

DEVELOPING ACCESS TO  
SCIENCE, ENGINEERING, AND TECHNOLOGY  
RESOURCES  
FOR THE  
GENERAL ASSEMBLY OF NORTH CAROLINA  
(PROPOSAL / GRANT NO. SP78-02509)

January 1979



Final Report  
December 31, 1978

DEVELOPING ACCESS TO SCIENCE, ENGINEERING, AND TECHNOLOGY  
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First Quarter Summary

As discussed in the First Interim Report filed June 30, 1978, during the first three months of its operation, the North Carolina General Assembly's State Science, Engineering, and Technology (SSET) Program centered its attention on three areas. These areas, which are specified by the time schedule table in the grant application, are: examination and identification of science/engineering/technology issues encountered by past sessions of the General Assembly, projections of future science/engineering/technology issues, and an inventory of science/engineering/technology resources available to the State of North Carolina. In the search for past science/engineering/technology issues, bills from the three most recent biennial sessions of the General Assembly were examined. A table showing the results of the bill examination and various statistical comparisons is attached to this report (Table 1). To accomplish the projection of future science/engineering/technology issues, an interview form was mailed to 39 selected leaders or science oriented members of the General Assembly. A table outlining the issue projections received is also attached to this report (Table 2). The inventory of science/engineering/technology resources available to the State of North Carolina was started in the first quarter of the project and it was completed in the second quarter. An

effort will be made to begin a continuing relationship between these resources and the staff and membership of the General Assembly; the plan for North Carolina linkage will stress the utility of this type of relationship.

### Second Quarter Discussion

The initial inventory of science/engineering/technology resources available to the State of North Carolina developed during the first quarter of the project has been expanded in two major areas during the second quarter. The first area of expansion includes heads of specific State agencies that deal with issues related to science/engineering/technology as a regular portion of their programmatic responsibilities. A second area, the community college system, was also added and this expansion represents the addition of the trade and technical schools found in North Carolina that represent potential sources of science/engineering/technology data. This additional information has been entered into the computerized data storage system along with the previous information in the inventory. Each resource is indexed according to the agency, department, or other head of the group or institution in the inventory and as a result the information may be retrieved accurately and rapidly.

The specialized bibliography dealing with the implementation and organization of various approaches to science/engineering/technology linkage with state legislatures which was started during the first quarter was expanded during the second quarter. There are now approximately 48 major

publications entered into the computer's storage system and indexed for easy access. Additionally, a summary of the content of each publication is also stored and indexed in the legislature's computer system. Of course, information is also being kept on file on science/engineering/technology sources outside the state. This includes the Model Interstate Scientific and Technical Information Clearing House and access information for the Federal Laboratory Consortium for Technology Transfer.

In order to enhance the selection of a science/engineering/technology model for use by the North Carolina General Assembly, the SSET staff examined operating programs in other states which utilized various approaches to providing SSET information for legislators. The staff carefully examined the descriptions of other SSET programs supplied by NCSL staff, and the various types of approaches were viewed in light of the other relevant research data collected in connection with the project. The staff chose to travel to Massachusetts for a first hand examination of their programs and to talk by phone and correspond extensively with Oklahoma to learn about their program. Massachusetts is working on a legislative SSET improvement grant (improvement of significant existing science mechanism) and Oklahoma is working on an SSET development grant (initial experience in working with science mechanism). Outlines of these state program examinations are attached (Exhibit A and Exhibit B). It was felt that the information acquired by other states in problem-solving for their programs would be useful to North Carolina in its planning and development of an SSET model.

A number of alternative programs and approaches which serve as models for the design of a state science/engineering/technology capability enhancement programs have been studied. The basic models examined include the personal research model, the committee model, the task force model, the expert consultant model, the intern staff model, and the professional staff model. The Massachusetts visit gave insight into the intern staff model and the recruiting, organization, and coordination of science and technology volunteers from universities and industry to assist the legislature. Oklahoma's program combines the professional staff model with some of the best aspects of the other models. The result of the second quarter of program study was that North Carolina might be best served by a model which would constitute a hybrid of the professional staff model and the intern staff model.

### Third Quarter Discussion

The third quarter of the SSET program study was devoted to the selection of a model alternative, the design of a North Carolina program to provide SET linkages, and the preparation of this final report. As the second quarter discussion indicated, the best choice of a North Carolina SSET program design would probably be a hybrid between the professional staff model and the intern staff model. This approach would allow the threshold institutionalization of the SSET concept into the North Carolina General Assembly's research system capacity and at the same time



would only require a modest economic investment and organizational structure change. Because the Legislative Services Office in North Carolina has no partisan commitments, the professional SET staff would likewise be non-partisan in perspective. The same consideration would also apply to the selection and hiring of technically oriented student interns to augment the program.

The professional SET staff would be integrated into, and a part of, the presently existing professional staff structure of the Legislative Services Office. This staff would have duties in addition to those relating solely to the SET program. The imposition of these additional duties on the professional SET staff is necessary because of the modest budget and limited number of staff people available to research issues for the members of the General Assembly. The primary functions of the professional SET staff would be to organize, coordinate, and supervise the technically-oriented interns used in the SET program. Also, the professional SSET staff would be expected to be scientific counsel on a limited basis to the members of the General Assembly and act as a clearinghouse for information flow from SET sources within and without the State. At the threshold level, the overall duty of the professional SET staff would be to act as a conduit for the SET information going to the legislative members and as a coordinator of information transfer from the public and private sectors to the members of the General Assembly.

