

them to the local situations, and to apply computer techniques to the forecasting operation.

Mathematical models are being developed and tested to describe the individual and cumulative effects of pollutant sources on air quality in an urban area. These models range in complexity from simple graphical presentations to highly complex descriptions of sources and of air flow patterns. Tracer studies are being undertaken to investigate the variability of dispersion parameters as they pertain to the roughness elements in the urban situation.

To provide continuing information on major trends in air pollution, we operate three air monitoring networks. One system of stations, the National Air Sampling Network (NASN), includes some 250 stations, which sample for suspended particulate matter; 50 of these stations also sample for sulfur dioxide and nitrogen dioxide. The stations obtain 24-hour integrated samples on a random schedule about once each two weeks. Stations of a Continuous Air Monitoring Program (CAMP) are operated in Cincinnati, Chicago, Philadelphia, Denver, St. Louis, and Washington, D.C. At each CAMP station, a set of instruments automatically measures and continuously records the atmospheric levels of carbon monoxide, total hydrocarbons, nitric oxide, nitrogen dioxide, sulfur dioxide, and total oxidants. A surveillance network has recently been set up to assist in the evaluation of effects of pollution in urban areas extending across State boundaries. These stations in this Surveillance Network for Interstate Pollution Effects utilize an "effects package" to measure dustfall, particulate impingement, sulfation, corrosion, tarnishing of metals, and deterioration of textiles, dyes, and rubber. Plans are to establish about 60 stations of this type this year.

Other Federal agencies play an important role in our research efforts. The Weather Bureau of the Environmental Sciences Services Administration of the Department of Commerce has carried the major burden of meteorological studies. The Bureau of Mines of the Department of the Interior is engaged in numerous projects relating to the nature and control of pollution from fuel combustion, primarily sulfur oxide pollution from the combustion of fossil fuels. The Tennessee Valley Authority is active in meteorological and engineering studies relating to pollution from large fuel-burning installations; the Agricultural Research Service and the Forest Service of the Department of Agriculture in studies of air pollution effects on plant life and the Bureau of Standards of the Department of Commerce in studies of the basic chemistry and physics of air pollution. The Library of Congress has been our principal bibliographical resource.

Although not, in contrast to the above noted agencies, recipients of all pollution research funds by transfer from this Department, the Office of Coal Research of the Department of the Interior, the National Science Foundation, the National Space and Aeronautics Agency, the Atomic Energy Commission and the Department of Defense have all sponsored research of great value to a better understanding of air pollution, its effects and its control.

I have given a rough indication, Mr. Chairman, of the extent of the air pollution research and development activities that are presently being carried out in the United States. I will be pleased to submit for the record a detailed breakdown of our Department's activities in this area. Further, under an arrangement with the American Society of Mechanical Engineers we are currently gathering detailed information on the air pollution research and development activities being carried out under other than Federal auspices. This information should be complete sometime in the fall of this year, and I will also be pleased to make it available to the Committee.

To conclude my remarks, Mr. Chairman, we have studied the report of the Research Management Advisory Panel to your Committee, and we are in agreement in large part with the fundamental findings of the report. As the report indicates, the quality of life is to a large extent dependent upon the quality of the environment. But it is only in recent years that we have begun to understand this relationship, and particularly to understand how dependent we are on our fundamental resources of air, water, and land. For the greater part of our historical development our interest in the environment was primarily that of subduing nature so that she would serve man better. We had to convert many of our beautiful rivers and lakes into practically open sewers before we concluded that we must conserve our water resources, and we had to experience the tragedy of Donora and the anguish of Los Angeles before we began to realize