

IV 76-01
II A-765

EPA'S QUIET COMMUNITIES
FIVE-YEAR PLAN

FY 1981 - FY 1985

DRAFT

February 1980

**EPA'S QUIET COMMUNITIES
FIVE-YEAR PLAN**

FY 1981 - FY 1985

DRAFT

February 1980

**EPA'S QUIET COMMUNITIES
FIVE-YEAR PLAN**

FY 1981 - FY 1985

Volume I

DRAFT

February 1980

TABLE OF CONTENTS

| | <u>PAGE</u> |
|---|-------------|
| INTRODUCTION | |
| <u>CONGRESSIONAL REQUEST</u> | 1 |
| <u>ORGANIZATION OF THE PLAN</u> | 2 |
| <u>PRIORITIES</u> | 2 |
| SECTION I | |
| <u>OVERVIEW</u> | |
| The Effects of Noise | 4 |
| The Pervasiveness of Noise Exposure | 7 |
| Mechanisms for Control of Noise | 12 |
| Separating the Public from the Noise | 12 |
| Interrupting the Path | 13 |
| Controlling the Source of the Noise | 14 |
| Noise Program Goals and Objectives | 17 |
| Year 2000 Noise Control Goals | 17 |
| Intrusive Noise Events | 19 |
| 1985 Noise Control Objectives | 19 |
| A Word about Prevention of Future Noise Exposures . | 20 |
| Steps EPA Has Already Taken | 21 |
| The Plan for FY 1981-1985 | 22 |
| SECTION II | |
| <u>SURFACE TRANSPORTATION</u> | |
| The Surface Transportation Noise Problem | 24 |
| Methods to Control Vehicular Noise | 27 |
| Separating the Public from Vehicular Noise | 28 |
| Interrupting the Path | 28 |
| Control of Vehicular Noise at the Source | 29 |
| Trucks..... | 30 |
| Interstate Motor Carriers (Trucks and Buses) . | 30 |
| State and Local Programs to Control Vehicular Noise . | 31 |
| The Need for a Network of Community Programs | 31 |

TABLE OF CONTENTS (Continued)

| | |
|--|----|
| EPA's Strategy for Fostering a Network Community Programs | 33 |
| Specific Program Activities | 34 |
| Multiplier Programs | 34 |
| Direct Assistance Programs | 41 |
| State and Local Prevention | 42 |
| Federal Regulations and Enforcement to Control Vehicular and Off-Road Noise | 42 |
| Vehicular Noise | 42 |
| New Source Standards | 42 |
| Labeling | 45 |
| Enforcement | 46 |
| Off-Road Vehicles | 47 |
| Railcars and Railroads | 47 |
| Guided Mass Transit | 49 |
| Snowmobiles | 49 |
| Motorboats | 49 |
| Support Programs | 50 |
| Types of Support Programs | 50 |
| Public Education | 50 |
| Health and Welfare Research .. | 50 |
| Health and Welfare Research | 50 |
| Technology Development and Demonstration | 51 |
| Cost/Economic Impact Analysis | 52 |
| Federal Program Coordination | 53 |
| Summary | 55 |

AVIATION

| | |
|---|----|
| The Aviation Noise Problem | 56 |
| The Next Twenty Years | 58 |
| Optimization of Aircraft Flight Procedures | 58 |
| Airport Noise Abatement Planning | 59 |

TABLE OF CONTENTS (Continued)

| | |
|--|----|
| Off-Airport Land-Use Management | 61 |
| Soundproofing and Relocation | 62 |
| Beyond the Year 2000 | 63 |
| Accelerated Research and Development | 63 |
| More Forward-Looking Regulation..... | 64 |
| General Aviation and Military Aviation | 65 |
| Summary | 65 |
| <u>CONSTRUCTION</u> | |
| The Construction Site Noise Problem | 66 |
| Control of Construction Site Noise | 68 |
| Controlling Noise at the Receiver | 69 |
| Interrupting the Path | 70 |
| Controlling Noise at the Source | 70 |
| Federal Regulations | 70 |
| State and Local Programs | 73 |
| Enforcement | 72 |
| <u>HOUSEHOLD/CONSUMER PRODUCTS</u> | |
| The Consumer Product Noise Problem | 74 |
| Approaches to the Problem..... | 74 |
| Public Education | 74 |
| Labeling | 75 |
| New Produce Regulations | 78 |
| Enforcement | 79 |
| <u>MACHINERY</u> | 70 |
| The Machinery Noise Problem | 80 |
| Federal Coordination | 80 |
| Summary | 81 |
| <u>COMPREHENSIVE PROGRAMS</u> | |
| Public Education | 82 |
| Health Effects Research | 84 |
| Other Comprehensive Programs | 88 |
| National Assessment of Noise Exposure | 88 |
| Local Information System to Evaluate Noise (LISTEN) | 89 |
| Alternative Manpower Staffing | 89 |
| International Standardization and Harmonization .. | 89 |

INTRODUCTION

CONGRESSIONAL REQUEST

This Report to the Congress sets forth a Five-Year Plan for the implementation of the U.S. Environmental Protection Agency's (EPA) Noise Control Program. In response to a Congressional request, this Plan has been developed during the first year following the passage of the Quiet Communities Act in November of 1978. It covers Fiscal Years 1981 through 1985.

The 1978 Act amended the Noise Control Act of 1972 and provided new authorization and direction to EPA's noise control efforts. During the intervening year EPA implemented the new Act by initiating a small financial assistance program for States and localities, and by giving greater emphasis to health effects research as called for by the new Act. The Agency has also completed longer range plans for carrying out its noise control responsibilities. EPA welcomes this opportunity to present these plans to the Congress.

This Five-Year Plan has three volumes: (1) EPA's Quiet Communities Five-Year Plan, which comprises this volume, covering all of EPA's noise control efforts; (2) a special report on aviation noise (Volume II); and (3) a special report on health effects research (Volume III). The conclusions of these special reports are summarized in this volume as well.

Because the Congressional request for this Five-Year Plan came relatively close to its March 1, 1980 due date, EPA has had less time than usual to solicit public comment in the development of this document. Nevertheless, EPA did consult with Committees formed for this purpose by the National League of Cities (elected officials) and the National Association of Noise Control Officials (State and local noise control professionals). For the aviation portion of this Plan, EPA consulted with air frame and engine manufacturers and also requested comments on a series of questions from persons on a voluntary mailing list of those interested in aviation noise. The research portion of this Plan was reviewed by selected experts in the field and by the Interagency Advisory Group on Noise Health Effects Research, a Federal interagency committee with representatives of all research and user agencies in the noise health effects area.

A second edition of this plan is due to the Congress in January of 1981. Before this second submission EPA will invite full public comment on this initial Plan and will revise the Plan accordingly.

ORGANIZATION OF THE PLAN

EPA's Quiet Communities Plan contained in this volume is divided into two major sections. The first section lays out the objectives EPA has identified for the Agency's noise control program over the next five years and the next 20 years and discusses the basis of the objectives in terms of current knowledge about the effects of noise, the pervasiveness of noise exposure, and the techniques and mechanisms for control at all levels of government. The second section provides specific details of the accomplishments expected over the next five fiscal years. This discussion is organized in the following six program areas which focus on noise source categories:

- Surface Transportation
- Aviation
- Construction
- Household/Consumer Products
- Machinery
- Comprehensive Programs (Public Education, etc.)

Within each of these program areas, the various functional activities authorized by the Act are discussed. These include:

- technical and financial assistance to States and localities;
- promulgation and enforcement of Federal regulations; and
- health and technology research and Federal program coordination.

PRIORITIES

Not all noise sources are of equal importance, nor does EPA have equal means or authority to deal with each source. Consequently, EPA's priorities for using its noise control resources are discussed in this report. The greatest emphasis has and will continue to be placed by EPA on abatement of surface transportation noise. Noise from trucks, buses, motorcycles, automobiles, and other surface transportation sources impacts far more people in this country than noise from any other source. In addition, EPA's authorities to control noise are most comprehensive in this area.

Aviation noise is the second most important area for EPA's efforts. Many people would argue that aviation noise should rank first in EPA's priorities because of the very high levels of noise involved, but the fewer numbers of people affected relative to surface transportation noise and the circumscribed role which EPA has in the area limit aviation noise to a very important but secondary part of EPA's total program. While EPA views aviation noise as the second most important area of concern, this does not imply that aviation noise programs rank second in resource commitment. At the present time, EPA is devoting a high percentage of senior staff time to this noise problem, and additional resources will be committed to this noise problem between now and 1985. While total dollar cost projections are less than several other categories, EPA proposes to increase its commitment to aviation noise abatement in the next five years. In percentage terms, we expect this increase to be the largest.

EPA believes that viewing the Nation's noise control problems in terms of these source categories is the best way to assess the extent and nature of the specific noise problems and to design appropriate Federal programs. For various reasons, (e.g. acoustical considerations, limited resources) EPA believes that this approach is the most effective method to provide relief to the populations impacted. As the sections covering major source categories explain, abatement measures for noise from one source may contribute to abatement of other sources. Although priorities are established, the EPA effort must be integrated among all major source categories. This integration is best displayed in the Agency's work with State and local programs, which are usually broad in scope, cover more than one source category, and can provide some but not total relief from noise caused by all source categories.

SECTION I

OVERVIEW

The Noise Control Act of 1972 established the goal of the Federal noise control effort as the promotion of an "environment for all Americans free from noise that jeopardizes their health or welfare."

To relate this overall goal to program activities to be carried out during the next five years, it is necessary to establish concrete objectives that will further the achievement of the Congressionally established goal. These objectives are presented later in this section. Three basic considerations underlie EPA's objectives:

- What are the harmful effects of noise?
- To what extent is the U.S. population so affected?
- By what mechanisms can these effects be controlled?

THE EFFECTS OF NOISE

Noise is seen as a pollution problem because of its effects on people. Unlike many pollutants which are hidden from public view, noise is a very obvious part of the lives of most Americans. It is not surprising, therefore, that when the Gallup Organization conducted a survey in November 1978, of urban residents' attitudes towards environmental issues they found that:

- 40 percent of urban residents think noise pollution is at least a fairly serious problem - the same percentage as for air pollution;
- 20 percent of urban residents believe noise is a health threat;
- 9 percent of urban residents said they want to leave their neighborhoods because of noise;
- 57 percent of urban residents feel the problem is growing or is more serious than a year ago, while only 22 percent found the problem to be less serious.

Local officials polled in July, 1979 by Nation's Cities Weekly showed even more awareness of noise as a pollutant than their average constituents:

- 59 percent think noise is a serious problem in their community;
- 67 percent think it is more serious than five years ago;
- 80 percent think their community is not doing enough to control noise; and,
- 55 percent think noise pollution represents a threat to the health of their citizens.

Thus, noise is perceived by citizens and public officials alike as a serious pollutant, requiring action to prevent harm to the public health.

Noise endangers health and well-being in many ways. Most obvious to everyone is hearing loss caused by exposure to loud noise. Noise loud enough to cause hearing loss is everywhere — in our jobs, our recreation, and our homes. More than 20 million Americans are estimated to be exposed daily to noise that is permanently damaging to their hearing. Most hearing loss is gradual, becoming worse with time. It is irreversible, and can be handicapping. Hearing loss is frequently associated with discomfort, pain, and tinnitus (irritating ringing or roaring in the head). As hearing worsens, a sense of severe isolation sets in. It has been suggested that losing one's hearing isolates a person more than the loss of one's sight, and blindness cuts you off from things; deafness cuts you off from people.

Noise-induced hearing loss is not just the result of industrial or occupational noise. Noise levels in many urban settings, homes, recreational areas, and many transportation vehicles exceed the levels which can cause hearing damage over prolonged periods, especially in combination with other occupational and environmental noises. For example, researchers have discovered that hearing difficulties in children are likely by-products of noisy schools, play areas, and homes. High frequency hearing impairment has been measured in college-age persons, some of it attributable to recreational activities. Indeed, environmentally-induced hearing loss affects people of all ages and occurs in a wide spectrum of activities in countless settings.

Noise initiates automatic and unconscious physiological reactions known as the classic "stress response." Blood pressure rises, heart rate and breathing speed up, muscles tense, hormones are released into the bloodstream, and perspiration increases. People do not stop responding physically to noise. Regardless of a person's consciousness of the noise, biological responses occur even during sleep. Noise levels below those accompanying hearing damage can cause these effects. Studies suggest that regular exposure to noise could lead to diseases of stress such as ulcers and high blood pressure, although sufficiently conclusive field studies have yet to be conducted.

Yet, epidemiological studies of noise in the workplace link the presence of noise with the incidence of cardiovascular disease. These results are mirrored in the preliminary findings of a study on rhesus monkeys now being conducted jointly by the National Institute of Environmental Health Sciences (DHHS, formerly HEW) and EPA. Heart disease and strokes cause 48 percent of the deaths in the United States each year, and to the extent that noise is linked to an increased incidence of these diseases, the public health implications could be very serious. This Five-Year Plan lays out a program for more research into these non-auditory physiological effects of noise.

Noise is the cause of many sleep disruptions in homes across the country. For many people, this is not an occasional event but rather one which happens night after night. The health implications of such disruptions in sleep are not yet known, but survey results do show that interruption of rest, relaxation, and sleep is the underlying cause for many complaints in noisy communities.

Even the unborn are not immune to the effects of noise. Loud noises are known to cause changes in fetal heart rate and may pose a threat to fetal development. In particular, some studies have shown a high proportion of low birth weight babies in noisy areas. Of increasing concern is how noise and other associated environmental agents affect the growth and development of children. The primary activity of developing children is, of course, learning. If children are required to speak and listen in a noisy environment, they may have difficulty acquiring essential communication skills. In the schools, reading ability may be seriously impaired by noise, and the impairment becomes more pronounced with increasing exposure. Aircraft, traffic, and railway noise cause severe educational disruption in many schools in this country, interfering with learning, attention, and performance.

Whether in the schools, home, or workplace, indoors or out, one of the most bothersome aspects of noise is its interference with communication. We must frequently speak up to be heard or ask others to do so. People are forced to stop talking or to change the content of their communications, and usually must repeat themselves. For millions of Americans in noisy urban environments, the use of outdoor areas for various forms of communication is virtually impossible. Because of frustrated efforts to communicate, lifestyles deficient in expression and social interaction are not uncommon. Moreover, costs are incurred in the workplace and classroom when aural communications are disrupted.

Many people perceive noise as simply an "annoyance." The usual use of this term as "mildly irritating, but easily bearable" can be deceptive. Anyone who has been confronted by the angry neighbors of a busy airport knows that "annoyance" caused by noise is not necessarily a minor irritation. In fact, the reactions known as "annoyance" have been the principal impetus to the noise abatement movement in communities across the nation.

Although annoyance from noise varies from individual to individual and from time to time, it is not limited to a few people. The Bureau of the Census' Annual Housing Survey has found that Americans in approximately four out of every five households feel that they live in good or excellent neighborhoods, but that almost half (49 percent) consider their neighborhoods too noisy. In this survey, year after year, noise is most often mentioned of all the undesirable conditions listed, surpassing many other factors that are often thought to determine people's perception of the quality of their lives.

Last but not least of the effects of noise is the ability of a small amount of noise to destroy the quietude in a pristine area. This is the issue at stake for instance, in the current controversy surrounding the possible introduction of commercial jet service into Jackson Hole Airport which is located in Grand Teton National Park, a park known for its unspoiled wilderness environment.

THE PERVASIVENESS OF NOISE EXPOSURE

Many public health programs focus on problems that involve critical consequences such as loss of life, but for a fairly small and select population. The Noise Control Act of 1972 was Congress' attempt to deal with a pollutant which at that time seemed to be

primarily an annoyance but which affects the daily lives of a large percentage of the American population. This pervasiveness of the problem, more than the severity of the impact, has brought the noise problem to the attention of Federal, State, and local officials in the past. While evidence is mounting that the effects of noise are far more serious than originally believed, the popularity of and the demand for noise control programs will continue to draw their strength from the fact that noise is the most pervasive pollutant.

Noise levels are measured on a logarithmic scale and designated in decibels (dB). Such a scale corresponds to the response of the human ear to noise. A tenfold increase in acoustic power is indicated by a 10 dB increase in the noise level. The noise level in an average residence or private office is about 50 dB; near a highway the noise level is likely to be 60 to 70 dB. A freight train 100 feet away or a vacuum cleaner 10 feet away will produce a noise level of about 70 dB. A pneumatic drill at 80 feet will produce a noise level of 80 dB, and a subway train at 20 feet will produce a noise level of approximately 90 dB. (See Exhibit 1.)

Noise exposure can be measured in a variety of ways. To show the connection between the number of people exposed and the expected health effects, EPA can quantify the population exposed to levels exceeding the two specific noise levels for which effects are reasonably well agreed upon by the scientific community. These levels were identified by EPA in response to a mandate from Congress in Section 5 of the Noise Control Act of 1972. In that section, Congress directed the Agency to identify those levels necessary to protect the public health and welfare with an adequate margin of safety. The noise levels in the resulting "Levels Document" published in 1974 and in supplemental reports still represent the best estimate of maximum safe noise levels for protection of public health and welfare. The levels were determined strictly on the basis of scientific findings without consideration of the cost or technical feasibility of achieving such levels for the U.S. population. Thus, they are good benchmarks for measuring the noise exposure of the U.S. population, and should not be interpreted as standards. These levels are:

- L_{eq}^* (8) of 75 dB and $L_{eq(24)}$ of 70 dB, above which there is a risk of hearing loss; and
- L_{dn}^{**} of 55 dB, above which there is significant interference with activities, such as sleep, conversation, and relaxation, in normal environments.

Many studies have provided estimates of the number of people exposed to various levels of noise from specific sources. These estimates and their periodic updates give a general view of the scope and nature of the noise problem in America. It is estimated that approximately 15 million American workers are exposed to an $L_{eq(8)}$ of 75 dB or or $L_{eq(24)}$ of 70 dB or greater in the workplace, thereby incurring a risk of hearing damage. Several more millions of Americans — perhaps as many as 13 million — are exposed to an $L_{eq(8)}$ of 75 dB or greater through their use of transportation or recreational vehicles.

The number of Americans exposed to noise levels greater than the L_{dn} 55 dB associated with activity interference is, of course, much larger. Approximately half of the U.S. population is exposed year after year to 24 hour average levels greater than L_{dn} 55 dB. Of course, most of these people are exposed to noise in the lower end of the decibel range between L_{dn} 55 dB and L_{dn} 65 dB rather than between L_{dn} 65 dB and L_{dn} 75 dB.

The major contributors to these exposures are surface transportation, aviation, and construction equipment (see Exhibit 2). In some cases people may be exposed to more than one of these sources at the same time, so the total number of people exposed to these levels from all sources may not be additive.

* L_{eq} , equivalent sound level, is the average energy level of sound over a given period of time. The period of time is shown in parenthesis. When considering hearing loss, sound exposure is measured at the ear.

** L_{dn} , day-night sound level, is the energy-averaged equivalent level (L_{eq}) for 24 hours adjusted to include a 10 dB penalty for noise exposures during nighttime hours (10 p.m. to 7 a.m.)