The combination of a professional staff model and an intern staff model has been adopted in part by the Massachusetts SET program. Like the Massachusetts legislature, the North Carolina General Assembly has a wealth of SET information available from university and private sources well within its geographical area. If the Massachusetts model were adopted, the North Carolina SET program would operate at three basic levels. At the first level the professional staff would serve as a link between legislative inquiries and technical resource people in the private and public sectors. Telephone conversations and correspondence with science/engineering/technology experts would be the main source of information for the legislators. An SET inquiry form could be easily designed for use in providing written responses from the science/engineering/technology experts to the legislative members.

The professional SET staff would organize and coordinate university volunteers from science and technological fields to be "on-call" to answer (on an informal basis) SET-related questions from the members of the General Assembly. Industry volunteers could also be used in this way. Accordingly, a directory indicating the name, address, and the area of expertise of the volunteer could be published and made available to the legislators. A preliminary directory has been developed under this planning grant (Exhibit C).

The second level of the SET program would allow deeper probing into the questions and issues raised by legislators than



would be possible with the first level. This approach would be designed to set up dialogue between the legislators and specialized science/engineering/technology experts with respect to a given issue. The dialogue sessions might typically range from one hour face-to-face interviews between technical experts and legislators. To promote efficiency through this mechanism, group briefings or seminars could be set up using the SET professional staff as liaison and coordinators for such meetings.

The third level of the SET program would be the initiation of technical studies. This approach would be used whenever the first or second levels of operation were not appropriate. Individuals or organizations might foreseeably be asked to make specialized studies in their fields of expertise on behalf of the General Assembly. It is important to note that the North Carolina General Assembly already has a Legislative Research Commission. The committees of the Legislative Research Commission would be set up with a combination of legislative members and non-legislative members, some of whom would be experts in the SET field under review. These committees would conduct in-depth studies of SET issues.

The science interns selected to participate in the program would be chosen from the undergraduate and graduate scientific and technical programs in colleges and universities in the State. Presumably a large majority of these interns would be majoring in science or engineering programs.

## Conclusion

If a SET program is implemented in North Carolina, the above model will be used subject to modification as experience in the program is gained. Although the plan outlined above would involve a minimal level of funding, additional federal financial assistance may be necessary to implement the program.

TABLE 1

BILL REVIEW (SSET Issues)

	SESSION of the N. C. General Assembly					
	1973-1974		1975-1976		1977	
	No. of Bills	% of Total	No. of Bills	% of Total	No. of Bills	% of Total
Concurrent One*	466	12.6%	254	11.0%	341	13.9%
Identifications Two*	307	3.3%	238	10.3%	229	9.3%
Identifications Three*	118	3.2%	97	4.2%	91	3.7%
Bills Ass't.						
Chosen Researchers	342	9.2%	384	16.6%	364	14.9%
With Researcher	303	8.1%	145	6.2%	128	5.2%
SSET Project						
Content Director	786	21.2%	503	21.8%	578	23.6%
Total No. of Bills	3701		2312		2451	

COMPOSITE - 1973, 1975, 1977		
	Total Bills	% of Bills
Concurrent One*	1061	12.5%
Identifications Two*	773	9.1%
Identifications Three*	306	3.6%
Bills Chosen with Asst. Researcher	1090	12.9%
SSET Content with Researcher	576	6.8%
SSET Content Project Director	1867	22.1%
Total No. of Bills	8464	

\*Designation means that in the opinion of the searcher the bill concerned a SET issue.

TABLE 2

SET\* ISSUE PROJECTION  
(Legislative Poll)

% OF LEGISLATORS PROJECTING  
THE SET ISSUE AS A MAIN  
CONCERN TO SOCIETY

SET ISSUE

Medical & Health Issues	40%
Hazardous Materials	16%
Solid Waste Disposal	16%
Clean Water & Air Legislation	32%
Resource Recovery & Recycling	4%
PCB Spills	4%
Utility Regulations	4%
Energy	56%
Drug Abuse	4%
Transportation, Mass	16%
Math & Science Education	16%
Governmental Waste Reduction	4%
Land Use Policy	4%
Shell Fish & Fish Protection	4%
Computer Use in State Government	4%
OSHA Worker Protection	4%
Highway Deterioration	8%
Coastal Erosion	4%

No. of Legislative Leaders Polled - 39  
No. of Responses to Poll - 25

\*Science, Engineering, and Technology

## EXHIBIT A

### Massachusetts SSET Program Site Visit

On September 15, 1978, Ed McClearen (SSET Researcher) visited the Massachusetts General Assembly SSET Program to take a first-hand look at that State's operation. The following is a basic outline of the structure of the Massachusetts Program:

#### Science Resource Network (Massachusetts Legislature)

##### I. Network Functions

###### A. Inquiry Service

1. Linkage between legislative inquiries and technical resource people
2. Telephone conversations with experts are the main source of information
3. Written responses
  - a. Single-page typed responses
  - b. Statement of question
  - c. Key resource person contacted
  - d. Background of SSET issue
  - e. Response summarized and references

