

b. For Control System B;

(i) install one of the following control devices;

(a) refrigerated chiller; or,

(b) carbon adsorption system, with ventilation greater than or equal to 15 cubic meters per minute per square meter (50 cubic feet per minute per square foot) of air/vapor area (when downtime covers are open), and exhausting less than 25 parts per million of solvent by volume averaged over a complete adsorption cycle; or,

(c) a system, demonstrated to have a control efficiency equivalent to or greater than paragraph 7(b)(i)a or 7(b)(i)b of this section, and approved by the Director; and,

(ii) equip the cleaner with equipment, such as a drying tunnel or rotating (tumbling) basket , sufficient to prevent cleaned parts from carrying out solvent liquid or vapor; and,

(iii) provide the following safety switches;

(a) a condenser flow switch and thermostate which shut off the pump heat if the condenser coolant is either not circulating or too warm; and,

(b) a spray safety switch which shuts off the spray pump or the conveyor if the vapor level drops more than 10 centimeters (4 inches); and,

(c) a vapor level control thermostat which shuts off the pump heat when the vapor level rises too high; and,

(iv) minimize openings during operation so that entrance and exits will silhouette workloads with an average clearance between the parts and the edge of the degreaser opening of less than 10 centimeters (4 inches) or less than 10 percent of the width of the opening; and,

(v) provide downtime covers for closing off the entrance and exit during shutdown hours; and,

(vi) not use workplace fans near the degreaser opening, nor provide exhaust ventilation exceeding 20 cubic meters per minute per square meter (65 cubic feet per minute per square foot) of degreaser opening, unless

necessary to meet OSHA requirements; and,

(vii) minimize carryout emissions by;

(a) racking parts for best drainage; and,

(b) maintaining the vertical conveyor speed at less than 3.3 meters per minute (11 feet per minute); and,

(viii) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than 20 percent of the waste solvent (by weight) can evaporate into the atmosphere; and,

(ix) repair solvent leaks immediately, or shutdown the degreaser; and,

(x) not operate the cleaner so as to allow water to be visually detectable in solvent exiting the water separator; and,

(xi) place downtime covers over entrances and exits of conveyorized degreasers immediately after the conveyors and exhausts are shutdown and not remove them until just before start-up.

Part G. Cutback Asphalt

1. For the purpose of this section "cutback asphalt" means asphalt cement which has been liquefied by blending with petroleum solvents (diluents).

2. No person may cause, allow or permit the use or application of cutback asphalt except as follows:

a. used solely as a penetrating prime coat,

b. long-life asphalt mix stockpile storage,

c. other use or application when the average ambient air temperature, on the day of use, is predicted to be less than 10°C (50°F).

Section III - Compliance Schedule

Part A. Process and Emission Control Equipment Installations

1. Except as provided under Part C and Part D, below, the owner or operator of a volatile organic compound emission source proposing to install and operate volatile organic compound emission control equipment and/or replacement process equipment and/or modification of existing process equipment to comply with Section II, above, shall adhere to the increments of progress contained in the following schedule:

a. Construction permit applications for the emission control system and/or process equipment and/or modification of existing process equipment must be submitted before January 1, 1980.

b. Contracts for the emission control systems and/or process equipment and/or modification of existing process equipment must be awarded or orders must be issued for purchase of component parts to accomplish emission control before July 1, 1980.

c. Initiation of on-site construction or installation of the emission control and/or process equipment and/or modification of existing process equipment must begin before September 1, 1980.

d. On-site construction of installation of the emission control and/or process equipment and/or modification of existing process equipment must be completed before March 1, 1981.

e. Final compliance shall be achieved before May 1, 1981.

f. Any owner or operator of a stationary emission source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress whether the required increment of progress has been met.

Part B. Low Solvent Content Coating

1. Except as provided under Part D or Part E, below, or under paragraph 2, below, the owner or operator of a volatile organic compound emission source proposing to employ low solvent content coating technology to comply with Section II, above, shall adhere to the increments of progress contained in the following schedule;

a. Construction permit applications for the application of low solvent content coating technology must be submitted before January 1, 1980.

b. Research and development of low solvent content coating must be completed before July 1, 1980.

c. Evaluation of product quality and commercial acceptance must be completed before January 1, 1981.

d. Purchase orders must be issued for low solvent content coatings and process modifications before March 1, 1981.

e. Initiation of process modifications must begin before May 1, 1981.

f. Process modifications must be completed and use of low solvent content coatings must begin before October 1, 1981.

g. Final compliance, shall be achieved before December 1, 1981.

h. Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

2. Where the Department determines that low solvent content coating technology has been sufficiently researched and developed for a particular application, the owner or operator of a volatile organic compound emission source proposing to comply with Section II, above, through application of low solvent content coatings shall adhere to the increments of progress

contained in the following schedule;

a. Final plans for the application of low solvent content coating technology must be submitted before January 1, 1980.

b. Evaluation of product quality and commercial acceptance must be completed before July 1, 1980.

c. Purchase orders must be issued for low solvent content coatings and process modifications before September 1, 1980.

d. Initiation of process modifications must begin before November 1, 1980.

e. Process modifications must be completed and use of low solvent content coatings must begin before April 1, 1981.

f. Final compliance, shall be achieved before June 1, 1981.

g. Any owner or operator of a stationary source subject to the compliance schedule of this section shall certify to the Department within 5 days after the deadline for each increment of progress, whether the required increment of progress has been met.

Part C. Alternate Compliance Schedule

1. Nothing in this Section shall prevent the Department from promulgating a separate schedule for any source if it finds that the application of a compliance schedule in Part A or Part B, above, would not be technologically feasible.

2. Nothing in this Section shall prevent the owner or operator of a volatile organic compound source from submitting to the Department a proposed alternative compliance schedule provided:

a. the proposed alternative compliance schedule is submitted before January 1, 1980; and,

b. the final control plans for achieving compliance with Section II, above, are submitted simultaneously; and,

c. the alternative compliance schedule contains the same increments of progress as the schedule for which it is proposed; and,

d. sufficient documentation and certification from appropriate suppliers, contractors, manufactureres, or fabricators is submitted by the owner or operator of the volatile organic compound source to justify the dates proposed for the increments of progress.

3. All alternative compliance schedules proposed or promulgated under this section shall provide for compliance of the volatile organic compound emission source with Section II, above, as expeditiously as practicable but not later than December 31, 1982.

4. Any schedule approved under this section will automatically terminate if the source does not meet the increments of progress stipulated.

Part D. Exception

Parts A through D, above, will not apply to sources which are in compliance with Section II, above, before the effective date of this Standard and which have determined and certified compliance to the satisfaction of the Department before November 1, 1979.