EXHIBIT 1

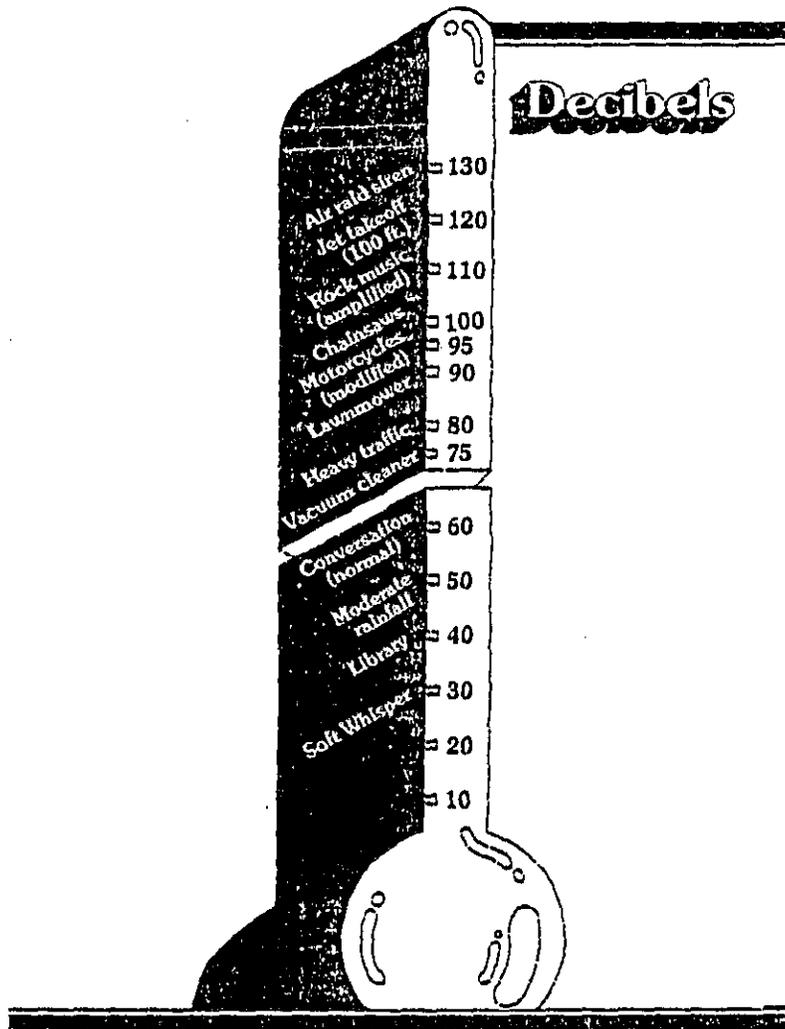


EXHIBIT 2

Environmental Noise Exposure from Major Noise Sources
1979

| NOISE SOURCE CATEGORIES | ESTIMATE OF NUMBER OF PEOPLE EXPOSED (millions) | | | OTHER RELEVANT FACTORS |
|--|--|-----------------|-----------------|---|
| | above Ldn 55 dB | above Ldn 65 dB | above Ldn 75 dB | |
| Surface Transportation (Truck, Automobiles, Buses and Motorcycles) | 81 | 16 | 1.0 | SURFACE TRANSPORTATION: EPA and States and localities have multiple means to control these sources. Although other Federal agencies such as DOT are involved, EPA clearly has the lead role and responsibility to abate this source of noise. |
| Aviation | 50 | 5 | .3 | AVIATION: EPA and States and localities have more limited authority to deal with this source. Emphasis must be placed on those areas where authority does exist and where EPA (and States and localities) can make a significant contribution. |
| Construction Sites | 37 | 7-15 | less than .01 | CONSTRUCTION: EPA has authority to deal comprehensively with these sources as newly manufactured products. The degree to which State and local communities have the ability to affect exposure levels from these sources has not been demonstrated. |

MECHANISMS FOR CONTROL OF NOISE

An Example — Surface Transportation

Evidence is increasing that noise is a serious threat to public health, and the levels of exposure are high for large segments of the U.S. population. The mechanisms for reducing exposures vary to some extent from source to source, but a number of common principles are applicable to all sources of environmental noise. These principles directly shape the respective roles of Federal, State, and local agencies in the control of noise, and affect industry and the general public. This section on principles and mechanisms for noise control takes as its example the most common type of noise - motor vehicle noise - which is familiar to everyone. Trucks, motorcycles, buses, and automobiles all contribute to the traffic noise which impacts urban, suburban, and rural homes and businesses in this country. This vehicle noise is caused or significantly affected by the operation of the exhaust and cooling systems, the design of the engine, the vibration of various engine and chassis parts, and the interaction of the tires with the pavement surface. The complex sound field thus produced can travel large distances, bend around corners, flow through small holes and, particularly with low pitched truck and traffic noise, can penetrate closed windows.

Highways and busy streets can generate high noise levels on a virtually continuous or "chronic" basis. The problem is compounded when individual vehicles are sufficiently loud on a particular pass-by to stand out above other noise sources. Such "acute" intrusions occur particularly when the exhaust systems of any of these vehicles are faulty because of normal wear and tear or have been replaced, as in some motorcycles and high performance automobiles, with modified exhaust systems. Because of both high level continuous background noise and distinct intrusions over the background, many communities across the country have initiated efforts to control vehicular noise in their own jurisdictions.

Separating the Public From the Noise

Since noise is a problem only if people hear it, the search for mechanisms to control vehicular noise can begin with the receiving public. Problems caused by vehicular noise could be eliminated if the public somehow could be separated from or desensitized to the sound. Unfortunately, noise abatement measures applied to the receiver are generally neither feasible nor cost-effective for existing vehicular noise problems.

Techniques for improving a person's tolerance for noise are limited and do not address the harmful physical effects of noise which may occur regardless of the listener's subjective attitude.

Moving people out of highly exposed houses is a very expensive solution, but may be the most cost-effective alternative in special situations. In the case of new dwellings, exposure to traffic noise can be prevented by building houses away from noisy streets and highways, or alternatively by building the highway away from pre-existing housing. Noise must be another criterion for determining appropriate land use, just as water level, topographic features, and other criteria are considered. On the whole however, attempts to control noise exposure at the receiving end offer only limited relief, particularly in existing neighborhoods, and such efforts must be carefully tailored to the specific geographical site.

Interrupting the Path

Noise exposure can be controlled by placing a barrier between the receiving public and the source of the noise. On the personal level, earplugs, and earmuff-type hearing protectors can provide significant noise attenuation, but except in isolated circumstances these cannot be seriously proposed as a socially acceptable solution for the general public any more than gas masks can be viewed as an acceptable solution to the air pollution problem.

On the other hand, homes can be designed to soundproof against excessive intrusion of outside noises. Existing homes can also be retrofitted to provide significant soundproofing. If done correctly, such soundproofing can also yield major energy savings. For instance, a recent EPA home soundproofing study in New England estimated that in addition to an approximate 25 dB reduction in internal noise, an energy saving of approximately 64 percent could be realized through reduced heating requirements.

A noise insulated home must have no openings in the walls. The equivalent of a one-inch hole in a good solid outside wall can let twice as much noise energy into the room as would enter if the hole were not there. Accordingly, all doors and windows must be kept shut, and double or triple window panes may be necessary. In extreme cases, sound reduction materials must be applied to the outside walls.

Of course, soundproofing of buildings gives no relief for residents in their yards or outdoors in their neighborhoods. Consequently, soundproofing is only a partial solution

to noise exposure in and around homes. Where the noise problem is severe, soundproofing can be the most cost-effective way of providing relief to people in their homes. But the costs are high, and generally soundproofing must be seen as a last resort once the other control mechanisms have been evaluated and implemented as appropriate.

Interrupting the path of the noise before it crosses the property line of residences and other buildings near the road is a method of noise control used increasingly across the country. Along existing roadways, noise attenuating berms or barriers can be constructed to deflect road noise away from sensitive areas. These barriers must be high enough to interrupt the path of sound between the source and the receiver; thus they offer little protection for high-rise structures. At approximately one half to one million dollars per mile, noise barriers are an expensive solution to the traffic noise problem. However, they may be the only reasonable solution for many "hot" spots where the noise levels exceed $L_{dn} 75$ dB.

New roadways offer more alternatives in noise prevention with more cost-effective, though still expensive, solutions to the noise problem. Noise abatement techniques include constructing noise barriers and recessed roadways and increasing the distance between residences and roadways. Unfortunately sufficient space is not available in many instances to employ techniques of path interruption.

Controlling the Source of the Noise

Removing individuals from the area of noise exposure and interrupting the path of the noise offer some promise for relief in specialized situations and are very attractive in particular cases for preventing additional exposure problems. However, the most direct attack on both the existing and future noise problems from roadway noise is to control the source of the noise itself — in this case, the motor vehicle. Steps can be taken to decrease the amount of noise generated or to contain the noise and attenuate it within the source. Controlling vehicular noise at the source has the most promise for success. It is generally more direct and causes the least disruption to the community.

There are two kinds of source control regulations: new and in-use. New source control regulations require manufacturer's vehicles to adhere to standards limiting noise emissions. In-use regulations require vehicle owners and operators to maintain the vehicle after its time of sale so noise emissions will not exceed Federal, State or local noise standards. Such in-use source controls can also further require that vehicles be operated in a manner which minimizes noise impact.

Quieting noisy trucks, buses, motorcycles, and automobiles requires a dual approach which can be illustrated by considering the noise one might experience approximately 50 feet from a residential street. The noise levels shown in Exhibit 3 reflect a hypothetical scenario in which approximately 20 vehicles pass by in a five or ten minute period. As the Exhibit 3a indicates, as long as a vehicle is passing by, the noise level seldom drops below about 65 decibels. Two peaks are shown where faulty vehicles pass by at about 90 dB. Both could have worn out mufflers that should be replaced or exhaust systems that have been modified or tampered with.

If the community in this example were to adopt a local noise control program, the noise levels of those faulty vehicles could be reduced to the levels shown in Exhibit 3b. Unless the number of faulty or modified vehicles being operated in the community is large, this local program probably would not significantly reduce the average fleet noise levels (which comprise the cumulative effect on the community), but it could substantially reduce the more intrusive peaks.

For properly maintained vehicles, the design of the vehicle greatly influences its noise emissions. Local authorities cannot easily require owners to quiet their vehicles below their manufactured noise level, although driving habits can be influenced. To achieve a significant reduction of the fleet noise levels, the design and manufacture of the vehicles must be controlled. The Noise Control Act mandates that such controls on major sources of noise be promulgated by the Federal Government.

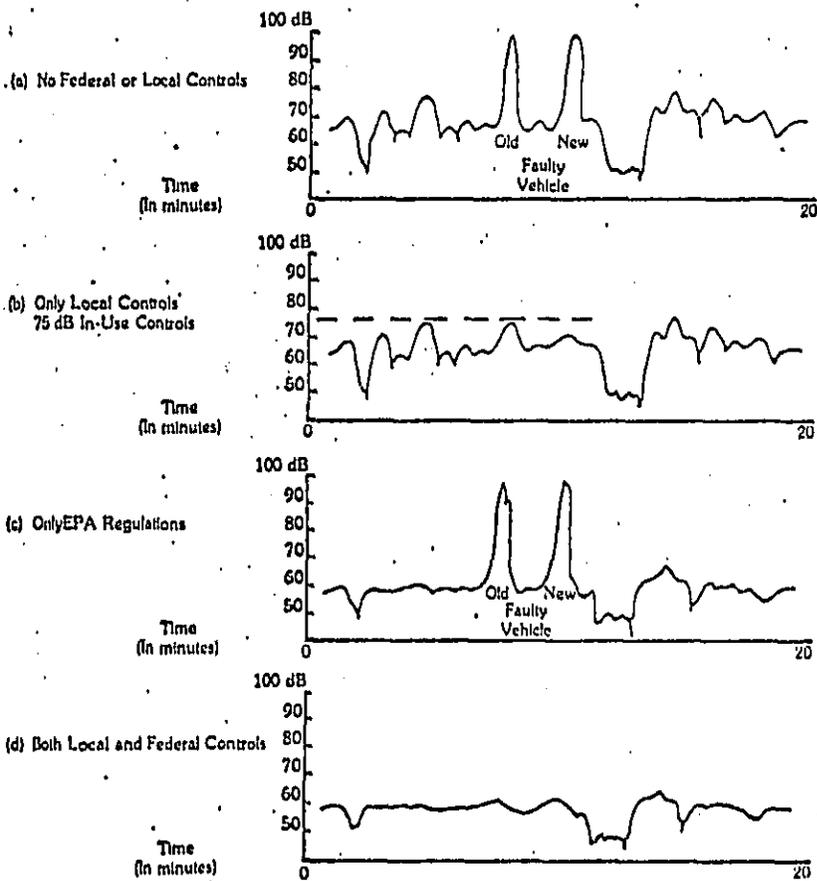
If a local noise control program did not exist, EPA regulations on manufacturers might result in noise levels similar to those shown in Exhibit 3c. In this case, vehicle levels would be more uniform and would be significantly reduced, but the two faulty vehicles would still stand out. This could be true even if it is assumed that one of the faulty vehicles is "new" — that is, manufactured to meet the EPA regulations. Since most muffler systems wear out in one to four years, and an additional significant number of motorcycles and "performance" cars are modified by their owners to exceed the level for which they were designed, a new federally regulated vehicle could become as noisy as a vehicle that was manufactured before the Federal rule was promulgated.

More benefits can be achieved if both phases of the source control effort — Federal regulation of manufacturers and active local control of use and maintenance — are implemented and properly coordinated. The result is illustrated in Exhibit 3d. Both the intrusive peaks and the overall fleet noise levels are reduced.

EXHIBIT 3

EFFECT OF LOCAL NOISE CONTROLS AND EPA REGULATIONS ON VEHICULAR NOISE LEVELS

example: STREET NOISE



If properly designed, both Federal and local programs can go beyond this basic delegation of functions. Federal regulations can facilitate local enforcement by providing labels on the vehicles and the exhaust systems to allow visual compliance checks. States and localities can extend their programs to give special relief to locations with excessively high noise exposure or where noise-sensitive activities are conducted (schools, hospitals, etc.). Such "hot" spots can be dealt with through the use of methods discussed earlier, such as barriers, soundproofing of houses, removal of houses close to the roadway, reducing speed limits (eliminating excessive stopping and starting), and ensuring that the pavement does not contribute excessively to noise from tire/pavement interaction.

One final element is needed to make this coordinated Federal/local effort succeed. Local authorities have great difficulty controlling vehicle noise if their efforts are not duplicated in communities across the country. Most major sources of noise, especially motor vehicles, move across jurisdictional boundaries. No single community can fully change the way these mobile noise sources are used and maintained. A network of communities is needed so that owners of excessively noisy vehicles will not travel very far without having to comply with vehicle noise limitations.

NOISE PROGRAM GOALS AND OBJECTIVES

On the basis of what is known about the effects of noise, its pervasiveness, and its control, taking into account the authorities and specific noise control mandates of the Agency, EPA has established goals for the year 2000 and objectives for 1985. Since the year 2000 goals reflect the ultimate direction of the noise control program they are discussed first

Year 2000 Noise Control Goals

Twenty years may seem a long time to plan for noise control since noise dissipates quickly and does not accumulate like other pollutants in the environment. Yet, the sources of noise endure over time. Highways and airports, once built, are seldom abandoned. Vehicle fleets evolve slowly over time. Decisions made today in the design of motor vehicles and aircraft will influence the fleet noise levels for many years to come. In addition, long range plans are necessary to assure that the growth in the

number of sources (such as motor vehicles and aircraft) and changes in population distribution and density are appropriately considered. Noise control efforts must not only seek reductions in the number of people presently exposed to noise, but must also prevent new cases of adverse exposure.

EPA's goals for the next twenty years must include reductions in the long term average noise exposures of people. Human responses to noise are largely related to these long term exposures. Within this framework, the Agency believes that most of its efforts should be devoted to reducing the number of people living in areas characterized by especially high levels of noise - that is, L_{dn} 65 dB and above. EPA recognizes that large numbers of people are exposed and significantly affected at levels between L_{dn} 55 dB and L_{dn} 65 dB. However, it is not clear how Federal, State, and local resources can be brought together to provide total protection for all people down to a level of L_{dn} 55 dB, and EPA believes the abatement of higher exposures must be given priority. EPA will continue to examine this problem as progress is made towards our primary goal of reducing exposures to L_{dn} 65 dB and above since many people presently exposed to the lower levels will benefit from our effort to reduce these higher exposures.

The Agency's goals for long-term average exposure are as follows:

- The number of people living in areas exposed to outdoor levels of L_{dn} 75 dB and above should be reduced to zero as soon as possible but not later than the year 2000.
- The number of people living in areas exposed to outdoor levels of L_{dn} 65 dB (but not greater than L_{dn} 75 dB) should be reduced by 20% from 1979 levels by the year 2000.
- The number of people who remain living in areas exposed to outdoor levels of L_{dn} 65 dB from aircraft sources by the year 2000 should be provided protection against activity interference (approximately L_{dn} 45 dB) inside their houses.

The special emphasis on aviation noise exposure is justified we believe because of the very great intrusiveness of aviation noise and the relative ease of identifying the polluter and assigning responsibility and liability for abatement. As the program develops, consideration can be given to broadening this objective to include other noise sources, such as surface transportation.

Intrusive Noise Events

To a large extent, intrusive noise events are taken account of by the cumulative average noise levels expressed in " L_{dn} ," but we have singled these intrusive events out for special treatment in our bus and motorcycle regulations and States and localities have made intrusive events a major focus of their programs as well. It therefore seems appropriate to have an EPA goal which explicitly recognizes this aspect of noise exposure. Since consideration of intrusiveness is a relatively new aspect of noise control, there can be considerable debate regarding how to count and measure intrusive events across all categories of sources. However, we expect that State and local measurements related to evaluating the effectiveness of their own programs will give us a good start in accounting for progress toward this goal. Since we know many of the control mechanisms needed to reduce intrusive events, disagreement on how to measure progress does not detract from the need for EPA to include intrusive events in its objectives. Intrusive events are disruptive of a variety of activities, including sleep, communication, and relaxation and are perceived to be very annoying and objectionable to the people exposed.

Therefore EPA's goal for intrusive events is to assure that by the year 2000 the total magnitude of intrusiveness from various surface transportation and aviation sources are reduced by 25 percent from that occurring today.

1985 Noise Control Objectives

The objectives EPA has established for the next five years for its noise control activities follow. These objectives are not listed in priority order.

- Take the necessary steps to ensure the creation of 400 active noise programs at the local level which will control the noise emissions of major sources of noise and otherwise reduce the noise exposure of their citizens;
- Put into place the institutional framework to assist these communities in beginning their noise control programs and making them effective. These institutions include a Technical Assistance Center in each Federal Region and strong State assistance programs in at least 40 States;
- Promulgate the remaining key Federal regulations for the manufacture of surface transportation and construction noise sources;
- Implement an aggressive labeling program and carry out a major public information program to assist the public in protecting themselves against adverse noise exposure;
- Accelerate a research program on the health effects of noise, with special emphasis on non-auditory physiological effects of noise; and
- Obtain national consensus on a new strategy for aviation noise control and carry out EPA's part of that strategy;
- Initiate a program of assessing and quantifying noise exposures in the U.S. as an aid to determining accomplishments and future directions.

The detailed program plans to accomplish these objectives are the subject of the remaining portions of this plan.

A Word About Prevention Of Future Noise Exposures

It makes no sense to place all the Federal Government's attention on abatement of existing problems if no attention is given to preventing similar problems in the future. This is especially true since, in many cases, preventing a problem from developing may be less expensive and easier to accomplish than trying to abate the problem once it already exists. Yet, very little work has been done in the past to examine either the

kinds of situations where noise exposures will increase or the appropriate mechanisms for control of such situations. To some extent, these problems of growth of exposure are covered implicitly by the objectives set forth above, but the Agency believes a special effort should be made to identify these special problems of exposure increases and to develop a proposed EPA program and national strategy for dealing with them. Consequently, by the 1983 revision to this Five-Year Plan, EPA will have completed a major study of prevention measures and will include appropriate objectives and initiatives in its program plans. This study will be done in close cooperation with State and local officials who have had extensive experience with growth problems in other areas and will be able to contribute significantly to EPA's study.