###### B. Dialogue Program

1. Deeper probing of questions and issues than is possible with the Inquiry Service
2. Dialogue program emphasizes legislative "foresight" as opposed to the more traditional after-the-fact legislative review of proposals and programs
3. Dialogue sessions typically range from one hour face-to-face interviews between technical experts and legislators
  - a. Group background briefings for legislator
  - b. Seminars for specific committees and groups of legislators

###### C. Technical Studies

1. Used whenever the network Inquiry Service or Dialogue Program is not appropriate
2. Science resource network seeks out individuals or organizations to perform specialized in-depth technical studies



3. Task force team of both legislative and resource people may be formed to coordinate the study and channel it in proper directions

## II. Network Support

### A. Information Service

#### 1. Talent Bank

- a. University volunteers from science and technology fields
- b. Industry volunteers from science and technology

#### 2. Resource directory development for legislators use

### B. Data Base

1. Data bases are comprised of the technical studies
2. Data bases are indexed

### C. Communications System

1. Film, slide, and video-projection equipment used
2. Use of camera and recorders in field research
3. Electronic response and teleconferencing techniques
4. Interactive computer graphics

## III. Network People

### A. Science Interns

1. College juniors and seniors
2. Graduate students
3. Majority of such students will be majoring in science or engineering
4. University credit may be possible for Science Interns

### B. Legislative Staff

1. Internal talent bank
2. Staff briefings as interval part of Dialogue Program

### C. Visiting Scientists

1. Temporary assignment to legislature to assist in technical studies
2. Supervision of work of Science Interns
3. Conduct of one or more staff briefings

### D. Legislative Committee (tentative)

PROPOSED SSET PROGRAM FOR THE OKLAHOMA LEGISLATUREI. Structural Characteristics

## A. Organizational accountability:

Research Coordinator plans and executes SSET program with advice and approval of Legislative Council Director and legislative leadership.

## B. Organizational Affiliations:

1. Oklahoma Executive Branch agencies
2. University community
3. State and national SET organizations
4. Private industry.

II. Mission Characteristics

A. Primary function: provide, via information transfers and impact assessments, reactive and proactive advisory support to the Legislature.

## B. Secondary functions:

1. Coordinate SSET needs and resources available from governmental, university and private sector sources.
2. Publish newsletter and conduct seminars and workshops.

III. Personnel Requirements

- A. Full-Time Staff: Research Coordinator, two staff members.
- B. Part-Time Staff: Interns, as needed.
- C. Technical Advisory Staff: Expert advisory assistance from external institutions, as needed.

V. Costs and Funding Support

A. Annual Costs:

1. First Year Estimate -- \$63,600 (Rsch.Coord. -- \$20,000  
Staff (each) - \$15,000  
Supplies ----- \$ 3,600  
Travel ----- \$10,000)
2. Second and Subsequent years -- \$75,000
3. Each additional staff member -- \$15,000.

- B. Possible Funding Support -- National Science Foundation,  
U.S. Civil Service Commission, private foundations, etc.

V. Implementation

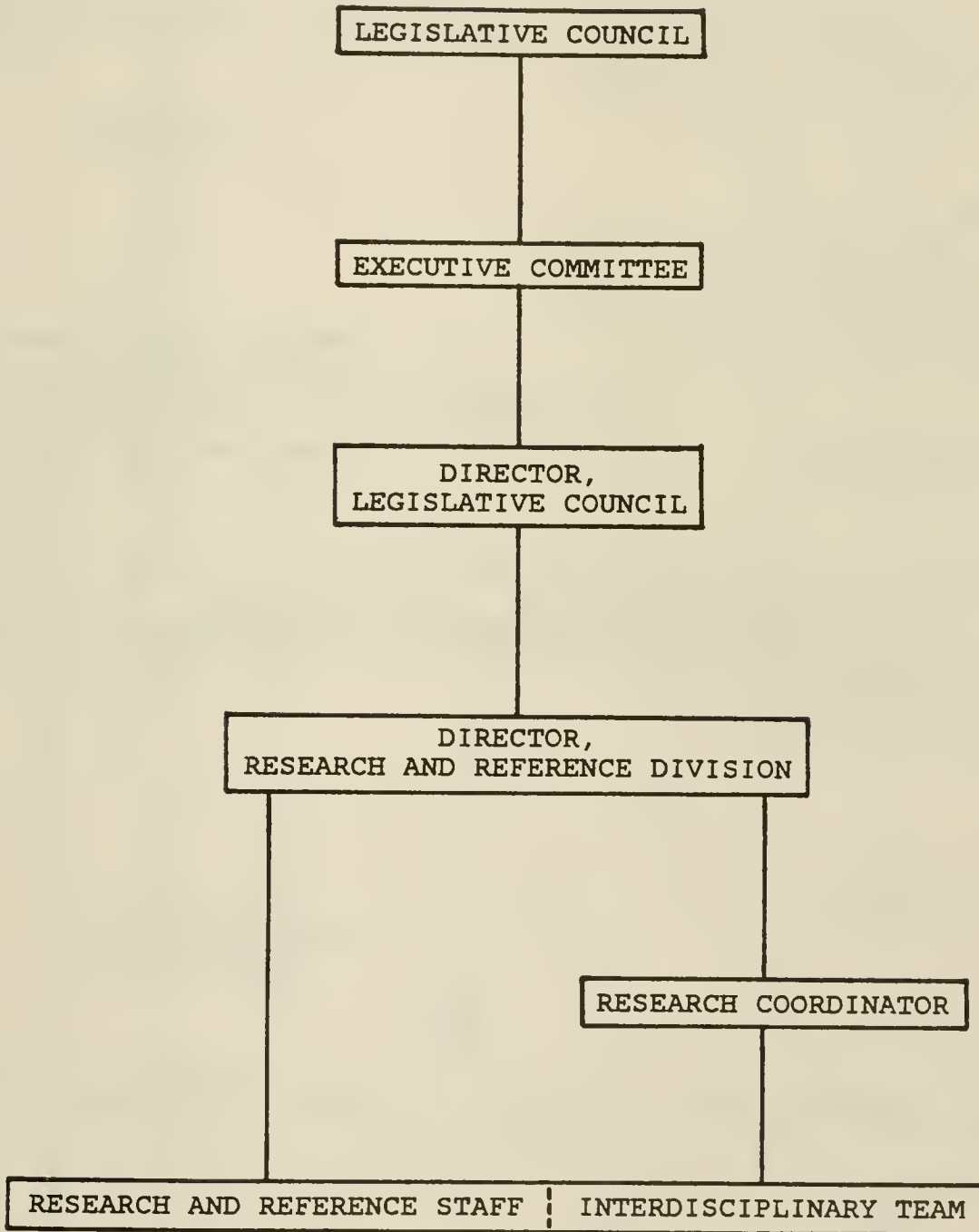
a. First Year:

1. Naming of Research Coordinator (0 - 4 months)
2. Hiring of two staff members (1 6 months)
3. Development of Impact Assessment Program (4 - 8 months)
4. Utilization of Resource Inventory and Intern Program,  
as needed.

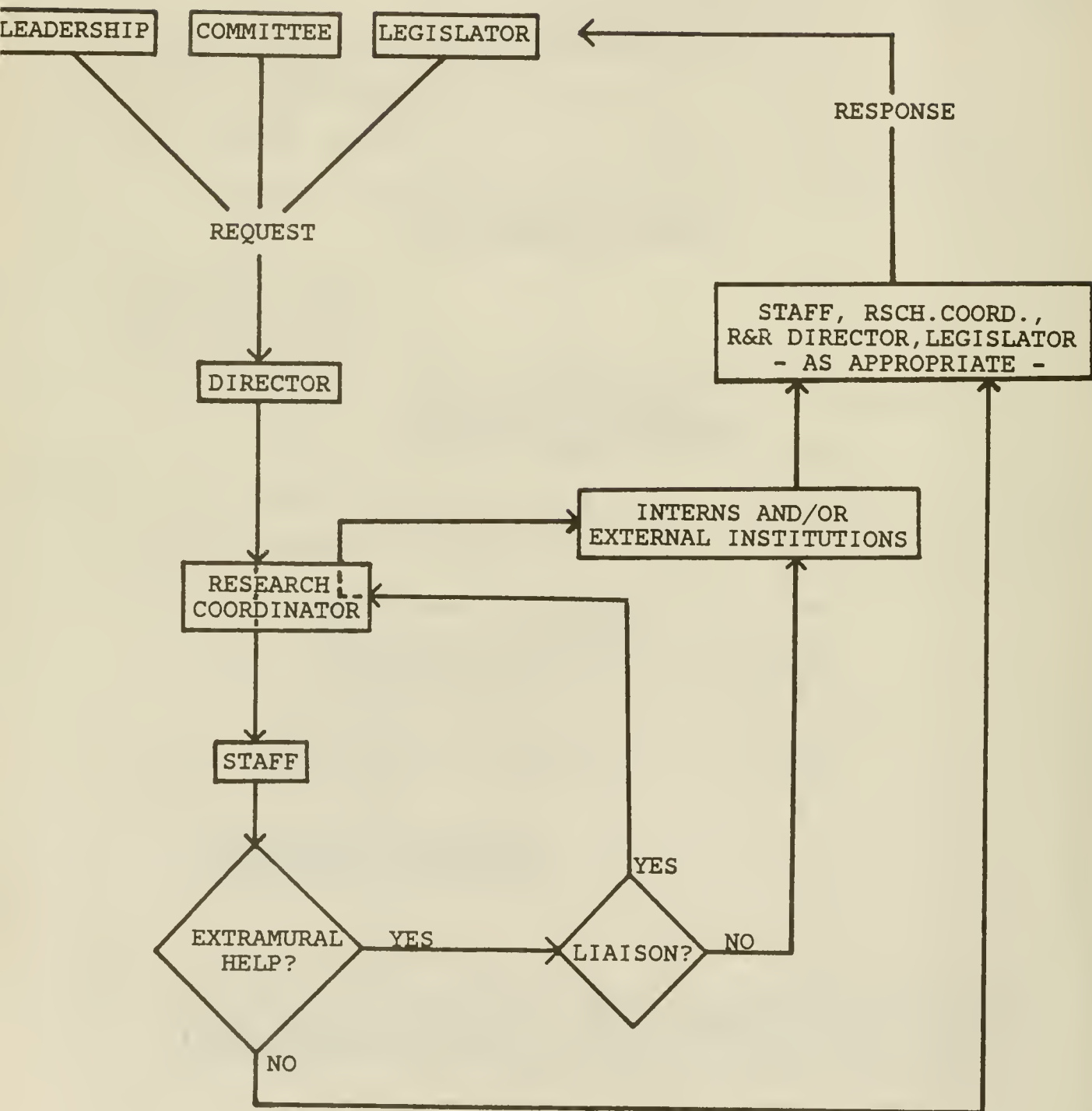
B. Second and Future Years:

1. Continue fully-operationalized SSET program.
2. Update Resource Inventory, as necessary.

ORGANIZATIONAL CHART -- LEGISLATIVE COUNCIL SSET PROGRAM



FLOW CHART -- IMPACT ASSESSMENT





FLOW CHART -- INFORMATION TRANSFER

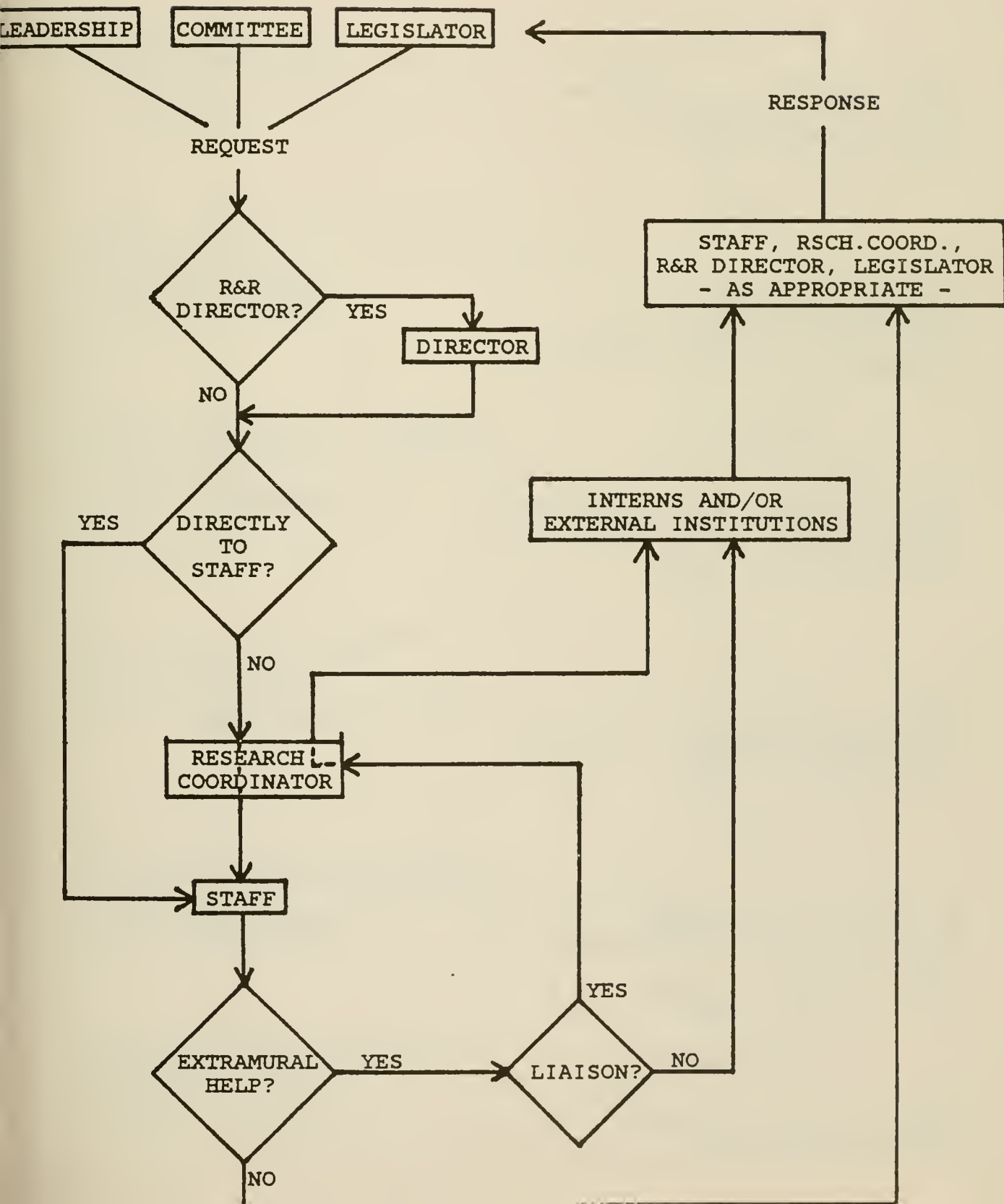


Exhibit C

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SUPPLEMENT TO THE  
REPORT OF THE  
AIR QUALITY LEGISLATIVE STUDY COMMISSION  
ON

IMPLEMENTATION OF A MOTOR VEHICLE  
INSPECTION/MAINTENANCE PROGRAM

TO THE

GENERAL ASSEMBLY

PURSUANT TO RESOLUTION 72  
OF THE 1979 SESSION

APRIL 30, 1980





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TO: The Members  
1979 General Assembly (Second Session, 1980)

Transmitted herewith is the Supplement to the Report of the Air Quality Legislative Study Commission made on April 30, 1980. This study was conducted pursuant to Resolution 72 of the 1979 Session Laws (House Joint Resolution 31).