Steps EPA Has Already Taken

Since the passage of the Noise Control Act in 1972, EPA has taken a number of steps toward the goals and objectives set forth above. Although this report concentrates on EPA's noise control activities for the next five years, a brief summary of activities since 1972 is useful to establish a base from which a plan can be implemented.

In the initial years following passage of the Noise Control Act, EPA focused on: development of health and welfare criteria, promulgation of Federal regulations, and recommendations to the FAA on the regulation of aircraft noise. Specifically, EPA:

- developed health effects criteria and identified levels necessary to protect public health and welfare with a margin of safety;
- submitted 11 proposed aviation noise regulations to the FAA;
- issued final new product noise emission regulations for medium and heavy trucks, portable air compressors, and garbage trucks;
- proposed new product noise emission regulations for motorcycles, buses, and wheel and crawler tractors;
- established initial in-use regulations for interstate rail and motor carriers;
- initiated a labeling program with issuance of a general provisions regulation and a specific regulation for hearing protectors.

In 1977 EPA began to shift more of its resources toward assisting States and localities in the establishment and strengthening of local noise control programs. Thus work on regulations and technology development has gone from a high of 59 positions and \$8.8 million in 1976 to 51 positions and \$5.7 million in 1980. Resources devoted to assisting States and localities, on the other hand, increased during the same period from 23 positions and \$1.2 million to 43 positions and \$5.8 million.

Among the programs which the Agency developed and implemented in these calendar years were the Quiet Communities Program which studies and demonstrates effective means of local noise control and the Each Community Helps Others (ECHO) program. The ECHO program, which sends volunteer local noise experts to other communities to provide assistance in developing local noise control programs, has been EPA's most popular and successful noise program. It has greatly expanded EPA's ability to provide high quality technical assistance targeted to the specific needs of the receiving community. To date, 93 communities have received some ECHO assistance. Both the Quiet Communities Program and the ECHO program laid the groundwork for the Quiet Communities Act of 1978.

THE PLAN FOR FY 1981-1985

EPA believes that a balanced program of Federal regulation and State and local control programs is essential. In order to achieve the goals for the next twenty years discussed earlier in this report, EPA has developed specific plans for the coming five years. These plans are based on the assumption of a modest growth in the size of the Federal program over the next five years. Since all of the Federal budgets for these five years, except for one (FY 1981) have not yet been written, it is not possible to be sure what resources will be available for EPA's noise control program. Trade-offs between programs within EPA and between EPA's programs and other governmental programs have to be made. In addition, the state of the Nation's economy at the time the budgets are written will greatly influence the nature and size of the President's budget. Nevertheless, the Agency has chosen to develop the Five-Year Plan contained in this report on the assumption of a modest budgetary increase each year. If more or fewer funds are made available, the Agency's plans will be adjusted accordingly.

The detailed Agency plans for FY 1981 through FY 1985 appear in the second section of this report. Each major source category is treated separately, with a final category reserved for those programs which cut across all source categories, such as public education. Finally, more detailed cost information is contained in Section III of this volume, and in the special reports on aviation noise and health effects research.

SECTION II

SURFACE TRANSPORTATION

THE SURFACE TRANSPORTATION NOISE PROBLEM

More people are exposed to environmental noise from surface transportation than from any other source. This noise originates in many types of vehicles, including trucks, motorcycles, buses, automobiles, railroad cars and locomotives, and all the equipment associated with these vehicles such as garbage compactors, truck-mounted refrigeration units, and railyard braking devices. The problem extends far beyond neighborhoods that immediately border major highways or railroads. In fact, urban vehicular noise is the major contributor to the total exposure of the public from surface transportation noise. Exhibit 4 reflects how EPA has acknowledged the severity of noise emissions from surface transportation sources and has planned programs accordingly.

Surface transportation is EPA's number one priority for the control of noise. Surface transportation sources dominate the cumulative dose of environmental noise for far more people than other sources. Thus, a major reduction in the exposure to cumulative noise, or L_{dn} , as proposed must focus on surface transportation if it is to be successful. Surface transportation is also a major contributor to the intrusive noise that impacts people, especially in their homes. Most of the local ordinances dealing with the surface transportation problem have focused on the intrusiveness problem. Thus, achievement of the EPA objectives is dependent on success in the surface transportation area. Finally, a noise prevention policy is important for surface transportation as well. Highways and major arterials are being expanded to absorb more traffic. Once built, highways will influence the ambient noise in their vicinity for the foreseeable future. In fact, highways and streets, once in place, are seldom abandoned. A brief description of the primary surface transportation objectives is shown in Exhibit 5. This Exhibit also indicates the number of people exposed to motor vehicle noise and the expected growth in this number if no further actions are taken by Federal, State and local governments. It is clear from this table that much of the effort at control must be directed simply at keeping the number of exposed people from growing.

EXHIBIT 4

1980-1985

Major Changes in Program Emphasis

Programs with more expenditure emphasis

- o State ECHO programs
- o Local start-up cooperative agreements
- o Regional technical centers
- o Urban interagency noise initiatives
- o Development of State and local control mechanisms
- o Enforcement of EPA regulations

Programs with less expenditure emphasis

- o Federal regulations
- o State start-up cooperative agreements

EXHIBIT 5

Surface Transportation Noise Source
and Control Objectives

Trucks, Light vehicles, Motorcycles and Buses

- o Presently over 81 million people are exposed to noise levels greater than Ldn 55 dB today from trucks, light vehicles, motorcycles, and buses, (16 million and 1 million for Ldn 65 dB and 75 dB respectively).
- o Without additional controls, exposure will grow to about 128, 22 and 1.3 million exposed to levels greater than Ldn 55 dB, 65 dB, and 75 dB respectively by year 2000.

EPA Objectives

- o Assist in establishing a network of 300 active local vehicular noise control programs supported increasingly by State ECHO programs, local start-up cooperative agreements, and Regional Technical Assistance Centers.
- o Complete promulgation of major regulations including trucks, motorcycles, and buses.
- o Devise and implement appropriate strategies for noise from light vehicles and tires.

Railroad Operations (yards)

- o 6.5 million or more people are currently exposed to greater than Ldn 55 dB.

- o Promulgate property line regulation for all railroads.

METHODS TO CONTROL VEHICULAR NOISE

The general discussion of available abatement mechanisms in Section I will not be repeated. Readers are urged to become familiar with that portion of the plan and basic EPA philosophy and approach presented there before reading this portion of the report. Ideally, the national strategy for noise control should be firmly based in a detailed analysis of the relative effectiveness of each of the control methods available, with special emphasis on the relative effectiveness of State and local actions versus the regulation of newly manufactured products. The field of noise control is a new one and the relative effectiveness of various means of controlling noise has not been the subject of very much analytical study. Since the passage of the noise Control Act in 1972, EPA has undertaken some of the needed analysis, but most of this effort has concentrated on the effectiveness of regulating newly manufactured products. Thus, we are today able to estimate the reduction in average noise levels to which the public will be exposed as a result of each Federal regulation.

With regard to the effectiveness of local control actions, however, there has been far less hard analysis. As one might expect, the emphasis at the local level is usually on enforcement of local ordinances and not on collection of data which would evaluate the effectiveness of these ordinances in reducing noise exposure on a national basis. EPA has now focused some of its evaluation effort on the State and local area as a result of the Quiet Communities Act. However, it is too early to draw any conclusions from this work.

Thus, no detailed analysis of the relative effectiveness of various noise control methods is possible in time for this first edition of the Five Year Plan because of the lack of adequate data on the effectiveness of local control actions. The data now being collected under the Quiet Communities Act amendments should allow at least an initial analysis of this sort in time for incorporation into the January 1981 revision of this Five Year Plan.

Nevertheless, the limited data which are available on the effectiveness of local control programs are very favorable. A number of communities report very good compliance rates with their ordinances. Communities have seen the number of vehicles found out of compliance with the ordinances drop dramatically as a result of active enforcement. EPA is now in the process of examining the impact of these compliance levels on the degree of exposure of the public to noise.

This Five-Year Plan is based on these initial data and the congressional mandates embodied in the Quiet Communities Act of 1978. Based on the analysis of further data during the next 12 months, mid-course program corrections can be made in the January 1981 revision to this Plan.

The types of mechanisms available to control vehicle noise fall into three classes and are discussed below.

Separating the Public from Vehicular Noise

Separating the receiver from the traffic noise has not generally received much attention in the governmental approach to vehicular noise control. Moving people out of existing homes is expensive, and governmental groups have looked to other solutions first. However, as the other solutions cannot always provide the necessary abatement, increased attention to this approach can be expected.

More attention has been directed to locating newly constructed buildings where the occupants of homes and offices will be separated from traffic noise. Specifically, the Environmental Impact Statement process has caused more study of the location of major new highways financed with Federal funds. Construction plans can sometimes be adjusted so that the highway is located away from populated areas. Unfortunately, few measures have been undertaken to prevent new housing developments from encroaching on a highway once it is built, so that the benefits of locating a highway away from residential areas are often short-lived.

Some communities have used their land use planning and control authority to require that housing be located away from street and highway noise. A few towns have required a housing set-back from the roadway or have zoned non-residential uses close to the roadway with residences further back and somewhat shielded from the roadway.

For the most part, however, the pursuit of mechanisms to separate the public from traffic noise has been sporadic, primarily because of the large costs involved and the need for fairly sophisticated planning by the community and the officials deciding on the location of streets and highways.

Interrupting the Path

More control efforts have been undertaken in the area of interrupting the path of the noise from the vehicles to the receiver, than in the area of separating the public from vehicular noise. However, these also have not been seen as the preferred approach to the control of traffic noise.

Interrupting the path of the noise through soundproofing of homes and other buildings is feasible and has been tried to a limited extent. The Federal Highway Administration (FHWA), through the State Highway Departments, has funded the insulation of public buildings along highways in some cases.

Control of Vehicular Noise at the Source

Substantial governmental activity has been directed to controlling vehicle noise at the source, including both Federal regulations and State and local in-use controls. This is appropriate since quieting the vehicles themselves appears to be the most direct method of solving the problem, at least in the initial stages of control. For instance, since 1972, approximately 282 local and State ordinances have been passed to control motor vehicle noise levels. A few State and local ordinances have been directed in part, to the manufacture of new vehicles (e.g. those of California, Oregon, Florida, and Illinois, specifically Chicago and Cook County). Most ordinances, however, control the use and maintenance of vehicles through on-street enforcement against operating vehicles with defective or modified equipment or against violation of a specific operational noise limit. Unfortunately, most of these ordinances are not continuously enforced by active noise control programs.

In jurisdictions where ordinances are aggressively enforced there is evidence that violations can be controlled. For example, a survey was made in Florida of 25,000 trucks at 135 sites during 1974 - 1976, in order to assess the impact of vigorous enforcement of Florida's truck regulation (modeled on the EPA interstate motor carrier regulation). This study concluded that enforcement of these regulations had the effect of reducing the average individual truck noise level by about 3 dB, which is equivalent to cutting the radiated sound energy by half. The reduction in L_{eq} for highways was one dB. Although this reduction is not significant in terms of total radiated sound energy in the community, it does decrease the severity of noise impact in terms of human annoyance to noise by eliminating the most annoying noise peaks in vehicular traffic.

Activities such as those mentioned are complemented by EPA's new product standards. The following vehicles are currently covered by regulations.

Trucks

Trucks are by far the most serious source of traffic noise. Under an EPA rule, new medium and heavy trucks manufactured after January 1, 1978 must not exceed 83 dB at 50 feet during maximum acceleration. This level will be lowered to 80 dB on January 1, 1982. These regulations do not cover auxiliary equipment mounted on these trucks. To address one such source directly EPA has issued a rule limiting the noise from newly manufactured solid waste compactors. Effective October 1, 1980, all newly manufactured truck-mounted solid waste compactors (garbage trucks) must meet a not-to-exceed level of 79 dB at 23 feet during compacting operations. This level will be lowered to 76 decibels on July 1, 1982.

In producing these regulations, EPA has found that significant reductions can be achieved in sound levels from newly manufactured vehicles. Methods for achieving such abatement are generally available and proven effective. Reductions of emissions from these vehicles will result, over time, in significant reductions in the total U.S. fleet noise level. Thus, these regulations can be a very comprehensive and effective control, with benefits for the entire U.S. population. Manufacturers have generally supported EPA's regulatory role, since a national standard avoids the proliferation of local controls on manufacturers which can result in multiple requirements for production of a single product. However, manufacturers have not always agreed with the stringency of the regulations promulgated, preferring to have the preemptive protection of the Federal regulations without the necessity to further reduce the noise generated by their products.

Interstate Motor Carriers (Trucks and Buses)

To ensure interstate commerce, motor carriers engaged in such trade must be subjected to uniform standards. Congress directed EPA to set national standards on the vehicles operated by these carriers. This regulation, made effective in October, 1975, requires that trucks and buses over 10,000 lbs GVW not exceed a range of levels from 86 dB to 90 dB, depending on the operating mode of the vehicle. This regulation differs from most other regulations* promulgated by EPA in that it applies to use and maintenance of the vehicle rather than to its manufacture and because it preempts local ordinances by controlling the use and maintenance of these vehicles. This regulation is enforced by the Bureau of Motor Carrier Safety at the Federal level, and by States and localities with coordinated legislation.

*The other exception is EPA regulations applicable to interstate rail carriers.

STATE AND LOCAL PROGRAMS TO CONTROL VEHICULAR NOISE

The Need for a Network of Community Programs

One of EPA's functions under the Quiet Communities Act is the support of strong State and local control programs. Of course, not every community may need to have a noise program; the choice of whether to have a program is a local one. There is no mandatory Federal requirement for States and localities to create noise control programs as there is in many other environmental control areas. Nevertheless, in order for the noise control efforts of individual communities and of the Federal Government to be fully successful, a network of community noise control programs must be created throughout the country. This will ensure that major sources of noise, such as vehicles that travel across jurisdiction lines, will not be able to go very far without being brought into compliance.

EPA estimates that for control of all noise sources a network is needed to cover a population exceeding 72 million people in approximately 400 communities of greater than 25,000, and that 300 of these communities should have vehicular noise control programs.

Such a network does not exist today. EPA estimates that approximately 90 communities have active noise control programs, most of which address the vehicular noise problem. Many more communities have some type of ordinance on the books, but these ordinances are not actively enforced. Unenforced or unimplemented ordinances rarely provide more than token relief.

A case in point is San Francisco, California. A great number of commuters drive into the city proper every workday. Many come from jurisdictions that do not enforce stringent local noise controls. By nature of operating their vehicles in the San Francisco city limits they must comply with existing local noise ordinances. Presently, most of the noise violators cited in San Francisco are from out of town, rather than local residents. This indicates the difficulty of bringing all vehicles into compliance unless surrounding jurisdictions have similar enforcement programs.

One city, obviously, cannot solve the national noise problem, but when a network of cities, especially larger cities, have effective noise control programs, the national effort is exponentially facilitated. EPA's regional noise staffs will work with State and local officials to create a network of communities which will maximize the mutual reinforcement among local control efforts.

To qualify as an "active" noise control program under EPA's criteria, the community must have an ordinance, or the equivalent, that includes controls for either: motor vehicles, stationary source/property line controls, construction noise, or prevention of future noise problems. The community must have further demonstrated its commitment through allocation of personnel, funds, and appropriate instrumentation. It must have ongoing enforcement and a public information service provided to its citizens. The agency will use this definition of an "active" program in tracking progress toward the goal of 400 community programs covering 72 million people.

In its work with State and local communities in the control of motor vehicle noise EPA will place special emphasis on the control of motorcycle modifications because they result in very large increases in the noise emitted from the vehicle. Citizens and local officials have identified motorcycles as one of their most serious noise problems, and State and local enforcement efforts are essential to control this problem. User modification of original noise suppression equipment currently occurs for approximately 12 percent of street motorcycles and 26 percent of off-road bikes. The Federal regulation of newly manufactured motorcycles and replacement exhaust systems should have a major impact on the noise from motorcycles but local in-use controls are the key to the control of the modification problem. A joint Federal/State/local effort to design and implement effective controls on modifications of motorcycles warrants high priority in the national effort to control vehicle noise. At least 300 of the 400 active community noise control programs will be targeted for active motor vehicular enforcement. This network of programs, along with Federal assistance in designing the necessary tools to enforce the standards, is intended to assure a sphere of compliance which will inhibit the occurrence of vehicles with faulty muffler systems.

Fostering the creation of a network of communities on a voluntary basis is, of course, no easy task. The interest in noise control at the community level has been rising dramatically since the passage of the Noise Control Act of 1972. Yet far more ordinances are written and passed than are actively implemented. Consequently, the degree of noise abatement actually being achieved in these communities is far less than the potential.

The reasons for the ineffectiveness of these programs apparently vary from community to community. However, EPA has identified certain problems which seem to be common to many such programs. The problems are associated particularly with the design of the initial program. Simply stated, starting a noise control program often appears far simpler than it is in fact. That noise is a pollutant seems straight forward enough, and many elected officials feel comfortable dealing with its control on a "common sense" basis. It is too easy to copy ordinances and programs from other communities rather than write one specifically for the community. Tailoring a local noise ordinance and program to the specific needs and problems of a community can in fact be a difficult task. Noise problems vary from community to community. Solutions which suit one community may not suit another. Perhaps most important, the control of noise — and its associated science of acoustics — can be highly technical. Appropriate analysis and planning is usually necessary in order to initiate a successful program. Once a well-designed noise control program is underway and its staff adequately trained, the problems encountered are more manageable, assuming adequate funding is provided in the community's budget.

EPA's Strategy for Fostering a Network of Community Programs

Because of this apparent need for technical and financial assistance at the start-up stage of community programs, EPA will concentrate most of its efforts on helping communities design and launch their initial programs or to add a new component to an existing program. This will be supplemented by a modest effort to carry out field studies and demonstrations on noise control mechanisms to determine which control methods work best, what their costs are, and how they might be made more efficient. These studies, along with EPA model codes and technical handbooks and training seminars, should help communities design and implement more effective programs.

Creating a network of community programs is not a task which the Federal Government can or should undertake alone. Federal resources for noise control have been limited in the past and there is no reason to expect a radical change in the near future. The Agency will therefore continue to work toward its stated objectives by maintaining and establishing ties with other institutions, including States, universities, and noise experts in communities with active programs. Joint efforts between EPA and these other organizations and individuals can greatly expand the resources targeted to help communities establish active noise control programs.

During the next five years, EPA will concentrate most of its limited resources on stimulating and assisting these organizations in providing help to local communities rather than focusing EPA's resources on direct assistance to communities. A limited amount of start-up financial assistance will be available to localities, with an emphasis where an acute problem exists and where there is inadequate State or regional capacity to meet the need. In early years EPA will devote a substantial part of its effort in terms of financial and technical assistance to middle sized and smaller communities, but above 25,000 population. This assistance will focus especially on helping these communities overcome the technical and financial problems of starting up a noise control program where one has not existed in the past.

As these programs are begun and as we and the noise control profession become more knowledgeable in the techniques of noise control at the local level, a larger percentage of EPA's resources will be devoted to the larger cities where the control problems are considerably more complex and the larger numbers of the population are severely impacted by noise.

EPA is confident that this approach will create a multiplier effect and will result in more actual assistance to communities than if EPA were to rely completely on helping communities directly. Exhibit 6 indicates both the existing and the planned local start-up cooperative agreements for 1979 through 1985.