Respectfully submitted,

*George P. Cullipher*

George P. Cullipher,  
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Air Quality Legislative Study  
Commission



## PREFACE

Although the Air Quality Legislative Study Commission reviewed much of the available literature concerning inspection/maintenance and heard from experienced administrators and professionals prior to February 1, 1980, the date on which the Commission's initial report was issued, the compressed schedule did not allow the Commission time to visit existing inspection/maintenance programs or to gather valuable input from the public. After February 1, the Commission was able to visit existing inspection/maintenance programs and hold two public meetings in Mecklenburg County. These subsequent activities enabled the Commission to finalize its findings and recommendations based on a more complete review of experiences to date in inspection/maintenance and considerable insight into the attitudes and concerns of those who will be subject to the inspection/maintenance program in North Carolina.

This supplement presents the findings and recommendations of the Commission along with a brief description of the rationale behind the findings and recommendations. In addition, a brief discussion of the air pollution problem in Mecklenburg County which led to the need for inspection/maintenance is included as an appendix.



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## FINDINGS AND RECOMMENDATIONS

1. In areas of the State where an inspection/maintenance program is found to be necessary to satisfy the requirements of the Federal Clean Air Act, the inspection/maintenance program should be implemented and operated within the private garage system, i.e., the decentralized system.
2. The annual exhaust emission inspections to be performed through the private garage system in the inspection/maintenance program should be performed in conjunction with the annual safety inspections.
3. The N.C. Division of Motor Vehicles should be the agency responsible for integrating the emission inspection system into the existing safety inspection system and overseeing and enforcing the emission inspections. The N.C. Division of Environmental Management and appropriate local agencies (such as the Mecklenburg County Environmental Health Department) should participate in the design of the inspection/maintenance program, and these agencies in conjunction with the N.C. Division of Motor Vehicles should develop and operate a comprehensive and effective public information program.
4. The N.C. Division of Environmental Management should be the agency responsible for analyzing exhaust emission data, setting exhaust emission standards, and determining air quality trends and exhaust emission trends related to the inspection/maintenance program.
5. The enforcement mechanism for the inspection/maintenance program should be a windshield sticker system; however, whether the emission test will be included in the safety inspection sticker or whether the emission test will require a separate inspection sticker will be decided by the N.C. Division of Motor Vehicles.
6. The exhaust emission test in the inspection/maintenance program should be performed on all registered gasoline-powered motor vehicles operated by any resident, firm, association, or corporation in the nonattainment area except for those vehicles older than twelve (12) model years.
7. All law enforcement agencies having the authority to enforce General Statute 20-128.1, relating to visible emissions (smoke) from motor vehicles, should be encouraged to enforce this statute especially in areas where an inspection/maintenance program is being implemented. In addition, these agencies should have adequate personnel who have completed the Visible Emission Evaluation Training Course and Certification offered by the N.C. Division of Environmental Management.

8. A motor vehicle which fails an emission test in an inspection/maintenance program should not be required to spend more than \$50 (fifty dollars) or the minimum cost ceiling specified by the U.S. Environmental Protection Agency, whichever is more; however, this repair cost ceiling should not apply in instances in which the devices on the vehicle designed specifically for emission control have been deliberately removed, disconnected, or otherwise made inoperative.
9. The automobile repair industry (including automobile dealerships, service stations, garages, etc.) in an area where an inspection/maintenance program will be implemented should be encouraged to have personnel properly trained in emission-related repair work.
10. Sufficient funds should be allocated to allow the N.C. Division of Motor Vehicles and the N.C. Division of Environmental Management to purchase equipment and materials, hire personnel, or enter into contractual agreements to facilitate the implementation of the inspection/maintenance program. These funds should be sufficient to allow the inspection/maintenance program to begin operation and to continue until the revenue from emission test fees is available to sustain the program.

The following appropriations will be necessary to implement the inspection/maintenance program and operate the program until revenue from the emission test fees can support the program:

	<u>1980-81</u>	<u>1981-82</u>
Division of Motor Vehicles	\$325,000	\$330,000
Division of Environmental Management	130,000	70,000
Total	<u>\$455,000</u>	<u>\$400,000</u>

Some of these appropriated funds could revert to the General Fund if the State can obtain federal matching funds which may be available to support part of the initial development and implementation of the program.

11. The inspection/maintenance program should not impose additional financial burdens on the local governments.
12. The General Assembly should enact this year the legislation necessary to implement and fund the recommended inspection/maintenance program. Legislation is being prepared at the request of this Commission by the Division of Motor Vehicles and the Division of Environmental Management in coordination with the appropriate local agencies for introduction by Legislative members of this Commission.

RATIONALE OF FINDINGS AND RECOMMENDATIONS

Note: The following rationales are in the same order as the "FINDINGS AND RECOMMENDATIONS."