Specific Program Activities

Multiplier Programs

EPA's first multiplier effect program in the noise control area, and its most successful so far, is the Each Community Helps Others Program which began in 1977. Known by its acronym, ECHO, this program draws on the talents of community noise experts currently employed in local noise control programs. As the need for technical assistance in a particular community becomes known to EPA, the specific requirements are determined by EPA regional staff. Then a community noise expert who has experience in the specific area of concern is asked by EPA to travel to the receiving community to provide on-site advice and counsel. These experts, or their employing community, volunteer their time to this effort and receive reimbursement only for out-of-pocket expenses. ECHO makes available to communities a pool of talent with actual field experience in the area of concern to the recipient community, such as motor vehicle enforcement, ordinance drafting, or monitoring. The acceptance of these community noise advisors by the receiving communities has been excellent.

EXHIBIT 6

Local Start-Up Cooperative Agreements

| | |
|------|----|
| 1979 | 11 |
| 1980 | 11 |
| 1981 | 20 |
| 1982 | 20 |
| 1983 | 22 |
| 1984 | 30 |
| 1985 | 42 |

The hours which an expert can volunteer are of course limited, but as the number of noise control programs grow across the country, more and more people have field experience which can be shared with others. EPA's task is to make sure that the advisors work in their area of expertise and that their time is used efficiently by the receiving community, and to pay the travel costs.

EPA plans to continue the ECHO program as a major component of its noise control effort, but will change the program to match the evolving nature of the national noise control effort. EPA has already entered into cooperative financial agreements with five States and one Metropolitan Planning Agency*, to have them assume our responsibility for administering the ECHO program within their jurisdictions. These build on contracts negotiated in 1978 with three of these States.

EPA expects to increase the number of such States to 16 in FY 1981 and to 35 by 1985. States with ECHO programs recruit new ECHO advisors, receive requests for assistance within their States, set priorities, select recipient communities, determine the specific needs of those communities and schedule a noise advisor for one or more visits as necessary. The States also handle the paperwork for paying the required travel.

In order for a State to administer an ECHO program, it must have some experience in the noise control area itself and be able to handle requests for technical assistance through its own staff. Otherwise, the technical quality of the ECHO program, which is one of its strong selling points, could degrade significantly. To assist States obtain this initial degree of experience, EPA has already provided financial assistance to eight States (FY 1979 funding). EPA will continue this State "start-up" assistance in order to foster the necessary increase in the number of States able and willing to assume the ECHO program in coming years. The schedule for assisting States to begin their own programs and then assume the ECHO program is detailed in Exhibit 7.

* California, Connecticut, Minnesota, New Jersey, Washington, and District of Columbia Council of Governments.

EXHIBIT 7

State Cooperative Agreements

| <u>TYPE</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> | <u>1983</u> | <u>1984</u> | <u>1985</u> |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| State Start-Up Assistance | | | | | | | |
| Continuing | - | 5 | 4 | - | 7 | 6 | 5 |
| New | 8 | 6 | - | 9 | 6 | 5 | - |
| State ECHO | | | | | | | |
| Continuing | - | 7 | 10 | 15 | 20 | 22 | 29 |
| New | 7 | 5 | 6 | 5 | 2 | 7 | 6 |

Regional Offices have begun discussions with the States in their regions that have expressed interest in assuming responsibility for the ECHO program. These initial contacts suggest that the attainment of the 1981 goal of 16 States appears feasible. Further expansion of the ECHO program will, of course, depend on the willingness of the States to assume this responsibility, but the response so far has made the Agency optimistic about reaching the 1985 goal of 35 States, if adequate resources are available beyond the current FY 1981 budget.

As the ECHO program in its current operation is assumed by more and more States, the National ECHO program (which is currently run on contract by the National League of Cities) will turn more and more to the handling of technical problems that require very specialized skills for their solution. Whereas the State ECHO programs are expected to concentrate primarily on helping communities with start-up problems, the National ECHO program will gradually move toward solving complex operational or technical problems where only one or two experts exist in the country or where a team of experts is needed. This aspect of the program is designed in recognition that even mature noise control programs occasionally require the assistance of specialized experts and that often the expertise can best be found among fellow noise control officials at the State and local level. In addition, the National ECHO program will need to continue to serve communities in States where there is no active State ECHO program.

A newer but equally important multiplier effect program is the Technical Assistance Center Program. Technical Assistance Centers, which originated in the State of Florida, are located at universities for the purpose of helping communities to establish and strengthen noise control programs. The State of Florida had contracted with several universities to work with local governments; the concept was later adopted in the Quiet Communities Act of 1978, and EPA was directed to establish similar technical assistance centers.

Pursuant to this directive, EPA established 10 Regional Technical Assistance Centers at universities across the country, one in each Federal region. These Centers, listed in Exhibit 8, are now operating on a small scale (\$60 thousand a year; 1 to 2 staff members). Initially, at least, these Centers are not expected to do research or to develop new materials of any complexity. Instead, they are to act as "extension agents" by running workshops, providing direct technical assistance, and otherwise helping the

EXHIBIT 8

EPA REGIONAL TECHNICAL ASSISTANCE CENTERS

| | <u>Location</u> | <u>Technical Center</u> |
|---------------------|--|---|
| <u>Region I:</u> | Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island | University of Hartford West Hartford, CT |
| <u>Region II:</u> | New York, New Jersey, Puerto Rico, Virgin Islands | Rutgers University New Brunswick, N.J. |
| <u>Region III:</u> | Pennsylvania, Maryland, Delaware, Virginia, West Virginia, District of Columbia | University of Maryland College Park, MD |
| <u>Region IV:</u> | Kentucky, Tennessee, Mississippi, Alabama, Georgia, South Carolina, North Carolina, Florida | North Carolina State University Raleigh, NC |
| <u>Region V:</u> | Minnesota, Illinois, Wisconsin, Ohio, Indiana, Michigan | IIT Research Institute Chicago, IL |
| <u>Region VI:</u> | New Mexico, Texas, Oklahoma, Arkansas, Louisiana | University of Texas at Dallas Richardson, TX |
| <u>Region VII:</u> | Nebraska, Iowa, Kansas, Missouri | University of Iowa Iowa City, IA |
| <u>Region VIII:</u> | Montana, North Dakota, South Dakota, Wyoming, Utah, Colorado | University of Colorado Boulder, CO |
| <u>Region IX:</u> | California, Nevada, Arizona, Hawaii, Trust Island's | University of California at Berkeley Berkeley, CA |
| <u>Region X:</u> | Washington, Alaska, Oregon, Idaho | University of Washington Seattle, WA |

Regional Offices work with individual States and communities. This program taps a large reservoir of talent which, as it becomes focused on the needs of the communities, should be helpful in achieving a network of community programs.

EPA chose to establish 10 Centers instead of one or two large national centers in order to widen the search for talent in this largely untried area, and also because EPA believes that the Centers can best help communities that are close by. One or two centers serving the entire country might tend to become too academic in approach and out of touch with the practical problems facing individual communities. In addition, since the Regional Offices have primary responsibility for fostering the network of community programs, the Agency felt that the Centers should be near those offices to respond directly to their supervision.

EPA cannot expect each of the 10 Centers to perform equally well in extending the ability of the Regional Offices to help establish strong community programs. Although an individual Center or two might fail to be fully productive and have to be terminated in favor of some more productive activity, we are confident that the Technical Center program, as a whole, will be very successful. In just the first few months of operation, the Centers have already worked successfully with a number of communities and conducted several workshops.

EPA plans to increase the funding of these Technical Assistance Centers in future years so as to provide them with more depth in staffing and more stability. EPA expects that from FY 1981 to FY 1985 the staffing can be increased two or three-fold. Particularly effective Centers could be increased more than this. In EPA's view, each Center need not be of equal size to optimally assist communities. In some Regions, the Centers may play the largest role in helping communities, while in others, the State ECHO programs may assume this role. The Agency's program plans for the next five years are flexible enough to allow these regional differences to be influential, depending on the respective talents of the Centers and States and the specific needs of the recipient communities.

Together the multiplier effects program of State ECHO, State Start-Up, Local Start-Up, National ECHO, Technical Assistance Centers, and Regional Offices are expected to result in approximately 300 communities forming a network of communities engaged in the control of motor vehicular noise by FY 1985.

Direct Assistance Programs

Until the passage of the Quiet Communities Act, EPA helped communities primarily through the delivery of direct technical assistance. This assistance consisted principally of technical information documents produced by headquarters personnel and direct on-site visits by regional personnel. Both of these functions will continue in the future, but higher priority will be placed on multiplier mechanisms. The Regional Office personnel will be increased in future years, primarily to manage the multiplier effects programs discussed above in initiating and maintaining active State and local programs. Some types of problems, however, can only be dealt with through direct regional office staff involvement, and resources must be allocated accordingly. Also, technical information and model codes are still needed, since the Agency continues to receive a large number of requests for assistance in technical problem areas. Rather than have these documents developed primarily at the Regional offices through, for instance, the Regional Technical Assistance Centers, it is efficient to develop some of them on a centralized basis in headquarters.

The most important areas of direct assistance for the next five years, however, are field research and demonstrations of effective measures of community noise control. The concepts of community noise control are generally known, and are effective, but the area has been the subject of surprisingly little applied scientific research. The relative effectiveness of various control methods is known only qualitatively. Little quantitative evidence is available for local officials to use in designing the optimal controls for their communities. For instance, the cost and effectiveness trade-offs are not known between enforcement of specific decibel level limits through on-street monitoring of passing vehicles or through an inspection program tied in with safety or air pollution inspections. Similarly, the optimal number of hours of on-street enforcement to achieve a certain noise reduction is unknown. Some community noise control officials spend most of their working hours doing on-street traffic noise enforcement each week. Others spend only a few hours a week and claim this is sufficient to achieve comparable results. These different approaches to noise control need to be studied and the results made available to all communities. The expected outcome will be a significantly more efficient use of local tax dollars in the control of community noise.

EPA has a modest research evaluation and demonstration program to find the answers to these kinds of questions. The program began with the Quiet Communities Program

experiment in Allentown, Pennsylvania in 1977 and expanded to Kansas City and Spokane in 1979. In addition, under the authority of the Quiet Communities Act of 1978, the Agency has awarded 6 demonstration cooperative agreements to communities to investigate related issues. Evaluative reports will be written under these cooperative agreements, and distributed nationally to interested communities through the Regional Offices, Technical Assistance Centers, and State noise programs. This program of field evaluation and demonstrations will continue at about the same level throughout the five years covered by this Plan.

State and Local Prevention

Noise control at the source is only one option for State and local governments. Within the broader context of Comprehensive Transportation planning, local political jurisdictions can exercise their land use planning authority to control:

- the proximity of residences to impacting noise sources;
- the structural characteristics of residences and other noise sensitive land uses; and
- the noise generation characteristics of sources themselves.

EPA is proceeding with the development, testing, and distribution of planning tools needed to design for noise control within the context of local government functions. A highway noise abatement planning model is now being tested and similar models are being developed for rail transport noise. All of these modal models are elements of a Community Noise planning system which, when finalized, will provide a uniform methodology for local comprehensive land use planning.

FEDERAL REGULATIONS AND ENFORCEMENT TO CONTROL VEHICULAR AND OFF-ROAD NOISE

Vehicular Noise

New Source Standards

As important as the network of active State and local noise control programs is for relief of the public from motor vehicular noise, these efforts will not be fully successful without a Federal regulatory program for the major vehicle sources. As discussed in detail in Section One of this Central Report, Federal regulations are needed to reduce

overall fleet noise levels. Communities can control the peak noise intrusions resulting from defective and modified exhaust systems, but cannot easily ask operators of vehicles to quiet their vehicles below the manufactured noise level.

EPA has made substantial progress in regulating trucks, including garbage trucks, which contribute more to community traffic noise than any other source. However, additional sources should be regulated, and trucks should be required to be even quieter. The surface transportation regulatory schedule is detailed in Exhibit 9.

EXHIBIT 9

Surface Transportation Regulation and Enforcement Schedule

| | <u>1980</u> | <u>1981</u> | <u>1982</u> | <u>1983</u> | <u>1984</u> | <u>1985</u> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| NOT TO EXCEED STANDARDS | | | | | | |
| Motorcycles | --F | --E | | | | |
| Motorcycles Exhaust Systems | --F | --E | | | | |
| Buses | --F | --E | | | | |
| Trucks (further lowering)* | | | | -----P----- | -----F | |
| Interstate motor carriers | | | | -----P----- | -----F | |
| Refrigeration units | | | | | -----P----- | -----F |
| REQUIRED LABELING** | | | | | | |
| Light vehicles | | | | -----P----- | -----F | --E |
| Tires | | | | -----P----- | -----F | --E |

Legend P= Proposed Rule E= Enforcement Begins
 F= Final Rule

Note: Dotted lines show dates during which resources must be committed to each regulation.

* The present regulation on trucks is already in effect and is being enforced.
 ** If the Agency were to decide to proceed with labeling of light vehicles and tires, the probable schedule would be as shown.

Within a few months, EPA will complete the motorcycle and bus regulations which have been under development since 1975. These regulations will have a substantial impact on the intrusive peaks associated with traffic noise through neighborhoods, lowering the number of sleep awakenings and speech interferences by millions. The Agency will then turn to the revision of its regulation of medium and heavy trucks and the interstate motor carrier regulation. Even after newly manufactured trucks reach the 1982 level of 80 decibels, trucks will still dominate the traffic noise situation. Significant further reductions are possible, conceivably to the 72-75 decibel level. EPA has a quiet truck demonstration program underway which is to show that a representative set of trucks can be lowered to decibel levels in the mid-70's range and still operate efficiently. The preliminary results are already very favorable. Similarly, the regulation of interstate motor carriers should be revised to incorporate the improvements brought about by the EPA truck regulations.

In 1970, the Agency identified refrigeration units used on truck trailers as a major source of noise worthy of regulation under the Noise Control Act. Considerable work has been done on this regulation, but no proposal has been made. Normally, work on this regulation would proceed as scheduled, but the Agency has concluded that a number of other regulations both in surface transportation and other areas have higher priority for promulgation during the early years of this Five-Year Plan. The Agency has decided not to proceed immediately with the refrigeration units merely because this source was identified earlier than some of the other sources. Instead, contract work is scheduled to begin late in 1982 with a proposal in FY 1984 and a final regulation in FY 1985.

Two other motor vehicle products are major components of the traffic noise problem: light vehicles (including automobiles), and tires.

Agency studies show that automobiles and light trucks comprise between 80 and 95 percent of the nation's urban traffic distribution. Further, the noise energy contribution of these two types of vehicles to the total urban traffic noise energy today is approximately 10 percent with an anticipated increase to about 40 percent as the noise levels of trucks, buses, and motorcycles are brought into compliance with existing and soon to be promulgated EPA rules. Our studies also show that tire noise exceeds engine noise on most vehicles at speeds ranging between 30 and 60 mph. Thus, tire noise becomes the most significant surface transportation noise source from vehicles at "cruise speeds."

The Agency is currently considering what regulatory action is appropriate for these two sources of noise. Both labeling and mandatory emission limits for newly manufactured tires and light vehicles are being considered. A decision on this matter will be made this year and reflected in the January 1981 revision to this Five-Year Plan. For illustrative purposes the schedule for labeling these products is shown in this report, should this be the direction which the Agency chooses to pursue.

Enforcement

The benefits which are achieved by a regulation are determined by the degree of compliance with that regulation by the regulated industry. In order to ensure compliance, oversight of actions which are taken by an industry in response to a regulation is necessary. This oversight ensures a high degree of compliance and ensures that manufacturers who do comply are not at a competitive disadvantage with manufacturers who do not. Most EPA noise regulations are enforced by the EPA's enforcement staff. The exceptions are the interstate motor carrier and rail carrier regulations which are enforced by the Department of Transportation and by States and localities with consistent codes.

EPA's oversight of its noise control regulations is designed to ensure industry compliance with a modest expenditure of the Agency's resources while leaving manufacturers in control of their compliance activities. For instance, all manufacturers of new trucks must demonstrate that they have the technology in hand to build a truck which complies

with the standard and that they are capable of incorporating this technology into their production process. This requires that manufacturers test one early production truck of each model rather than a prototype to make the necessary determination. Once the manufacturers have "production verified" their trucks, they may distribute them in commerce. EPA ensures continued compliance by selectively requiring that manufacturers conduct statistical sampling and testing ("Selective Enforcement Auditing") of production products. EPA can correct violations of the regulation which it discovers by using several types of remedies allowed under the Noise Control Act. To ensure that trucks continue to perform at their quieted noise levels, manufacturers must provide truck purchasers with a time-of-sale warranty and maintenance instructions for the noise control parts and systems of the truck. Owners and operators of the truck are prohibited from removing or disconnecting these noise control systems and parts. In order to measure the emission levels of these trucks in-use, EPA conducts a surveillance testing program.

To date, the success of the Agency's oversight program is confirmed by the high level of compliance with the regulation which the truck manufacturers have achieved. Based on its success with the truck regulation, EPA plans to use this basic program to ensure compliance with future noise control regulations which will become effective between now and Fiscal Year 1985.

Noise From Off-Road Vehicles

Railcars and Railroads

EPA issued, on December 31, 1975, a noise emission regulation for locomotives and railcars operated by interstate rail carriers. The Association of American Railroads (AAR) challenged the regulation on the grounds that it did not include sufficiently comprehensive standards for railroad equipment and facilities under Section 17 of the Noise Control Act of 1972. It therefore did not provide the rail carriers with adequate Federal preemption of potentially conflicting State and local noise ordinances, as intended by the Act. The U.S. Court of Appeals for the District of Columbia Circuit ruled in favor of the AAR and required that EPA must substantially broaden the scope of its regulation affecting rail carrier facilities and equipment, [Association of American Railroads v. Costle, 562 F. 2d 131 (D.C. Cir. 1977)]. On April 17, 1979, EPA proposed additional rules in response to this court order.

EPA's review and analysis of the comments received, especially those regarding the availability of technology, costs associated with the property line standard, the L_{dn} noise descriptor, led EPA to divide the final regulation into two parts, each to be issued separately. The first segment, involving standards on four specific sources was promulgated in December 1979 and takes effect four years later in January of 1984. The Agency has now begun re-analyzing the property line portion of the standard which incorporates all other major sources of noise within the railyard by setting a limit for all those sources at the receiving property line. The final regulation is scheduled for promulgation in January of 1981. This will complete the Agency's work on railroad noise in response to the Court order, except that specific regulations are needed to implement the "special local condition exemption" contained in the railroad and interstate motor carrier sections of the Noise Control Act. Specifically, the Act authorizes EPA to exempt certain communities from preemption of the interstate rail and motor carrier regulations upon a showing that the community has a special local condition which merits exception and that the resulting community standards are not in conflict with the national standard. The regulations governing the submission and approval or disapproval of such applications are scheduled to be proposed in FY 1982 and made final in FY 1983.

Once the Agency completes the railroad regulation work required by the Court's interpretation of the Noise Control Act, noise from railroad operations will be essentially a Federal concern. States and localities will be preempted from promulgating standards which are different from the EPA regulations, unless they are issued an exemption. Since the regulations will be issued by EPA on a national uniform basis and will of necessity be focused on the "average" railyard, many communities will be confronted with serious noise problems from railyard operations which they cannot address even though there may be simple low cost solutions to the problem at that particular site. This policy of total preemption of local communities is directly counter to the division of responsibility between the Federal government and States and localities found in other parts of the Noise Control Act. Even in the area of aviation noise which is heavily regulated by the Federal government, there is considerable room for State and local noise abatement actions.

Guided Mass Transit

A study is underway to review the products used in guided mass transit, both vehicles and equipment. Investigations will cover the products which produce the noise, the noise levels, the applicable foreign and domestic noise control technologies, and the rate of deterioration and user modification of noise control equipment.

The probability of greater use of alternative transportation systems is strong. EPA will conclude the study in 1980 and will plan further actions based on the results of the study.