1. Although each of the alternative approaches for implementing and operating an inspection/maintenance program is associated with specific advantages and disadvantages, the decentralized approach (private garage system) seems to be particularly appropriate for North Carolina since the safety inspection program already exists in the private garages. Such an approach should be more convenient to the motorist by allowing "one-stop shopping" for both the safety and the emission tests. The safety inspection program also provides an existing administrative framework within which the inspection/maintenance program can be implemented and enforced without possibly creating a new governmental organization solely for the new program. In addition, implementation through the private garage system should allow the inspection stations (service stations, garages, etc.) to recover their costs for exhaust gas analyzers which they would need under any alternative in order to perform proper emission repairs.

The disadvantages of the decentralized approach relating to enforcement and supervision and data processing should be able to be overcome if sufficient resources are allocated for this purpose. The efforts to supervise and monitor the accuracy and fairness of the emission inspections must be

effective and highly visible to assure the public of the efficacy of the inspection/maintenance program.

2. One of the major advantages of the decentralized approach in a nonattainment area in North Carolina is that the safety and emission inspections can be combined into one test so that the motorists' trips are reduced. If these inspections were separated, a motorist might have to make two trips and the paperwork may be unnecessarily doubled.
3. Since the N. C. Division of Motor Vehicles currently administers the safety inspection and since the emission test will actually become a part of the safety inspection, the natural choice for the administering agency is the Division of Motor Vehicles.
4. A major task of the inspection/maintenance program will be the determination of standards that the different years and makes of motor vehicles will have to meet. The standards will be based to a large degree on the reduction in carbon monoxide emissions that will be necessary to eliminate violations of the national health standard in a timely manner. Thus, the standards must continually consider air quality trends and reductions in carbon monoxide emissions through other programs. Since the N. C. Division of Environmental Management will be analyzing air quality trends and monitoring the effectiveness of other control programs, the determination of emission stand



should be by regulations proposed by this Division for N.C. Environmental Management Commission adoption.

5. Since the enforcement of the existing safety inspection program through a windshield sticker system has been well established, it is appropriate that the inspection/maintenance program also be enforced through a sticker system. Enforcement through the registration system (e.g., denial of registration without emission test) does not appear to offer significant advantages over the sticker system if the sticker system includes a comprehensive effort by the law enforcement agencies.
  
6. Gasoline-powered motor vehicles are the main contributors to carbon monoxide pollution, whereas diesel-powered motor vehicles, although associated with higher visible emissions, are relatively minor sources of carbon monoxide. A requirement for diesel-powered vehicles to participate in the inspection/maintenance program would not accomplish a significant reduction in carbon monoxide. Similarly, vehicles which are older than twelve (12) years contribute only a small portion to the total carbon monoxide emissions mainly because these vehicles constitute only a small percentage of the vehicle fleet. Vehicles older than twelve years often account for less than three or four percent of the total miles traveled in an area, and many of these vehicles are owned by persons in low-income groups. Thus, inspection/maintenance of these older vehicles

might create economic hardships on some persons without producing meaningful reductions of carbon monoxide emissions.

7. Although diesel-powered vehicles and older vehicles will be exempted from the emission test, they are subject to the existing regulation (G.S. 20-128.1) regarding visible emissions (smoke) as are all other registered motor vehicles. A strong enforcement effort of this regulation is an important element in an overall motor vehicle pollution control program, and it assures those who are subject to the emission test that diesel-powered vehicles and older vehicles do their share to control pollution. In order to effectively enforce this regulation, law enforcement agencies must have adequate personnel trained and certified in recognizing the various degrees of visible emissions.
8. Studies in existing inspection/maintenance programs have shown that the average repair costs for vehicles which fail the emission test are usually about \$25 or \$30. A great majority of all the repair costs are below \$50 with only a small percentage of the repairs reaching over \$100. Since most repairs can be accomplished for under \$50 and since it is desirable to avoid creating any major economic hardship on vehicle owners, it seems appropriate to establish a repair cost ceiling that provides an adequate range for restorative maintenance work yet assures the public that unreasonable repair work will not be required. However, it is also



appropriate that this repair cost ceiling not apply in instances where deliberate removal or other tampering with the emission control devices has occurred or where the oxidation catalyst has been destroyed by the use of leaded fuel. The repair cost ceiling should be set at \$50 or the U.S. EPA minimum requirements, whichever is more. Initial reports indicate that the EPA minimum will probably be about \$75.