Snowmobiles

In 1974 EPA announced its intention to study snowmobiles as a possible major source of noise requiring Federal regulation under the Noise Control Act of 1972. Prior to 1974, however, concerned States and the snowmobile industry had become aware of the seriousness of the noise impact of snowmobile operations. It was this awareness, and the actions that followed, that were responsible for major strides in reducing the overall noise impact of snowmobile operations. The sound levels of production snowmobiles sold in the United States have been reduced from values in excess of 100 dB at 50 feet (pre-1970) to the present values of 78 dB (+ 2 dB measurement tolerance) as measured under the Society of Automotive Engineers (SAE) recommended practice J-192a. As a result of these lower levels, the area impacted by snowmobile noise has been considerably reduced.

More than half the snowbelt States now have snowmobile regulations that contain provisions concerning noise or mufflers, and many local jurisdictions have noise regulations or restrictions on the time and place of use of snowmobiles. Because of the reductions of snowmobile noise by the industry and the performance of the States, EPA does not plan any regulatory activity for snowmobiles in the five-year period.

Motorboats

Motorboats are a significant source of noise in some communities, but the chief contributors are non-standard high performance boats which have been altered and fitted with powerful engines. For these boats, State or local ordinances covering hours of operation and source distance or receiving-property noise levels are often effective.

A study of motorboat noise is underway; EPA will conclude this study in 1980 and will plan further actions if warranted.

SUPPORT PROGRAMS

Types of Support Programs

Federal regulations and State local programs cannot function without certain essential support activities. Primary examples are:

- Public education;
- Health and welfare research;
- Technology development and demonstrations;
- Cost/Economic Impact Analysis
- Federal program coordination.

Public Education

In addition to the public education programs described under the Comprehensive Programs section, EPA also directly supports the State and local assistance programs, including ECHO, through the development of public information plans and materials which can be adapted to each participating community's needs. Materials and services include brochures, press releases, articles, noise information, technical and planning assistance, and a correspondence course for State and local officials to provide these officials with continued training.

Health and Welfare Research

Each of the regulations and other major activities of the Environmental Protection Agency must be tied to protection of public health and welfare. The quantification of these benefits by the use of various criteria is a major function of the Agency, for all scientific data must be turned into dose response relationships which can allow the Agency decision-makers to determine the benefits of various abatement techniques and to portray them to the public and other decision-makers. This is an important support function to the regulatory activity in the Agency as well as to the support of States and localities and without it, the core programs in the national noise control effort could not function. A description of further research needed to support this area of activity is contained in the special report on health effects research. The report details an ambitious five-year research plan for the Agency in conjunction with other Federal agencies, including the National Institutes of Health.

Technology Development and Demonstrations

In developing the regulations for the control of noise at the manufacturer level, EPA is constrained by the words of the Noise Control Act to promulgate the regulations based on the best available technology taking costs into account. In the first round of regulation of any product, it is often possible for EPA to determine by examination of products now being manufactured, certain techniques of noise control, which if applied to similar products, would result in significant noise abatement for the country. However, for some products, advances in technology are not as obvious. This is also true in many cases where EPA has already required an initial application of the best available technology and yet, further reductions are necessary to provide the public adequate relief. In these latter cases, since there is generally little incentive for industry to initiate development programs on advanced noise control technology, it falls on the Federal Government to demonstrate and validate advanced noise control techniques.

As direct result of the disestablishment of the Department of Transportation's Office of Noise Abatement, (where all previous vehicle noise RD&D was supported), EPA initiated several technology demonstration programs. Efforts are aimed at demonstrating the availability of trucks that can be made quieter than required by the existing regulations and to identify possible modifications to the primary contributors of noise generation in vehicles, namely, engines and tires, so that these components can be initially designed and developed for low noise characteristics in any new products development cycle.

The first of four heavy trucks to be demonstrated under this program, a Ford CLT 9000, has undergone treatment and been reduced from a level of 77.1 dB to a level of 72.6 dB, a dramatic reduction since the truck was already three decibels below EPA's noise standard for trucks which becomes effective in 1982. The modified truck is currently in commercial service and will be developing additional data on possible operational cost increments related to the modifications. Additional demonstrations of medium duty trucks are also planned. This type of demonstration will assist EPA in determining the feasibility and costs of applying similar techniques to the entire truck fleet in the year 1986 by way of the regulation to be promulgated in 1984.

Any further reductions in surface transportation noise will be strongly influenced by tire design and interaction with the road surface. Increased activity in the early part of the five-year period will be placed on the identification of noise producing characteristics of tires and pavements. This data will be useful to States and local communities when road re-surfacing decisions are made.

Preliminary work shows that similar opportunities appear to be available in the case of cooling systems and engines. The Agency will carry out a modest demonstration program to prove the best available techniques which can be applied by manufacturers of these components to further reduce the noise from surface transportation vehicles and other equipment.

Cost/Economic Impact Analysis

The Noise Control Act requires EPA to take the cost of compliance into account when promulgating regulations. The Agency undertakes extensive studies for each regulation to ensure that the regulation is as cost-effective as possible. The Quiet Community Act Amendments also require EPA to investigate the economic impact of noise on property and human activities and the use of economic incentives in the control of noise. Studies will be conducted in these areas, with special attention on the use of economic incentives in the aviation area, where previous studies by other organizations have indicated a particularly strong potential for the effectiveness of economic incentives.

In addition, EPA is conducting agency wide studies on the economic benefits of various regulations. One or more noise regulations may be included in these studies.

Federal Program Coordination

The Noise Control Act of 1972 requires EPA to coordinate the programmatic and research activities of all Federal agencies concerned with noise. As a principal means of achieving this coordination EPA initiated a number of joint projects with other Federal Agencies. The joint agency projects are intended to act as catalysts for program changes by demonstrating the benefits of implementing noise abatement techniques in ongoing projects being carried out by the other Federal Agency such as, along federally funded highways or in Urban Transit Mall developments. Secondary benefits include the acquiring of realistic case history information for use by the private sector.

Several Federal agencies have a great deal of influence over the present and future noise levels in this country. They have this ability by virtue of certain primary responsibilities which, when carried out, can significantly impact the noise environment. An obvious example is the Federal Highway Administration which has the responsibility of assisting State highway agencies to develop appropriate highway systems. These systems in many ways can be considered the "source" of noise in the Nation's neighborhoods as much as the individual motor vehicles themselves. Once a highway is built in a specific location, it is unlikely to be closed. Thus, the actions of State highway agencies under the guidance of the Federal Highway Administration (FHWA) can greatly determine the ambient noise level in a community for many years to come. The FHWA has an active noise program, and EPA is working with the FHWA to identify additional ways in which the Nation's highway development program might further the cause of noise abatement. Very important programs in areas which impact

highway noise are also carried out by the Department of Housing and Urban Development (HUD) and the Department of Energy (DOE). Many of the authorities which these agencies have to carry out primary missions can be combined with programs to abate noise with mutual benefits to both programs.

In his Environmental Message to Congress on August 2, 1979, President Carter directed Federal agencies to carry out a five point Urban Noise Initiative directed at combining Federal urban programs with the noise control effort. Important progress is being made in carrying out this initiative. For example, the concept of soundproofing schools and hospitals severely impacted by noise as part of the DOE energy conservation program is being tested by EPA with a grant to the Massachusetts Port Authority. The concept has been endorsed by DOE, and arrangements with the Massachusetts Energy Office, Massport, and local communities in the Logan airport area are being finalized. It is hoped that this program will allow all communities with noise impacted schools and hospitals to both soundproof and weatherize these buildings as part of the DOE program at little or no extra cost.

In other developments, the National Institute of Governmental Purchasing, under a cooperative agreement with EPA, is organizing a Buy-Quiet program wherein participating Federal, State and local governments will purchase products and equipment with noise reduction features. Quiet-product demonstrations, prebid conferences with industry, and a quiet products data bank are now being organized.

Neighborhood organizations which are active in community improvement activities are also being encouraged to participate in local noise control programs through a Quiet Neighborhood Self-Help program. This program is being administered by the National Association of Neighborhoods under a cooperative agreement with EPA.

Other aspects of the Urban Noise Initiative deal with urban transportation noise and noise compatible land use controls. In the initial thrust of the transportation program, EPA and DOT (UMTA) will promote the use of bus noise reduction retrofit kits previously tested by the two agencies in Portland, Oregon. These kits are particularly valuable in high density transit corridors where bus noise can hinder other revitalization efforts.

In the case of noise compatible land use controls, our interagency effort to establish and jointly publish guidelines for noise compatible land use is now being finalized. This joint guide is the first step to establishing a joint program for technical assistance in noise compatible development controls to states and local governments.

EPA is currently seeking cofunding with agencies doing work in energy conservation to demonstrate the synergistic benefits of energy conservation and noise control in urban residences. The "Quiet House" program would be divided into two main areas of action: the structures themselves and the consumer products and appliances with which they are equipped. The results of this project would be issued to guide consumers, manufacturers, and various trade associations in adapting information obtained from the study for their own use. In addition it will give EPA additional information on the co-benefits of soundproofing and weatherization for energy conservation.

SUMMARY

EPA's five-year plan for surface transportation presents a comprehensive foundation for future noise control. The national network of 300 communities with active motor vehicle noise control programs to be established in the coming years will facilitate the execution of new noise abatement measures. These measures will reflect the coordinated efforts of States and localities with the Federal regulatory effort which will be completed in this five-year period. They will be supported by public education efforts, technology development, Federal program coordination and health effects research efforts. This plan should yield considerable health and welfare benefits and establish the basis for even greater improvement in the surface transportation noise environment in the future.

AVIATION

This chapter summarizes the conclusions of Volume II, the special report on aviation noise, entitled "Aviation Noise — The Next Twenty Years." In that study the progress which has been achieved in this field in the last seven years since the passage of the Noise Control Act is described and a new national strategy for aviation noise is proposed. This summary provides the highlights of the new strategy and describes EPA's plans for the coming five years in this area.

THE AVIATION NOISE PROBLEM

A great deal of progress has been made since 1973 to deal with the aviation noise problem posed by commercial carrier operations. The Federal Aviation Administration (FAA) has promulgated a number of important regulations which, when fully effective, will provide dramatic relief for a large number of people around our nation's airports who are now exposed to high levels of noise from commercial aircraft operations.

Progress has also been made on the control of noise at the local level. Both the Courts and the Federal Government have articulated more clearly the rights and responsibilities of the airport proprietor to reduce the noise from his specific facility, and a small start has been made at the Federal level to finance the development of plans which lay the groundwork for such actions.

It would be a very serious mistake, however, to become too complacent about this progress and to lose sight of the substantial portion of the aviation noise problem which remains. These accomplishments, though considerable, fall far short of what those who live around our nation's airports had expected at the time Congress enacted the Noise Control Act of 1972, directing the Executive Branch to deal aggressively with this problem. There is still widespread dissatisfaction on the part of those who live in the vicinity of airports with the current level of aircraft noise abatement progress. Community objection to aircraft noise has resulted in both proposed and existing airport restrictions involving night curfews, aircraft type restrictions, and limitations on expansion of existing airports. Construction of new airports has been blocked. Legal

action involving noise damage claims is continuing. Airports are being slowed in their expansion despite the billions of dollars which are available for this purpose through the Airport Development Aid Program (ADAP).

Stated in general terms, the national goals of aviation noise abatement have been to confine severe outdoor aircraft noise-exposure levels, greater than L_{dn} 75 dB,* around U.S. airports to the areas included within the airport boundary, or to areas which are otherwise being used in a manner compatible with this level of noise, and to reduce substantially the number and extent of areas receiving noise-exposure levels that interfere with human activity. The EPA, the FAA, and the Department of Housing and Urban Development (HUD) all have essentially the same noise-exposure goals for aviation.

Based on actions taken to date, in the year 2000 there would still be approximately 2.5-million people living in areas exposed to outdoor noise levels/from aviation operations of L_{dn} 65 dB or above. Approximately 100 thousand of these will live in areas with extremely high levels of noise (L_{dn} 75 dB or greater). Many more millions of people will still be exposed to levels greater than L_{dn} 55 dB. In this Five Year Plan EPA proposes a national strategy for dealing with these remaining cases of high noise exposure from aviation (greater than L_{dn} 65 dB). To be fully successful this proposed strategy must receive the support and active involvement of the FAA, the aircraft manufacturers, the airlines, the pilots, the airports, elected officials, and airport neighbors. The strategy is divided into two parts: The first is focused on providing relief to airport neighborhoods as soon as possible but no later than the year 2000. Since the nature of the aircraft fleet is to a large extent already determined by actions previously taken, the strategy for this period is targeted on operational changes and compatible land-use actions. Changes in the noise characteristics of the aircraft fleet are more possible in the years beyond 2000 if steps are taken now to begin the process of facilitating those changes. These necessary actions are spelled out in the second half of the proposed national strategy.

*The generally accepted measure of community noise exposure is the outdoor annual average day/night sound level in decibels, denoted L_{dn} .

THE NEXT TWENTY YEARS

Relief for the approximately 2.5 million people expected to be still exposed to noise levels of L_{dn} 65 dB or greater by the year 2000 is possible but, of course, difficult. EPA proposes that a goal be set of relocating those families living in neighborhoods expected to remain exposed to noise levels of L_{dn} 75 dB or higher, and providing relief to families living within the L_{dn} 65 dB areas at least inside their homes. Such a strategy identifies soundproofing as the ultimate solution for these families if relief is not obtainable in other ways at less cost. We believe that there are a number of steps which should be taken which will have the effect of reducing the number of people who will need to be protected through soundproofing. These include the following:

- Optimization of aircraft flight procedures, including throttle and flap management, flight tracks, and preferential runway utilization.
- Airport noise-abatement planning.
- Off-airport land-use management which prevents future encroachment of neighborhoods on airports.

Optimization of Aircraft Flight Procedures

The FAA has promulgated two regulations pertaining to noise-abatement flight procedures. One prohibits sonic booms from SSTs over land; the other requires pilots of subsonic aircraft to use less-than-maximum flap settings when approaching an airport. Lower flap settings require lower thrust thereby leading to less noise exposure.

The FAA has issued an advisory circular which recommends noise-abatement takeoff procedures which can reduce noise exposure considerably. In addition, it is possible to optimize the selection of runways (use of "preferential runways") and the flight tracks to be followed for approach and departure so as to minimize population exposure to noise.

Pilots and airlines should be encouraged to adopt these noise-abatement flight procedures. The FAA should take the initiative by convening one or more conferences and a series of training seminars for affected individuals. The FAA should also explore the

need for further regulation in this area. For its part EPA proposes to initiate a program with several airport operators to monitor approach and departure flight procedures routinely employed by commercial air carriers to determine whether procedures recommended by the FAA are being employed and to determine the benefits resulting from them. Reports will be published quarterly to determine seasonal weather effects as well as effects of schedule and traffic pattern changes. This data will be provided to the FAA, air carriers, airport proprietors and pilots in support of FAA-sponsored conferences and seminars and will be available to support the development and promulgation of regulations, if they are found to be necessary.

Airport Noise Abatement Planning

As recognized by the Aviation Safety and Noise Abatement Act of 1979 airport noise abatement planning must play a key role in future abatement efforts. Site-specific changes at individual airports can have a major influence on the impact of aircraft operations on surrounding neighborhoods. EPA promoted this idea in its 1973 Report to the Congress on Aviation Noise and its 1976 regulatory proposal to the FAA calling for mandatory planning at all commercial air carrier airports. We are glad to see the idea finally become an official part of the national aviation noise policy.

All airport proprietors should be encouraged to map noise-exposure areas around their airports and to work with representatives of surrounding communities to develop noise-abatement plans. This information will aid the proprietors in recommending site-specific flight procedures of the sort mentioned above. The proprietors may also use noise-exposure mapping as a basis for restricting numbers of aircraft operations or types of aircraft operating at their airports based on their noise levels and for taking other site-specific actions. There is still some confusion about the authorities and responsibilities of airport proprietors particularly in light of airline deregulation. EPA will work with the FAA and the Civil Aeronautics Board (CAB) to develop a unified Federal policy regarding appropriate noise-abatement actions by airport proprietors. The Department of Housing and Urban Development and the Council on Environmental Quality should participate in the development of this policy as well.

The Quiet Communities Act of 1978 directs EPA to assist in the development of noise abatement plans in areas around major transportation facilities including airports. This authority builds on EPA's experience in working with airports in the development of

airport noise abatement plans in the past. While the Quiet Communities Act of 1978 is very recent, EPA has received many requests for assistance from public officials and city governments which do not qualify for FAA planning grant funds, i.e., the FAA can make grants for planning only to airport proprietors. In many cases, the communities surrounding those airports do not feel that their concerns, particularly with regard to compatible land use can or will be adequately studied under an airport proprietor's planning process focused on abatement at the airport itself. In addition, land-use compatibility planning around airports can be very helpful even in the absence of on-site planning by the airport proprietor.

EPA is now helping several communities to develop noise maps and interpret those results through the Technical Assistance Program. Skilled professional staff at EPA headquarters are available to assist local communities to the extent that resources will allow. The complexity of developing and implementing land-use programs, around airports area, makes it difficult for local officials to work effectively in this area without technical assistance. In the future EPA's Regional offices will expand their efforts in this important area.

Financing for off-airport land use management actions may be available to the airport proprietor through ADAP. However, in the past ADAP funding for these purposes has been minimal. A more promising avenue, open to local political jurisdictions, is the Community Development Block Grant Program (CDBG) administered by the Department of Housing and Urban Development (HUD) under the Housing and Community Development Act of 1974 (P.L. 93-383). Specifically, the objectives of Section 101 of the Act include both the elimination of detrimental conditions and more rational land utilization. CDBG financing is now being used for noise related land use charges at Hartsfield Atlanta International Airport.

Another aid to financing land use charges for more impact reduction purposes is being considered by the Treasury Department in the form of revised project eligibility guidelines for tax-free Industrial Development Bonds. If noise related programs are made eligible for tax-free bonding, local financing of such programs will be easier to obtain.

Airport plans developed without the active involvement of local officials and citizens in the surrounding communities affected by the airport cannot assure that all the resources of the larger community will be brought to bear on the task of making the airport compatible with the community and the community compatible with the airport. During the next several years EPA will work with local officials in communities surrounding the nation's largest airports to seek the active involvement of these officials in the airport planning process and the development of compatible land-use development around the airport. In this task EPA will use the mechanisms and institutions developed in conjunction with other portions of EPA's noise control program -- namely, Regional Technical Assistance Centers, the national Each Community Helps Others (ECHO) program, and State noise control programs. These programs are described earlier.

Off-Airport Land-Use Management

New encroachment by neighborhoods on noisy airports must be restricted. Although all parties to the aviation noise problem, aircraft manufacturers and airline operators, airport proprietors and neighbors agree that future encroachment should be discouraged, they have not spoken with one voice on this subject. EPA will take the initial steps to form a "Compact" of these parties to work in a united fashion along with the National League of Cities and the National Association of Counties to help local officials and developers find compatible uses for land near noisy airports.

The Airport Development Aid Program (ADAP) requires airport proprietors who receive funds for expansion of facilities to assure compatible land use. The mechanism of assurance is based upon Letters of Cooperation between the airport proprietor and the impacted communities. Letters of Cooperation cannot assure anything unless all parties agree on a compatible land-use plan. Thus, in those situations where no such plan exists or where disagreement develops, the Letters of Cooperation are totally ineffective. EPA will ask FAA to join in a thorough review of its policies regarding compatible land use with the expectation that these policies can be strengthened.