9. Studies in existing inspection/maintenance programs have shown that potential emission reductions and consumer protection are greatly enhanced by a strong effort to upgrade the skills of in-service mechanics relating to emission-related repair work. The complexity and changing character of many emission control systems warrant a concerted effort to assure that adequate training opportunities are available and that the repair industry is aware of the benefits of these opportunities.
10. An inspection/maintenance program requires a substantial manpower and financial commitment to assure that the program is implemented with minimal adverse impact to the community and operated in an efficient and effective manner. Although the program will be self-sustaining through the emission inspection fees that will be collected, there will be an initial period in which State funds will be required to accomplish public information activities and a voluntary inspection phase and to establish an administrative and

enforcement staff. The following costs have been estimated for the Division of Motor Vehicles and the Division of Environmental Management (of the Natural Resources and Community Development Department):

	<u>1980-81</u>	<u>1981-82</u>
Division of Motor Vehicles		
Personnel	\$126,000	\$183,000
Equipment	122,000	52,000
Other	77,000	95,000
Sub Total	<u>\$325,000</u>	<u>\$330,000</u>
Environmental Management Division		
Public Information Activities	\$ 60,000	\$ 15,000
Personnel	38,000	41,000
Equipment (Data Processing)	30,000	12,000
Other	2,000	2,000
Sub Total	<u>\$130,000</u>	<u>\$ 70,000</u>
Total	\$455,000	\$400,000

The costs in 1980 and 1981 are related primarily to public information activities and the voluntary inspections. Costs in 1981 and 1982 are devoted to establishing administrative, enforcement, and data processing functions. The costs identified above are needed to support the program until the middle of 1982 when the revenue from emission inspection fees should begin to support the program.

Some of the State funds could revert to the General Fund if the State can obtain federal matching funds to support public information activities, the voluntary inspections, and some

other tasks related to the development and implementation of inspection/maintenance.

11. Although inspection/maintenance should reduce carbon monoxide air pollution in one specific county (Mecklenburg), this program is advocated and specifically required by the federal government. Therefore, any supportive or supplemental funds should be either federal or State funds rather than local funds. This recommendation does not preclude the participation of local agencies in the implementation of inspection/maintenance but rather it encourages such participation so long as a significant allocation of local funds would not be required.
12. Legislation is necessary to implement and fund the inspection/maintenance program recommended by the Commission. The legislation is needed this year to provide the necessary lead-in program prior to the deadline for the mandatory phase of the program.

APPENDIX

AIR QUALITY IN MECKLENBURG COUNTY

Various air pollutants in Mecklenburg County have been monitored for several years by the County Environmental Health Department. The results of the monitoring efforts have shown that the levels of ozone and carbon monoxide have often been above the national standards for those air pollutants. High ozone and carbon monoxide levels often result in urban areas like Charlotte where concentrated motor vehicle activity and industrial processes emit more pollution than can safely be dispersed by natural processes (wind, rain, etc.).

Ozone is formed through a chemical reaction involving nitrogen oxides, hydrocarbons, and sunlight. The chemistry of this reaction indicates that the most effective approach for reducing ozone is to reduce the emissions of hydrocarbons. In Mecklenburg County, as in other urban areas of the country, about half of the hydrocarbons come from motor vehicle exhaust emissions while the other half comes from factories, petroleum storage and transfer facilities, and other industrial facilities. The hydrocarbon emissions from motor vehicles are essentially unburned gasoline vapors, gasoline being composed of several different hydrocarbons.

Ozone has been monitored at three locations in the county: downtown at the Environmental Health Department; just north of I-85 at Beatties Ford Road; and near Woodlawn Road to the south. At all of these sites the ozone levels have been higher than the national standard at certain times during the year. Some of these ozone levels have been 50 percent higher than the ozone national

standard, and all sites have experienced ozone levels at least 35 percent higher than the standard.

To reduce the hydrocarbon emissions which contribute to the formation of ozone, a set of regulations based on reasonably available control technology has been implemented in Mecklenburg County to reduce emissions from existing stationary sources (petroleum storage facilities, industrial processes, etc.), and even more stringent control regulations apply to new stationary sources. At the same time, the hydrocarbon emissions from motor vehicles are being reduced as newer motor vehicles with more effective emission control systems replace older vehicles which have higher emission rates. Through these emission reductions from stationary sources and motor vehicles, the exceedances of the ozone standard are expected to be eliminated by the end of 1982.

Unlike ozone, carbon monoxide is emitted directly from motor vehicles and, thus, is characterized by significantly different dispersion and transport properties. Over 90 percent of the carbon monoxide in Mecklenburg County results from motor vehicle activity while the remaining portion comes from certain industrial processes, residential wood burning, and other sources of combustion. Carbon monoxide levels are currently monitored continuously at three locations in Mecklenburg County (at the Federal Reserve downtown, near Park-Woodlawn intersection, and near Central-Sharon Amity intersection) and have been monitored at five other locations. All of the monitoring sites have recorded violations, i.e., carbon monoxide levels above the national standard, with the higher levels being about twice the standard. These high levels have usually

occurred on about 20 days out of the year.

Since almost all of the carbon monoxide emissions comes from motor vehicles, the strategy to reduce carbon monoxide levels centers around reducing emissions from motor vehicles, although controls on stationary sources, e.g., factories, are also part of the strategy. The greatest reduction in motor vehicle emissions will result from newer cars and trucks with more effective emission controls replacing older cars and trucks with less controlled emissions. Although these new, more controlled vehicles will reduce carbon monoxide emissions by over 40 percent between now and 1987, this reduction in emissions will not be sufficient to lower the carbon monoxide levels, i.e., ambient concentrations, to below the standard throughout the year. Further measures will be required. Among these measures, inspection/maintenance will provide the most additional reduction in carbon monoxide emissions. Inspection/maintenance should be able to reduce the 1987 carbon monoxide emissions by another 25 percent which should prevent the national carbon monoxide standard from being exceeded.