Soundproofing and Relocation

For those people who will continue living in areas where the outdoor noise exposure is between L_{dn} 65 and 75 dB, after all the above actions are taken, EPA believes that a program of soundproofing of homes is appropriate. While such a program might not be wholly satisfactory to these people because their enjoyment of the outdoors would still be limited, they could at least escape to the privacy of their homes and for the first time enjoy a good night's sleep, family conversation, and relaxation around the television or stereo without the nerve-racking disruption of over-flying aircraft. Where the outdoor exposure exceeds L_{dn} 75 dB residents should be relocated to quieter neighborhoods.

There are a number of ways in which funds for soundproofing and relocation might be found. Several matching-grant programs are available such as ADAP and Urban Development Action Grants (UDAG), as well as weatherization programs administered by the Department of Energy (DOE) and HUD. The application of such grants to the soundproofing needs of communities should be an interagency effort following the directions established by the President in his August 1979 Environmental Message to Congress.

In addition, it may be desirable to establish a separate noise trust fund program. Revenues for such a trust fund might be based on passenger enplanement and air cargo noise charges and on landing fees. EPA will propose to the FAA that a joint program office be established to develop a plan for the implementation of a soundproofing and relocation program. The joint program office would investigate possible funding mechanisms and would also conduct an in-depth soundproofing study to establish as precisely as possible the number of residences affected, together with cost and time estimates, and to resolve questions pertaining to the stewardship, use, and disposition of those properties which would be candidates for purchase. While we believe that the FAA's leadership, with full EPA participation, is desirable in developing this program, EPA is prepared to undertake the development of the program alone, if necessary.

Beyond the Year 2000

Looking beyond the year 2000, we realize that if we want quieter neighborhoods in the 21st century, or if we just want to maintain the gains we are making in this century, further actions must be taken now. Future expansion of the national air transportation system is likely and desirable, but not at the expense of our urban neighborhoods. It is therefore essential that the following elements be added to the aviation noise-abatement program:

- Accelerate research and development to ensure the design and manufacture of quieter engines and airframes.
- Establish more forward-looking regulations for certification of new types of aircraft, derivative aircraft, and new-production aircraft. To achieve L_{dn} 65 dB for outdoor environments on a national basis would require that noise levels of future air carrier aircraft be reduced below present certification levels (Stage 3) by approximately 10 to 15 dB.

Accelerated Research and Development

Industry believes that up to a 10-dB reduction may be possible by the year 2000 with an aggressive Federal R & D Program. Continued expenditures in noise-abatement research will provide benefits in the post-2000 time period and may be necessary to maintain the level of environmental compatibility that will result from the national noise-control strategy proposed for relief in the next 20 years. Unfortunately, there has been a dramatic reduction in Federally sponsored programs in aviation noise research. From a high of \$47 million in FY 1973, Federal expenditures were down 60% to \$18 million by 1978 and this downward trend is continuing.

The Congressional Office of Technology Assessment (OTA) has a study underway on advanced air transport technology. EPA recommends that OTA supplement that study with an evaluation of the existing NASA noise research program to identify the additional program effort required to develop and demonstrate the necessary technology to realize the long-range noise goals. Active participation of FAA and EPA would probably be necessary. In addition, EPA plans to undertake several joint projects with NASA to demonstrate the effectiveness of available emerging technology and publish reports on results.

More Forward-Looking Regulations

The Federal Government needs to establish aircraft noise limits based upon future requirements to achieve realistic goals. It is not adequate to establish limits which are based on "common practice" technology as is now the case in EPA's view. The 10-15 dB goal should be incorporated in Federal noise regulations so that engine and airframe designers can identify and develop the technology necessary for its attainment and the necessary R & D programs can be undertaken and supported. This longer-range goal level would apply to new aircraft designs which may become operational after the turn of the century, thereby providing adequate lead time to identify, develop, and demonstrate the requisite technology.

EPA will continue to press the FAA to act favorably upon its proposed "Stage 4" regulations, which would essentially meet an interim goal level of 3-5 dB noise reduction below current certification levels and would be effective in 1980. EPA plans to hold a series of formal hearings with the airplane manufacturers to determine why some airplane designs are now producing noise levels within EPA's proposed Stage 4 limits although some manufacturers claim that these limits are neither technologically feasible nor economically reasonable.

Further noise reduction should be required in the Stage 2 aircraft now in the fleet and still being manufactured. These aircraft will dominate the noise situation for many years in communities adjacent to many of the nation's air carrier airports. One approach would be to prohibit, after some future date, any change in air carrier fleet makeup that would of itself result in an increase in fleet noise level, unless operations are reduced so that fleet noise level remains the same or decreases. The EPA is re-investigating the potential benefits of a Fleet Noise Rule that would incorporate these considerations and will provide appropriate recommendations to the FAA.

Another approach that has merit, which is being investigated by the FAA, is to issue a rule that after some date certain, (e.g., 1982 or 1983), newly produced Stage 2 aircraft would have to meet Stage 3 noise limits. (This approach is called "Stage 2 Production Cut-Off".) This could hasten the purchase of available quieter and more-fuel-efficient engines in the newly produced Stage 2 aircraft.

General Aviation and Military Aviation

While the primary emphasis of this report is on air carrier noise, EPA recognizes that both general aviation and military aviation may also become significant contributors to the national aviation noise problem. Studies, now under way, to evaluate the noise implications of these activities, will form the basis for additional national strategy recommendations in subsequent revisions to EPA's five-year plan for noise abatement.

SUMMARY

Since the success of this proposed National Strategy for actions during the next twenty years depends heavily on its acceptance by the FAA and other parties to the aviation noise problem, EPA will devote its resources during the next few months to discussing this strategy with these parties and taking the initial steps to clarify the strategy in such areas as soundproofing and relocation as mentioned above. EPA's plans for the next five years depend to a large extent on the degree of acceptance which this proposed strategy receives.

CONSTRUCTION

THE CONSTRUCTION SITE NOISE PROBLEM

Within the continental limits of the United States there are currently more than 2.4 million active construction sites including residential, mixed residential/commercial, industrial, and public works (sewer, water, electric, gas, and street repair) projects. EPA estimates on the basis of national surveys of construction site types, site locations, and the average population densities around the sites, that more than 101 million people are exposed on any one day to construction noise. More than 37 million of these people are exposed to noise levels greater than L_{dn} 55 dB on an annual basis, the level EPA has identified as adequate to protect the public health or welfare. Exhibit 10 lists the number of construction projects as of September 1978 on a site type basis and the attendant estimated population exposed on any one day.

EXHIBIT 10

Construction Site Noise Impact

| <u>SITE TYPE</u> | <u>NUMBER OF SITES</u> | <u>POPULATION EXPOSED TO LEVELS ABOVE Ldn 55 dB</u> | |
|--------------------------|------------------------|---|-----------------|
| | | <u>On any one Day</u> | <u>Annually</u> |
| Residential | 1,159,100 | 35,730,000 | N/A |
| Mixed Residential/Office | 108,764 | 7,280,000 | N/A |
| Industrial/Commercial | 148,135 | 9,820,000 | N/A |
| Public Works | 1,013,582 | 48,330,000 | N/A |
| TOTAL | 2,429,581 | 101,160,000 | ≈ 37,000,000 |

N/A - Not Available.

According to a survey of 15 industrial insurance companies, hearing loss is the largest single compensable health problem today. The survey estimated that out of 14.7 million workers exposed to $L_{eq}(8)$ 75 dB and above, a level high enough in cumulative doses to result in damage to hearing, over 4 million work at construction sites.

Congress expressed its concern about the adverse effects of construction site noise in Section 6 of the Act. This section authorizes the Administrator of EPA to publish proposed regulations which set construction equipment noise emission limits for newly manufactured products that protect the public health and welfare, taking into account the characteristics of the products' uses and the degree of noise reduction achievable through application of the best available technology, with consideration of the cost of compliance.

The surface transportation noise problem is comprised of five major noise sources, but the construction site noise problem in contrast, is comprised of approximately 22 different categories of contributing noise sources. To further complicate the problem, construction site noise is dependent upon an equipment mix which, in turn, is generally dictated by the type (see Exhibit 10) and the stage (clearing, excavation, foundation, erection, and finishing) of construction activity. Although EPA anticipates that the number and the predominant type of construction activities will vary from year to year between now and the year 2000 because of the construction industry's sensitivity to national economic conditions, EPA does not anticipate a significant upward trend in construction nor significant shifts in population density near construction sites. However, a continuing transition is occurring from small size equipment to larger, more powerful units in an effort to increase productivity and decrease overall construction costs. This trend brings with it higher noise levels and attendant increases in the severity and extensiveness of construction site noise impacts.

CONTROL OF CONSTRUCTION SITE NOISE

Ideally, a single noise emission limit could be set for construction sites. However, this is not always possible since the noise producing activities and sources must generally be mobile within the boundaries, even though the boundaries of a site may be fixed.

The methods available for the control of site noise are basically the same as those described as controls on motor vehicle noise:

- (1) controlling exposure at the receiver location;
- (2) interrupting the path of noise from the source to the receiver; and
- (3) quieting the noise source.

Controlling Noise at the Receiver.

The separation of the receiver from construction site noise can be accomplished in a number of ways. Although in some instances contractors have temporarily removed people from homes and offices near construction sites during high noise activities*, such measures generally are not suitable for abatement of most construction noise. By the same token, generally accepted land-use planning techniques (i.e., acquisition of adjacent buildings or land for low noise sensitivity activities), would be unacceptable because construction activities are so transient.

The installation of noise insulating materials on buildings adjacent to construction sites cannot be ruled out, although this approach is costly. However, in the planning and design of new buildings in urban areas that are frequently impacted by construction noise, the opportunity to prevent noise impact in an effective way does exist.

Another possible approach is to establish not-to-exceed property line noise levels. This approach has much merit for "fixed" noise sources, but because of the mobility requirement and the prevalence of construction in urban areas that extends to the property line it is often not an effective means of controlling construction site noise.

One of the more practical receiver noise control procedures is the establishment of limits on the hours (curfews) during which certain construction activities may occur. This could be modified to permit construction activities beyond the curfew provided the equipment used did not exceed a specified level**.

* One New York City contractor paid for one-week vacations to Florida during blasting activities on the New York subway.

** A San Francisco, California building contractor stated in a recent trade publication that he attributes his success in obtaining contracts to his use of only quiet construction equipment. His clients believe it is important to be good neighbors.

Interrupting the Path

The construction of noise barriers around a construction site is not widespread for several reasons. First, due to the transient nature of construction (although sites may remain several years for many types of construction), "effective" noise barriers are costly to install and remove. Second, in high density urban areas where major noise impacts occur above street level, simple barriers would not be effective. Third, the installation of effective barriers often requires additional land area around the site which may not be available.

Consequently, while portable noise barriers are being used on a limited basis for public works type construction, the general use of barriers for reducing construction noise impact is not very practical.

Controlling Noise at the Source

State and local governments can and frequently do require that only "quieted" construction equipment be used in a given environment, but they have generally stopped short of regulating the manufacturer of construction equipment. Moreover, the Noise Control Act of 1972 mandates that the Federal Government set such standards to the extent that the equipment is a major source of noise.

Federal Regulations

An EPA program, underway since 1974, is directed at the development of noise emission standards for new construction equipment. To date the Agency has initiated the following regulatory actions.

- Portable Air Compressors

Portable air compressors, though not the noisiest piece of equipment found on a construction site, has one of the largest product populations in construction. Furthermore, portable air compressors are used in almost every type and during almost every stage of construction. As its first construction noise regulatory action, the Agency promulgated on December 31, 1975 a standard for compressors manufactured after January 1, 1978, which limits their noise emissions to 76 dB at 7 meters (approximately 23 feet).

- Wheel and Crawler Tractors

Agency studies have shown that 22 categories of major noise producing products are present at a construction site, including wheel and crawler tractors, better known as "bulldozers", and "front end loaders." The Agency identified these products as major noise sources in May of 1975 and published proposed noise emission standards in July of 1977. The Agency anticipates that the final rule will be promulgated in 1982.

- Pavement Breakers/Rock Drills

Pavement breakers (including "jack hammers") and rock drills are generally integral to the use of portable air compressors, the latter being the primary source of motivepower for pneumatic tools. However, the breaker and drill constitute distinctly separate noise sources in that they are frequently operated at some distance from other power sources, thus constituting a separate source of noise impact. In combination with a portable air compressor (or wheel tractor used to power hydraulic tools) breakers and drills frequently constitute the total equipment complement at many public works construction sites. To deal with this unique operational circumstance and also to realize maximum benefit from the earlier noise standards for portable air compressors, in February 1977 the Agency identified pavement breakers and rock drills as major noise sources. EPA will publish proposed noise standards for these products in 1983.

The Agency currently plans to complete its development of regulations for wheel and crawler tractors, pavement breakers, and rock drills during the next five years, and promulgate an additional regulation for earthmoving equipment as shown in Exhibit 11. During this five-year period, the Agency will also reassess the severity and extent of construction site noise in light of the three new equipment regulations and will decide if regulation of any additional categories of equipment will be necessary. If so, such regulations would be considered for proposal and promulgation after 1985.

State and Local Programs

Most source controls available to State and local governments are in-use controls that affect the operation of construction equipment. Some in-use controls are curfews that specify the hours during which the equipment may be used, property line noise limitations, and/or restriction of equipment noise levels. During the next five years EPA will conduct a limited number of field demonstrations and evaluations of local techniques for abating noise at construction sites with interested State and local governments. The resulting information can be provided to other States and localities through EPA's various public information and technical dissemination networks.

Enforcement

EPA is using the same program which is described in the chapter on surface transportation to monitor the compliance of manufacturers with the noise emission standard for portable air compressors. This program will also be used to monitor compliance of manufacturers with the future standards for wheel and crawler tractors, pavement breakers and rock drills, and mobile earthmoving equipment.

The basic elements of the program are production verification, selective enforcement auditing, and in-use provisions (warranty, maintenance instructions, and anti-tampering provisions).

The capability of this program to assure a high level of compliance by manufacturers of regulated pieces of construction equipment is demonstrated by the current high level of compliance achieved by manufacturers of compressors, which are subject to standards. In only two instances has EPA been required to use its authorities under the Noise Control Act to remedy non-compliance with the standard for portable air compressors.

HOUSEHOLD/CONSUMER PRODUCTS

THE CONSUMER PRODUCT NOISE PROBLEM

Items classified as consumer products include large and small appliances, home shop tools, and lawn and garden equipment.

In theory individuals can largely control their exposure to consumer product noise since they choose what products to purchase and how to operate them. Since the user himself is generally the person most adversely affected by the noise, direct governmental intervention usually does not seem appropriate. On the other hand, some consumer products do affect others (e.g., air conditioners, chain saws, lawnmowers) and direct governmental intervention may be necessary. In addition, the user cannot always protect himself because: (1) most users do not know either the full extent of the effects of noise on their health or that they can do anything about noisy products; (2) even consumers who want quiet products find it very difficult, if not impossible, to determine before purchase which products are quieter. EPA has three programs to deal with these problems.

APPROACHES TO THE PROBLEM

Public Education.

In 1976, EPA launched a major public information campaign that was given increased emphasis by the passage of the Quiet Communities Act of 1978. The following materials, either developed or under development, are specifically directed at helping the consumer understand the effects of noise and what he can do about his own exposure:

- teaching materials for elementary and secondary schools;
- teaching materials for vocational students, i.e., industrial arts, home economics; etc.;

- brochures for children and adults to be distributed at the time of hearing tests;
- pamphlets to encourage "buying quiet";
- publications such as Quieting in the Home;
- pamphlets on the adverse impacts of consumer product noise.

This program will be expanded in the five years covered by this Plan.

EPA has also established the National Information Center for Quiet, a national clearinghouse for the collection and dissemination of public information materials on noise, its effects, and method used to quiet the environment.

Labeling

EPA's labeling program is directed at helping concerned shoppers to choose quieter products. Consumer products are primary targets of this labeling program. Section 8 of the Noise Control Act of 1972 requires EPA to label "any product which emits noise capable of adversely affecting the public health or welfare" and "any product which is sold wholly or in part on the basis of its effectiveness in reducing noise."

In September 1979, rules were promulgated establishing the Agency's product labeling program. Labeling provides accurate and understandable information on the noise generating or noise reducing characteristics of products so that consumers can compare different brands. The label on noise emitting products will bear a numerical noise rating showing the level of noise in decibels that the product emits. The label also will state the range in decibels of noise emitted by the same product made by all manufacturers.

The labels for noise reducing products will bear a numerical noise reduction rating that gives a measure of the product's effectiveness in reducing noise. The label also will show the range of noise reduction ratings for competing products.

Thus, the consumer, as well as local government officials such as building inspectors and public health officials, will be able to tell at a glance the relative noise levels of a specific product brand by comparing its Noise Rating or Noise Reduction Rating to those of other brands. In September 1979 the General Labeling Provisions were promulgated, as well as regulations requiring hearing protectors to be labeled.

The General Provisions detail the uniform approach the Agency will follow in requiring the noise labeling of designated products. The provisions describe the approach and basic criteria for designating products for labeling; the required format, content, and graphics of labels; procedures for requesting labeling exemptions; and the procedure EPA will use to conduct testing on a product subject to a labeling regulation.

The Agency must set priorities for products to be labeled since resources are limited. An Advance Notice of Rulemaking is now being drafted which will announce the next set of products which EPA will require to be labeled. Final decisions have not been made on the list. The Agency uses the criteria listed in Exhibit 12 to select candidates for labeling.

EXHIBIT 12

CRITERIA IN PRIORITIZING POSSIBLE CANDIDATES FOR LABELING

1. (For noise producing products) Is the product noise level sufficiently high to be potentially capable of producing an adverse health or welfare impact?
2. (For noise reducing products) Does the product have a noise reducing capability and is the product sold wholly or in part on the basis of this capability?
3. Is the product used in a location or in a manner that makes an adverse health or welfare impact possible?
4. Is there a potential for the product to be misused? (e.g. aerosol operated horns in a crowd, decorative ceiling tiles used as sound absorbing ceiling tile)
5. Does the product's noise affect a large number of people?
6. Is the noise from the product likely to impact more non-users (i.e. third parties) than purchasers and/or users?
7. Is the product used by the purchaser or household members, and does the adverse noise impact of the products fall primarily on the purchaser or household members?
8. Are large numbers of the product types in use?
9. Are large numbers of the product types being manufactured/sold?
10. Is there a significant range in the acoustic performance of different brands or models?
11. Is the product purchased with high frequency so that consumers can use the labeled noise information for repeated purchases?
12. Do future trends in the product's population, design, or use suggest noise labeling benefits?
13. Do purchasers desire a quieter product or more effective noise reducing product?
14. Can the acoustic performance of some or all models of the product be improved?
15. Is acoustic information currently lacking?
16. Would Federal labeling be a significant improvement on any existing product noise labeling?
17. Would labeled noise information be useful to purchasers and/or users, and to Federal, State, and local noise ordinance enforcement organizations?
18. Is it desirable for EPA to augment existing or planned noise emission/noise attenuation standards by labeling a product with noise information?
19. Are the acoustic data necessary to the development of product noise emission/attenuation standards currently available?
20. Would the prospect of Federal labeling promote voluntary labeling by manufacturers?
21. Is a measurement methodology for the product types readily available?

The Advance Notice of Rulemaking will be published during the coming summer. EPA will then proceed to write regulations requiring labeling of selected consumer products, according to the schedule found in Exhibit 13.

EXHIBIT 13

Product Labeling Schedule

| | <u>1981</u> | <u>1982</u> | <u>1983</u> | <u>1984</u> | <u>1985</u> |
|------------|-----------------------------|-------------|-------------|-------------|-------------|
| Product #1 | Promulgated September, 1979 | | | | |
| Product #2 | P | F | | | |
| Product #3 | | P | F | | |
| Product #4 | | | P | F | |
| Product #5 | | | | P | F |
| Product #6 | | | | P | F |
| Product #7 | | | | | P |
| Product #8 | | | | | P |

Legend P= Proposed Regulation
 F= Final Regulation

Note: Labeling regulations are expected to go into effect one year after promulgation, and enforcement will begin at that time.

Manufacturers are being encouraged to establish their own labeling program as an alternative to EPA's mandated noise labeling program. Several industries already are at work on such programs. The interpretive language in the Preamble of the General Provisions encourages the development of voluntary noise labeling programs by industry. However, it also specifies the minimal conditions under which EPA will defer the requirements for labels for a period to evaluate the voluntary program.

New Product Regulations

Where consumer products are serious sources of noise and affect other people as much or more than the user, not-to-exceed noise limits for newly manufactured products may be appropriate. EPA has begun work on one such product - lawnmowers - but the regulation will be proposed the latter half of this five-year period so the Agency can concentrate first on surface transportation, aviation, and construction equipment. Promulgation of a lawnmower regulation is scheduled for 1985.

Enforcement

Oversight of labeling or new product regulations will be handled by the EPA's enforcement staff. This oversight program is modeled after the one used to monitor compliance with the noise emission regulations for portable air compressors and medium and heavy duty trucks. EPA is presently working to implement this program for the labeling of hearing protectors which will be required for protectors manufactured after September 27, 1980. The EPA's oversight activities on the regulations will usually begin approximately six to nine months before the effective date of the regulation.

MACHINERY

THE MACHINERY NOISE PROBLEM

Machinery noise is defined in this Plan to include noise from industrial machinery and electrical equipment not used in households or in construction. Machinery noise affects more people at L_{dn} 75 dB or greater than noise from any other source, and most of these exposures are in the workplace. The Occupational Safety and Health Administration (OSHA) in the Department of Labor has primary responsibility for protecting industrial workers. OSHA has set what is in effect a noise dose standard. To meet this standard, plant operators must modify (retrofit) existing equipment, buy quieter equipment, use acoustic treatment or use administrative changes to reduce exposure. Although this has led to significant reductions in noise, many workers are still exposed to noise in excess of 90 dB.

Noise exposure from machinery is not only an occupational but a community noise problem as well, and States and localities have struggled with the problem for some time. In some cases local ordinances that limit the amount of noise crossing the property line (from a factory to a residential neighborhood, for instance), can control this problem if the technology exists to do so.

FEDERAL COORDINATION

EPA has no present plans to regulate industrial machinery. However, EPA has exercised some leadership with other Federal agencies to ensure that occupational and non-occupational exposure to noise from machinery is adequately controlled. For example, EPA currently chairs the Noise Subgroup of the Interagency Regulatory Liaison Group that is concerned with providing a coordinated interagency regulatory effort for machinery noise.

EPA has worked closely with the Federal Advisory Council on Occupational Safety and Health (FACOSH). FACOSH was established by the President through Executive Order to assist agencies in the control of occupational hazards in the Federal government. In 1977, FACOSH established the Standing Committee on Noise to deal with worker occupational noise exposure within the Federal sector. The Standing Committee is

working to meet three objectives: to provide guidance for hearing conservation measures and programs throughout the Federal government; to develop a central source of technical and policy information that supports hearing conservation programs of Federal agencies; and to develop policy recommendations and guidance for reducing hazardous occupational noise at Federal facilities. In the past EPA has provided support for the Standing Committee's activities and has assisted in developing guidelines for hearing conservation programs. EPA has also undertaken small demonstration programs jointly with other Federal agencies to reduce machinery noise within their facilities. Through these programs EPA provides technical assistance to other Federal agencies in reducing noise.

SUMMARY

EPA plans a relatively low level of effort over the next five years in the area of machinery noise. Primary emphasis will be placed on providing technical assistance to other Federal agencies in their efforts. EPA has been studying whether it should exercise regulatory authorities to control certain noise exposures in factories and other workplaces. The conclusions of this study will be discussed in the revision of this Five-Year Plan due in January, 1981.

COMPREHENSIVE PROGRAMS

The preceding sections of this plan present EPA's programs directed primarily toward a specific noise source. Several key programs described in this section apply equally to all sources of noise, and are designated comprehensive programs.

PUBLIC EDUCATION

Public education is very important in the area of noise because so many people believe they must endure noise since they think so little can be done about it. This, of course, is not true, and if informed of the consequences of noise exposure and what can be done about it, individuals can greatly influence the extent of their own exposure without relying completely on government regulation or control. Noise has long been considered a problem which only affects people personally and generally does not require government intervention. Only recently have more and more citizens realized that they can and should solve some of their own noise problems; many of their problems are shared with their neighbors, and solutions to these problems often require some governmental assistance.

The education of the public about the community impact of noise, its adverse effects, and its solutions is the responsibility of all parties concerned, especially local officials. EPA will play a leading role by producing educational materials which can be used nationally and can be tailored to the specific situations in communities. The production of booklets, public service announcements for TV and radio, posters, educational curricula for elementary schools, and model agendas for public symposia is probably best carried out on a national basis by EPA, even though communities will and should continue to produce their own materials as well. This Five-Year Plan provides for an increase in EPA's efforts in public education, with emphasis on the development of materials and delivery mechanisms for this material through State and local agencies, under the direction of locally elected officials.

EPA will expand dissemination of public education materials in order to increase citizen awareness of noise. This will be fostered through the National Information Center for Quiet, directed by former Surgeon General Dr. Luther Terry. The Center will make available program-package kits for civic groups, public service announcements,

brochures, lists of films, and referrals to information on noise sources and on the efforts of various communities to reduce noise.

EPA will provide administrators of State and local noise control programs with health effects information by distributing Guidelines for Preparing Environmental Impact Statements on Noise to be published in 1980. This report will contain information on health effects and on the data and criteria used to determine the identified health effects. This publication will be distributed to the public at large and specifically to all individuals involved in State and local noise abatement and control programs.

EPA will also disseminate noise information through the community noise counseling program, which is a cooperative effort between EPA and the National Retired Teachers Association/American Association of Retired Persons (NRTA/AARP). The primary goal of this program is to train laymen to become coordinators or ombudsmen for solving noise problems in their communities. The noise counselors are paid through funding provided to NRTA/AARP under Title 5 of the Older Americans Act, although some counselors are volunteers. EPA has developed the Community Noise Counselor's Handbook and has provided this and other materials to the noise counselors. A newer version of the same program, the Urban Noise Counseling Program, is being initiated by the National Urban League, and will focus on solving noise problems of the inner city.

Several noise training programs and modules are planned for the next five years. The prototype module was developed in cooperation with the International Union of Operating Engineers for inclusion in their training program. The module provides basic noise information as well as detailed descriptions of noise reduction through better equipment operating techniques. This training module was very well accepted and EPA has targeted other specific groups for similar training. Some of the modules developed or under development are:

- Elementary School noise education module;
- Secondary School noise education module;
- School Hearing Test Educational Programs;
- Driver Education/Automobile Passby Testing Program;

- Teaching units for vocational students, (i.e., mechanics, agriculture, home economics).

EPA has also provided, and will continue to provide, assistance, guidance, and training for State and local noise enforcement activities. During 1978-79 EPA sponsored a number of noise enforcement training courses for State and local police officers and developed a Police Training Workbook designed to encourage and assist in additional police training. Also in 1980 EPA plans to publish the following two noise enforcement guidance materials: a guidance manual for State and local prosecutors and a Catalog of Noise Enforcement Resources (persons who have had experience with State and local noise enforcement). In subsequent years this manual will be used in training sessions and updated as the need develops.

EPA believes that public education on both the adverse effects of noise and the many steps individuals can take to abate noise is a necessary public health service. Increased emphasis will be placed on all aspects of public education during the next five years. All EPA cooperative agreements transferring funds to State and local programs contain a public education element, and EPA is developing a public education technical assistance package to assist the local officials in implementing that part of their program.

HEALTH EFFECTS RESEARCH

As requested by Congress, EPA has developed a research plan which presents specific research objectives for noise related health effects. The details of these objectives are found in the Volume III, Special report on Health Effects Research.

The goal of the research plan is "to improve the noise related Health and Welfare data base, refine existing criteria, and develop quantified dose-response criteria where they are lacking." The application of this data base and criteria will feed into EPA's future noise regulatory and labeling actions, and will enhance the development and effective implementation of community ordinances, especially those incorporating such features as comprehensive land use planning, vehicular controls, traffic management, property line limits, building codes, and the purchase of quieter equipment.

The priorities levels of the EPA research plan are:

- Priority A: Nonauditory Physiological Effects
- Priority B: Sleep Disturbance
Individual and Community Response
- Priority C: Noise-Induced Hearing Loss
Behavioral, Social, and Performance
- Priority D: Communication Interference
- Priority E: Wildlife

Nonauditory physiological effects has been ranked as EPA's highest priority (A) based on the following five evaluation factors: Severity of the particular health problem, EPA Program Needs, Recommendations of the Scientific Community, Feasibility, and Appropriateness. This priority is endorsed as well by the National Academy of Sciences, the International Commission on Biological Effects of Noise, and by a consensus of Federal Agencies involved in noise effects research.

Noise as a stressor is a suspected factor in hypertension and potential heart disease. Some epidemiological studies reveal this relationship, and EPA's primate study at the University of Miami has demonstrated a sustained elevation of blood pressure levels of 30 percent. The possible public health implications that have been uncovered support the high priority given to this area of study. The planned research program over the next five years should verify the extent to which noise/physiologic health relationships exist and, therefore could possibly change both the direction and importance of the EPA noise abatement program.

The (B) priorities, sleep disturbance and individual and community response, have a large bearing on noise abatement strategies and actions. Most people at one time or another have been annoyed by various sounds and have had their sleep disrupted. Noise disturbed sleep may affect general health, behavior, and work performance. Since millions of Americans, especially susceptible populations (elderly, the ill, and others), live in localities where noise interferes with activities (sleep and communications, especially on a repetitive basis), EPA considers additional research in this area to be important.

In its study of Noise-Induced Hearing Loss, EPA will try to determine more accurately the contribution of environmental noise exposure to the significant hearing problem in the U.S. In the study of behavior and performance, one major concern is the effects of noise on the cognitive and social development of children. The noise effects research plan presents a rationale for selecting the specific research initiatives. The rationale covers the status of research to date; EPA priorities; current Federal research activities; and a list of research initiatives for the five-year period. The Plan also contains detailed descriptions of the research initiatives, their timing and funding, the planned coordination of research; and the initiatives that will not be undertaken due to resource constraints and other factors.

EPA will seek co-funding of certain Research Initiatives with other Federal Agencies, such as the National Institutes of Health, in areas where agencies have mutual interests. A concise listing of research categories and Initiatives with planned EPA funding levels is presented in the special report on Health Effects Research, as well as an integrated schedule of expected results by the end of each fiscal year over the Five-Year Plan period. Specific applications within the five-year period as well as beyond are presented. For example, the refined criteria resulting from sleep research will have direct bearing on the prediction of sleep disturbance caused by regulated products in the five-year term such as medium and heavy trucks, tires, interstate rail carriers, truck mounted refrigeration units, earth moving equipment, and lawnmowers. Exhibit 14 provides a summary of the proposed research funding for FY 1981 - FY 1985.

EXHIBIT 14

Projected Cost for Health Effects Research
(In Thousands)

| PRIORITY CATEGORY | <u>1981</u> | <u>1982</u> | <u>1983</u> | <u>1984</u> | <u>1985</u> |
|--|-------------|-------------|-------------|-------------|-------------|
| Non Auditory Physiological | 420 | 795 | 900 | 1000 | 1300 |
| Sleep Disturbance | 100 | 300 | 400 | 600 | 750 |
| Individual & Community Response | 230 | 310 | 335 | 390 | 500 |
| Noise Induced Hearing Loss | 150 | 150 | 150 | 150 | 100 |
| Behavioral, Social & Performance Communication Interference | | | 115 | 260 | 350 |
| Wildlife | | | | | |
| TOTAL | 900 | 1555 | 1900 | 2400 | 3000 |

OTHER COMPREHENSIVE PROGRAMS

National Assessment of Noise Exposure

Neither EPA nor the States or communities operate networks designed to assess the ambient noise background as is done with air and water pollution. Instead, EPA and communities base their control efforts on periodic surveys of the acoustical environment.

The main basis for EPA's present work is the exposure information acquired from the "100 Site Study" conducted by EPA in 1973. In 1974, the Agency performed further measurement at 24 of these sites, which provided, in addition to data on noise levels, important information on peoples' attitudes at different ambient noise levels. Measurements related to specific product regulations have also been carried out from time to time.

EPA is now developing a new national noise assessment plan which can serve as the basis for planning and measuring progress in the 1980-1990 period. The program is intended to permit:

- expansion of the data base from year to year, for projections of national noise levels of gradually increasing accuracy;
- projection of national noise levels and exposures in impacted areas by city size, population density, and exposure from surface transportation and aviation;
- the ability later in the decade to assess the impact of Federal and State/local noise control and other factors, including the growth in the number of sources, which might influence noise levels.

In addition to direct EPA monitoring, EPA is exploring ways to integrate the increasing amounts of data collected by States and communities into the national data base. This additional data could supplement the limited Federal resources and potentially improve the accuracy of the national projections.

Local Information System to Evaluate Noise (LISTEN)

The LISTEN program offers computer services to assist communities in assessing their noise problems and in planning their strategies for abating and controlling noise. LISTEN provides communities with a computer analysis of noise survey data which they collect. The objective is to provide a technically sophisticated analysis of a community's data in a form useful to decision-makers engaged in designing and implementing a noise control program.

Alternative Manpower Staffing

The alternative manpower staffing program provides supplemental human resource capabilities to State and local governments to enable them to develop noise control programs. This program uses persons eligible for employment benefits under: Title 5 of the Older Americans Act, the Comprehensive Employment Training Act (CETA); Youth Conservation Program (U.S. Department of Interior); and the Senior Environmental Employment Program (SEE).

International Standardization and Harmonization

In the international standardization and harmonization program, EPA has been working increasingly to assure that tests, procedures, and standards used as a basis for regulatory action are closely coordinated with, and wherever possible, in harmony with, the standards of our principal trading partners. Cooperation in this regard has been particularly noteworthy with the European Economic Community Common Market. This activity will continue at the same level for the five-year period.

SECTION III

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

SURFACE TRANSPORTATION

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| EXTRAMURAL | | | | | | |
| State Cooperative Agreements* | | | | | | |
| State Start-Up | 242 | 79 | 196 | 301 | 270 | 136 |
| State ECHO | 370 | 410 | 544 | 673 | 927 | 1190 |
| Local Start-Up Cooperative Agreements* | 92 | 143 | 224 | 303 | 408 | 571 |
| Regional Technical Centers* | 455 | 397 | 612 | 748 | 884 | 1020 |
| National ECHO | 125 | 135 | 150 | 150 | 150 | 150 |
| Development of State and Local Control Mechanisms | | | | | | |
| Field Research, Demonstrations and Evaluations | 530 | 525 | 550 | 780 | 600 | 500 |
| Model Codes and Technical Information | 232 | 129 | 500 | 690 | 730 | 730 |
| Urban Interagency Noise Initiatives | | | | | | |
| Compatible Use Planning and Redevelopment | - | - | 150 | 250 | 250 | 400 |
| Soundproofing (and Weatherization) | 50 | 50 | 300 | 300 | 400 | 400 |
| Transportation Systems Noise Reduction (Bus Retrofit, Transit Halls, etc.) | - | 170 | 175 | 190 | 205 | 210 |
| Quiet Neighborhood Self-Help and Buy Quiet | 125 | 100 | 200 | 200 | 200 | 200 |
| Technology Assessment (Emphasis on Tire/Pavement Interaction and Light Vehicles) | 50 | 172 | 325 | 350 | 350 | 250 |
| Technology Demonstration (Emphasis on Trucks, Engines, Tires and Coating Systems) | 832 | 700 | 550 | 250# | 200# | 250# |
| Medium and Heavy Truck Regulation | 129 | 400 | 300 | 300 | 200 | 125 |
| Tire Labeling Regulation (Tentative) | 189 | 382 | 394 | 208 | 150 | 50 |

#/Amount would increase if tire program is as successful as hoped.

*/Financial assistance to communities and States and Technical Assistance Centers is divided among several source categories (e.g., surface transportation, aviation, etc.) on a percentage basis based on present and projected programmatic emphasis which EPA will promote through these financial arrangements.

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

SURFACE TRANSPORTATION

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| <u>EXTRAMURAL</u> | | | | | | |
| Light Vehicle Labeling Regulation (Tentative) | 114 | 150 | - | 50 | - | - |
| Truck Transportation Refrigeration Unit Regulation | - | - | 175 | 50 | 50 | 50 |
| Interstate Rail Carrier Regulation and "Special Local Conditions" Regulation | 731 | 475 | 175 | 150 | 150 | 150 |
| Advanced Surface Transportation Systems Regulations | - | - | - | 150 | 180 | 250 |
| Enforcement of EPA Regulations | 100 | 105 | 150 | 150 | 300 | 300 |
| Surface Transportation Strategy Work and Modeling | 74 | 75 | 90 | 175 | 90 | 75 |
| Economic Analysis | - | (155) | 135 | 140 | 100 | 75 |
| Health and Welfare Support for Regulations | 80 | 90 | 88 | 83 | 75 | 50 |
| Health and Welfare Support for State and Local Assistance Programs | 50 | 56 | 75 | 96 | 120 | 130 |
| Final Promulgation of Proposed Regulations and Follow-Up on all Promulgated Regulations | 378 | - | - | - | - | - |
| Completion of Noise Source Studies | 241 | - | - | - | - | - |
| Abatement and Control Extramural Subtotal | 5089 | 4598 | 5908 | 6587 | 6689 | 6962 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 316 | 329 | 450 | 550 | 600 | 600 |
| Headquarters | 2122 | 1946 | 2400 | 2580 | 2400 | 2310 |
| Intramural Subtotal | 2438 | 2275 | 2850 | 3130 | 3000 | 2910 |
| Abatement and Control TOTAL | 7527 | 6873 | 8758 | 9717 | 9689 | 9872 |
| Regional Offices PFTE | 6.9 | 6.5 | 11.9 | 13.9 | 13.9 | 13.9 |
| OPFTE | 1.1 | 1.1 | 6.1 | 8.1 | 10.1 | 10.1 |
| Headquarters PFTE | 45.0 | 38.4 | 49.0 | 52.0 | 48.0 | 47.0 |
| OPFTE | 30.0 | 17.0 | 31.0 | 34.0 | 32.0 | 30.0 |
| Enforcement Extramural Subtotal | 100 | 105 | 150 | 150 | 300 | 300 |
| Enforcement Intramural Subtotal | 423 | 307 | 460 | 460 | 600 | 600 |
| Enforcement TOTAL | 523 | 412 | 610 | 610 | 900 | 900 |
| Enforcement PFTE | 10.0 | 9.0 | 12.0 | 12.0 | 17.0 | 17.0 |
| OPFTE | 8.0 | 6.0 | 11.0 | 11.0 | 13.0 | 13.0 |
| GRAND TOTAL | 8050 | 7285 | 9368 | 10327 | 10589 | 10772 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

AVIATION

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| <u>EXTRAMURAL</u> | | | | | | |
| State Cooperative Agreements* | | | | | | |
| State Start-Ups | 32 | 20 | 49 | 75 | 67 | 34 |
| State RCNO | 49 | 102 | 136 | 168 | 232 | 297 |
| Local Start-Up Cooperative Agreements* | 12 | 36 | 56 | 76 | 102 | 143 |
| Regional Technical Centers* | 60 | 110 | 153 | 187 | 221 | 255 |
| Optimization of Flight Procedures | 45 | 50 | 100 | 125 | 100 | 100 |
| Airport Noise Abatement Planning | 70 | 50 | 300 | 300 | 350 | 400 |
| National RCNO | - | - | 75 | 75 | 75 | 75 |
| Regulatory Proposals | 80 | 70 | 80 | 50 | 25 | 25 |
| Soundproofing and Relocation | (100) | (50) | 150 | 250 | 250 | 300 |
| Special Studies and Strategy Support | 100 | 80 | 120 | 200 | 250 | 250 |
| Research Coordination | 25 | - | 125 | 275 | 375 | 375 |
| Economic Analysis | - | 15 | 50 | 50 | 50 | 50 |
| Health and Welfare Support | 33 | 34 | 40 | 40 | 45 | 50 |
| Abatement and Control Extramural Subtotal (Reimbursement from FAA) | 441 (65) | 567 | 1434 | 1871 | 2142 | 2354 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 80 | 85 | 125 | 175 | 250 | 275 |
| Headquarters | 171 | 152 | 510 | 690 | 750 | 810 |
| Intramural Subtotal | 251 | 237 | 635 | 865 | 1000 | 1085 |
| Abatement and Control TOTAL | 692 | 804 | 2069 | 2736 | 3142 | 3439 |
| Regional Offices PFTE | 2.5 | 2.5 | 4.5 | 6.5 | 9.5 | 10.5 |
| OPFTE | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Headquarters PFTE | 3.0 | 3.0 | 10.0 | 14.0 | 15.0 | 16.0 |
| OPFTE | 2.0 | 2.0 | 7.0 | 9.0 | 10.0 | 11.0 |

*Financial assistance to communities and States and Technical Assistance Centers is divided among several source categories (e.g., surface transportation, aviation, etc.) on a percentage basis based on present and projected programmatic emphasis which EPA will promote through these financial arrangements.

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

CONSTRUCTION

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---|---------------------|-------------|-------------|-------------|-------------|-------------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| <u>EXTRAMURAL</u> | | | | | | |
| Assessment and Demonstration of Construction Equipment and Site Abatement | 45 | 35 | 100 | 100 | 100 | 100 |
| Earthmoving Equipment Regulation | - | - | 250 | 100 | 50 | 50 |
| Pavement Breakers and Rock Drills Regulations | 105 | 249 | 100 | 50 | 30 | - |
| Wheel and Crawler Tractors Regulations | 136 | 247 | 247 | - | - | - |
| Enforcement of EPA Regulations | 95 | 50 | 100 | 225 | 225 | 300 |
| Modeling, Strategy Work, and Health and Welfare Support | 53 | 48 | 81 | 130 | 102 | 93 |
| Economic Analysis | - | (31) | 34 | 20 | 18 | 17 |
| Abatement and Control Extramural Subtotal | 339 | 579 | 812 | 400 | 300 | 260 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 53 | 53 | 140 | 140 | 140 | 275 |
| Headquarters | 205 | 273 | 480 | 210 | 180 | 180 |
| Intramural Subtotal | 258 | 326 | 620 | 350 | 320 | 455 |
| Abatement and Control TOTAL | 597 | 905 | 1432 | 750 | 620 | 715 |
| Regional Offices PFTE | 1.5 | 1.5 | 3.5 | 3.5 | 3.5 | 5.5 |
| OPFTE | 1.0 | 1.0 | 2.0 | 2.0 | 2.0 | 5.0 |
| Headquarters PFTE | 4.0 | 6.0 | 10.0 | 4.0 | 4.0 | 4.0 |
| OPFTE | 3.0 | 2.6 | 6.0 | 3.0 | 2.0 | 2.0 |
| Enforcement Extramural Subtotal | 95 | 50 | 100 | 225 | 225 | 300 |
| Enforcement Intramural Subtotal | 259 | 205 | 140 | 180 | 180 | 220 |
| Enforcement TOTAL | 354 | 255 | 240 | 405 | 405 | 520 |
| Enforcement PFTE | 7.0 | 6.0 | 5.0 | 6.0 | 6.0 | 7.0 |
| OPFTE | 4.0 | 4.0 | 2.0 | 3.0 | 3.0 | 4.0 |
| GRAND TOTAL | 951 | 1160 | 1672 | 1155 | 1025 | 1235 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

HOUSEHOLD/CONSUMER PRODUCTS

| | CURRENT | PROJECTIONS | | | | |
|---|------------|-------------|-------------|-------------|-------------|-------------|
| | ESTIMATE | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| | FY 80 | | | | | |
| <u>EXTRAMURAL</u> | | | | | | |
| Creation of a "real world" facility (Quiet House) to assess and demonstrate technological development in housing construction and consumer products | - | 35 | 200 | 150 | 100 | 100 |
| Power Lawn Mower Regulation | - | - | 250 | 75 | 50 | 30 |
| Labeling (Candidate Selection) | 100 | 75 | - | - | - | - |
| Labeling (One Product per Year FY 81-83) | 101 | 80 | 215 | 365 | 365 | 365 |
| Labeling (Two Product per Year FY 84-85) | | | | | | |
| Enforcement of RPA Regulations | 70 | 50 | 150 | 250 | 375 | 425 |
| Consumer Products Strategy Work, and Health and Welfare Support | 45 | 43 | 115 | 32 | 118 | 35 |
| Economic Analysis | - | (28) | 15 | 8 | 7 | 5 |
| Abatement and Control Extramural Subtotal | 246 | 233 | 795 | 630 | 640 | 535 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 40 | 40 | 50 | 50 | 150 | 150 |
| Headquarters | 137 | 122 | 420 | 360 | 360 | 300 |
| Intramural Subtotal | 177 | 162 | 470 | 410 | 510 | 450 |
| Abatement and Control TOTAL | 423 | 395 | 1265 | 1040 | 1150 | 985 |
| Regional Offices PFTE | 0.5 | 0.5 | 0.5 | 0.5 | 2.5 | 2.5 |
| OPFTE | 1.5 | 1.5 | 1.5 | 1.5 | 3.5 | 3.5 |
| Headquarters PFTE | 3.0 | 3.0 | 8.0 | 7.0 | 7.0 | 6.0 |
| OPFTE | 2.0 | 2.0 | 6.0 | 5.0 | 5.0 | 4.0 |
| Enforcement Extramural Subtotal | 70 | 50 | 150 | 250 | 375 | 425 |
| Enforcement Intramural Subtotal | 118 | 102 | 120 | 160 | 240 | 320 |
| Enforcement TOTAL | 188 | 152 | 270 | 410 | 615 | 745 |
| Enforcement PFTE | 3.0 | 3.0 | 4.0 | 5.0 | 8.0 | 10.0 |
| OPFTE | 2.0 | 2.0 | 2.0 | 3.0 | 4.0 | 6.0 |
| GRAND TOTAL | 611 | 547 | 1535 | 1450 | 1765 | 1730 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

MACHINERY

| | CURRENT | PROJECTIONS | | | | |
|---|----------|-------------|-------|-------|-------|-------|
| | ESTIMATE | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| | FY 80 | | | | | |
| <u>EXTRAMURAL</u> | | | | | | |
| State Cooperative Agreements* | | | | | | |
| State Start-Up | 32 | 12 | 29 | 44 | 39 | 20 |
| State RCHO | 49 | 60 | 80 | 100 | 100 | 100 |
| Local Start-Up Cooperative Agreements* | 12 | 21 | 33 | 44 | 60 | 84 |
| Regional Technical Centers* | 60 | 65 | 90 | 110 | 110 | 110 |
| Assessment and Demonstration of Machinery Technology and Abatement Mechanisms | 80 | 80 | 80 | 80 | 80 | 80 |
| Machinery Strategy Work, and Health and Welfare Support | 8 | 27 | 60 | 40 | 60 | 45 |
| Economic Analysis | - | - | 50 | 50 | 50 | 50 |
| Abatement and Control Extramural Subtotal | 241 | 265 | 422 | 468 | 499 | 489 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 33 | 33 | 40 | 40 | 90 | 90 |
| Headquarters | 35 | 60 | 90 | 90 | 150 | 120 |
| Intramural Subtotal | 68 | 93 | 130 | 130 | 240 | 210 |
| Abatement and Control TOTAL | 309 | 358 | 552 | 598 | 739 | 699 |
| Regional Offices PFTF | 0.5 | 0.5 | 0.5 | 0.5 | 1.5 | 1.5 |
| OPFTE | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 2.0 |
| Headquarters PFTF | 1.0 | 1.0 | 2.0 | 2.0 | 3.0 | 2.0 |
| OPFTE | 1.0 | 0.5 | 1.0 | 1.0 | 2.0 | 2.0 |

*Financial assistance to communities and States and Technical Assistance Centers is divided among several source categories (e.g., surface transportation, aviation, etc.) on a percentage basis formulated on present and projected programmatic emphasis which EPA has and will promote through these financial arrangements. In this category of machinery, the amounts shown are those expected to be spent in response to local requests and needs rather than because of EPA priorities.

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

COMPREHENSIVE PROGRAMS

| | CURRENT | PROJECTIONS | | | | |
|---|----------|-------------|-------|-------|-------|-------|
| | ESTIMATE | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| | FY 80 | | | | | |
| EXTRAMURAL | | | | | | |
| <u>Public Education</u> | | | | | | |
| State Cooperative Agreements** | 16 | 5 | 14 | 22 | 20 | 10 |
| State Start-Up | 25 | 30 | 40 | 49 | 68 | 88 |
| State ECHO | 6 | 10 | 17 | 22 | 30 | 42 |
| Local Start-Up Cooperative Agreements** | 30 | 33 | 45 | 55 | 65 | 75 |
| Regional Technical Centers** | 180 | 180 | 300 | 410 | 450 | 600 |
| Media Materials Development Program | 341 | 341 | 400 | 455 | 512 | 645 |
| Education and Information Dissemination Mechanisms | 598 | 599 | 816 | 1013 | 1145 | 1460 |
| Subtotal | | | | | | |
| <u>Health Effects</u> | | | | | | |
| Health Effects Investigations Directly Applicable to several EPA Noise Programs** | 250 | 300 | 610 | 695 | 940 | 850 |
| Health Effects Research** | 345 | 375 | 940 | 1205 | 1460 | 2150 |
| Subtotal | 595 | 675 | 1550 | 1900 | 2400 | 3000 |
| <u>Other Programs</u> | | | | | | |
| LITER Program | 90 | 76 | 168 | 200 | 200 | 200 |
| National Assessment | - | 75 | 150 | 200 | 200 | 200 |
| Alternative Manpower Staffing Program | 80 | 65 | 35 | 50 | 100 | 200 |
| Comprehensive Land Use Planning Assistance | - | - | 100 | 180 | 300 | 400 |
| Subtotal | 170 | 216 | 453 | 630 | 800 | 1000 |
| International Standardization and Harmonization | 116 | 100 | 100 | 100 | 200 | 200 |
| Economic Analysis Directly Applicable to all EPA Noise Programs | - | (100) | 100 | 200 | 200 | 200 |
| Five-Year Plan Development and Update | 145 | 242 | 250 | 50 | 200 | 150 |
| Subtotal | 261 | 342 | 450 | 350 | 600 | 550 |
| Enforcement Assistance to Communities | 37 | 20 | 80 | 80 | 110 | 150 |

**Public Education is being made a required component of each cooperative agreement.

**/Extensive detail for these figures is given in the Research Plan, Part III of this Five-Year Plan.

**/Financial assistance to communities and States and Technical Assistance Centers is divided among several source categories (e.g., surface transportation, aviation, etc.) on a percentage basis formulated on present and projected programmatic emphasis which EPA has and will promote through these financial arrangements.

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

COMPREHENSIVE PROGRAMS

EXTRAMURAL

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| Abatement and Control Extramural Subtotal | 1624 | 1832 | 3269 | 3893 | 4945 | 6010 |
| Abatement and Control Intramural | | | | | | |
| Regional Offices | 180 | 151 | 270 | 270 | 320 | 320 |
| Headquarters | 686 | 668 | 1320 | 1440 | 1890 | 2100 |
| Intramural Subtotal | 866 | 819 | 1590 | 1710 | 2210 | 2420 |
| Abatement and Control TOTAL | 2490 | 2651 | 4859 | 5603 | 7155 | 8430 |
| Regional Offices PFTE | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| OPFTE | 3.8 | 2.1 | 8.8 | 8.8 | 10.8 | 10.8 |
| Headquarters PFTE | 14.0 | 15.0 | 27.0 | 29.0 | 38.0 | 42.0 |
| OPFTE | 9.0 | 6.0 | 17.0 | 19.0 | 25.0 | 28.0 |
| Enforcement Extramural Subtotal | 37 | 20 | 80 | 80 | 110 | 150 |
| Enforcement Intramural Subtotal | 118 | 102 | 80 | 80 | 100 | 100 |
| Enforcement TOTAL | 155 | 122 | 160 | 160 | 210 | 250 |
| Enforcement PFTE | 1.0 | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| OPFTE | 4.0 | 4.0 | 2.0 | 2.0 | 1.0 | 3.0 |
| GRAND TOTAL | 2645 | 2773 | 5019 | 5763 | 7365 | 8680 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
 (FY 1981 - FY 1985)
 (THOUSANDS)

COOPERATIVE AGREEMENTS SUMMARY

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|--|---------------------|-------------|-------------|-------------|-------------|-------------|
| | | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| STATE COOPERATIVE AGREEMENTS | | | | | | |
| State Start-Up | | | | | | |
| Surface Transportation | 242 | 79 | 196 | 301 | 270 | 136 |
| Aviation | 32 | 20 | 49 | 75 | 67 | 34 |
| Machinery | 32 | 11 | 29 | 44 | 39 | 20 |
| Comprehensive Programs | 16 | 6 | 14 | 22 | 20 | 10 |
| Subtotal | 322 | 116 | 288 | 442 | 396 | 200 |
| State ECHO | | | | | | |
| Surface Transportation | 370 | 410 | 544 | 673 | 927 | 1190 |
| Aviation | 49 | 102 | 136 | 168 | 232 | 297 |
| Machinery | 49 | 60 | 80 | 99 | 100 | 100 |
| Comprehensive Programs | 25 | 30 | 40 | 50 | 68 | 88 |
| Subtotal | 493 | 602 | 800 | 990 | 1327 | 1675 |
| TOTAL, State Cooperative Agreements | 815 | 718 | 1088 | 1432 | 1723 | 1875 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

COOPERATIVE AGREEMENTS SUMMARY

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|---------------------------------------|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| Local Start-Up Cooperative Agreements | | | | | | |
| Surface Transportation | 92 | 143 | 224 | 303 | 408 | 571 |
| Aviation | 12 | 36 | 56 | 76 | 102 | 143 |
| Machinery | 12 | 21 | 33 | 44 | 60 | 84 |
| Comprehensive Programs | 6 | 10 | 17 | 22 | 30 | 42 |
| Subtotal | 122 | 210 | 330 | 445 | 600 | 840 |
| Regional Technical Centers | | | | | | |
| Surface Transportation | 455 | 397 | 612 | 748 | 884 | 1020 |
| Aviation | 60 | 110 | 153 | 187 | 221 | 255 |
| Machinery | 60 | 65 | 90 | 110 | 110 | 110 |
| Comprehensive Programs | 30 | 33 | 45 | 55 | 65 | 75 |
| Subtotal | 605 | 605 | 900 | 1100 | 1280 | 1460 |
| TOTAL COOPERATIVE AGREEMENTS | 1542 | 1533 | 2318 | 2977 | 3603 | 4175 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY NOISE SOURCE
(FY 1981 - FY 1985)
(THOUSANDS)

SUMMARY BY SOURCE

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|-------------------------------|---------------------|-------------|-------|-------|-------|-------|
| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| <u>Grand Totals by Source</u> | | | | | | |
| Surface Transportation | 8050 | 7285 | 9368 | 10327 | 10589 | 10772 |
| Aviation | 692 | 804 | 2069 | 2736 | 3142 | 3439 |
| Construction | 951 | 1160 | 1672 | 1155 | 1025 | 1235 |
| Household/Consumer Products | 611 | 547 | 1535 | 1450 | 1765 | 1730 |
| Machinery | 309 | 358 | 552 | 598 | 739 | 699 |
| Comprehensive Programs | 2645 | 2773 | 5019 | 5763 | 7365 | 8680 |
| TOTAL | 13258 | 12927 | 20215 | 22029 | 24625 | 26555 |

COST OF IMPLEMENTING QUIET COMMUNITIES ACT BY APPROPRIATION CATEGORIES
(FY 1981 - FY 1985)
(THOUSANDS)

SUMMARY

| | CURRENT ESTIMATE | PROJECTIONS | | | | |
|-------------------------------|---------------------|-------------|-------|-------|-------|-------|
| | | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 |
| <u>Abatement and Control</u> | | | | | | |
| Extramural | | | | | | |
| FY 1980 Appropriation | 7796 | | | | | |
| FY 1979 Carryover | 184 | | | | | |
| FY 1980 Subtotal | 7980 | | | | | |
| FY 1981 Presidential Budget | | 8074 | | | | |
| FY 1982 - FY 1985 Projections | | | 12640 | 13849 | 15215 | 16610 |
| Intramural | | | | | | |
| FY 1980 Appropriation | 3356 | | | | | |
| FY 1981 Presidential Budget | | 3221 | | | | |
| FY 1982 - 1985 Projections | | | 5220 | 5370 | 5730 | 5820 |
| Abatement and Control Total | 11336 | 11295 | 17860 | 19219 | 20945 | 22430 |
| PFTE | 70 | 66.4 | 106 | 108 | 115 | 117 |
| OPFTE | 47 | 30.1 | 68 | 71 | 76 | 77 |
| <u>Regional Offices</u> | | | | | | |
| Intramural | | | | | | |
| PFTE | 702 | 691 | 1075 | 1225 | 1550 | 1710 |
| OPFTE | 13.9 | 13.5 | 22.9 | 26.9 | 32.9 | 35.9 |
| | 8.9 | 7.2 | 19.9 | 21.9 | 28.9 | 31.9 |

| | <u>PRESIDENT'S BUDGET</u> | | | | | |
|---|---------------------------|--------------|----------------|----------------------------|--------------|----------------|
| | <u>(THOUSANDS)</u> | | | | | |
| | <u>Current Estimate</u> | | | <u>Presidential Budget</u> | | |
| <u>1980</u> | | | <u>1981</u> | | | |
| | <u>PFTE</u> | <u>OPFTE</u> | <u>DOLLARS</u> | <u>PFTE</u> | <u>OPFTE</u> | <u>DOLLARS</u> |
| <u>ABATEMENT AND CONTROL</u> | | | | | | |
| <u>Environmental Noise Strategies and Standards</u> | | | | | | |
| Noise Standards Development | 22 | 2 | 3575 | 22 | 2 | 3615 |
| Noise Control Technology Assessment and Criteria | 15 | 13 | 2518 | 15 | 13 | 2638 |
| Subtotal | 37 | 15 | 6093 | 37 | 15 | 6253 |
| <u>Noise Program Strategies Implementation</u> | | | | | | |
| Noise Control Implementation and Evaluation | 25 | 28 | 4382 | 22 | 15 | 4353 |
| Federal Agency Coordination | 8 | 0 | 677 | 8 | 0 | 689 |
| Noise Regional Program Implementation | 14 | 9 | 702 | 13 | 8 | 691 |
| Subtotal | 47 | 37 | 5761 | 43 | 23 | 5733 |
| <u>Enforcement</u> | 21 | 18 | 1220 | 19 | 16 | 941 |
| TOTAL NOISE PROGRAM | 105 | 70 | 13074 | 99 | 54 | 12927 |