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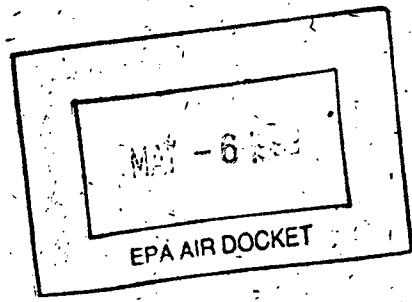
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January 1996

A N N U A L R E P O R T

December 1997



**MICKEY LELAND
NATIONAL URBAN**



Houston Texas

CLEAN AIR ACT AMENDMENTS OF 1990

(Title III, Section 301(p))

(p) MICKEY LELAND URBAN AIR TOXICS RESEARCH CENTER.

"(1) ESTABLISHMENT. - The Administrator shall oversee the establishment of a National Urban Air Toxics Research Center, to be located at a university, a hospital, or other facility capable of undertaking and maintaining similar research capabilities in the areas of epidemiology, oncology, toxicology, pulmonary medicine, pathology, and biostatistics. The center shall be known as the Mickey Leland National Urban Air Toxics Research Center. The geographic site of the National Urban Air Toxics Research Center should be further directed to Harris County, Texas in order to take advantage of the well developed scientific community presence on-site at the Texas Medical Center as well as the extensive data previously compiled for the comprehensive monitoring system currently in place."

The Mickey Leland National Urban Air Toxics Research Center

Annual Report

January 1996 – December 1997

Mission

To carry out sound environmental health research to better understand the potential risks posed to human health by the presence of toxic chemicals in urban air.

Strategic Goals

After exploring the most critical public health aspects of air toxics risks, the following goals were adopted by the Center:

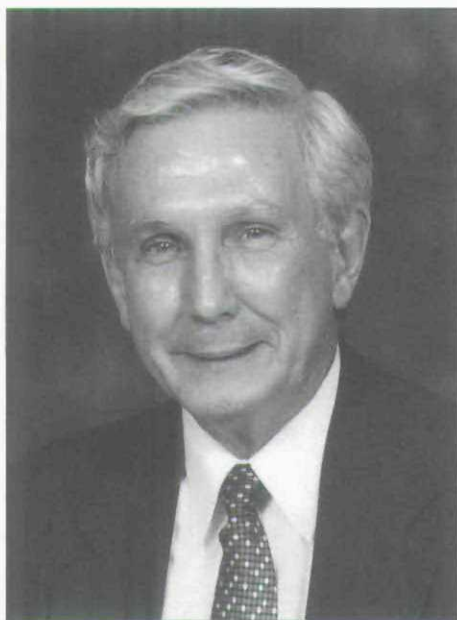
①

determination of actual human exposures to air toxics in urban environments;

②

formulation of studies of human health effects that might be associated with exposure to air toxics, primarily those affecting the respiratory and immune systems.

LETTER FROM THE PRESIDENT AND EXECUTIVE DIRECTOR



Raymond J. Campion, Ph.D.
President

Raymond J. Campion



Alison A. Kerester, J.D.
Executive Director

Alison A. Kerester

The Mickey Leland National Urban Air Toxics Research Center (NUATRC) was incorporated in 1991, and the Board of Directors was selected by the Congressional leadership and the President in late 1994. The NUATRC has now been able to move forward aggressively to fulfill its Congressional mandate.

The NUATRC's role is clear from its Mission Statement – "to carry out sound environmental health research to better understand the potential risks posed to human health by the presence of toxic chemicals in urban air." The major decision reached by the Board and the Center's Scientific Advisory Panel was to define specific research niche areas that are important to the national debate on air toxics public health effects, and which were not being adequately addressed from a research standpoint. This established the NUATRC's dual emphasis on individual personal exposures to air toxics and health effects associated with human respiratory and immune systems.

It is also critical to the NUATRC's mission that results of the existing programs be available through publication in the peer-reviewed literature so that these data can be used in national standard setting and future regulatory development in the next decade. The three major research programs underway in 1998, and our plans to initiate several new research awards in early 1999, should allow the NUATRC to contribute timely input to these developments.

There is no shortage of pressing questions about the health risks posed to the public by air toxics and related atmospheric contaminants. The challenge for the NUATRC is to continue the high quality research standards that have been established, while moving forward with a carefully developed research agenda that maintains our focus on our mission. NUATRC will continue to emphasize research to gather scientific data on air toxics that are relevant to the development of realistic and cost-effective regulations for use by federal and state agencies.

LETTER FROM THE CHAIRMAN OF THE BOARD

In reflecting on this first edition of The Mickey Leland National Urban Air Toxics Research Center's Annual Report, I am both pleased and excited about what it says about our ability to strike out in new directions in addressing key national environmental issues.

The U.S. Congress, in establishing the NUATRC as an environmental research resource to the nation, clearly sought an opportunity to bring together the stakeholders in the debate on the public health effects of air toxics, so that common ground could be established on that issue and a reasonable science-based consensus on the relative health risks could be developed. We believe that a good start has been made in fulfilling that mandate, as evidenced by the growing support for the NUATRC's research agenda among those stakeholders.

The specifics of the Center's progress are carried elsewhere in this report and I will leave to the reader that task. Rather, I choose to focus on the broader issue of whether a private-public environmental health research partnership can succeed in engaging all participants in a constructive research dialogue. That process should eventually lead to more cost-effective government regulations which have broad support in the business community, government and public interest groups.

Whether or not this goal is reached, I am gratified that we have made a good start to this end. Through the fine efforts of the Board's first Chair, Dr. Patricia A. Buffler of the University of California at Berkeley, the NUATRC has succeeded in defining its role in the environmental health research arena. It has required considerable good will and trust from among our corporate sponsors, the U.S. Environmental Protection Agency, members of Congress, the academic research community and the public. The mem-

bers of the NUATRC Board commend the members of its Scientific Advisory Panel for their fine work in developing a research program that is both modest in scope befitting our developmental status, while being directly focused on key air toxics issues.

We are still in a testing stage as to the utility of these research partnerships. We are pleased with this start and we anticipate continued progress and growth through the year 2000.



*James M. Lents, Ph.D.
Chairman of the Board of Directors*

DEVELOPMENT PERIOD: 1992-1995

AIR TOXICS

Hazardous air pollutants (HAPs), commonly referred to as air toxics, are pollutants that cause, or may cause, adverse human health effects or ecosystem damage. The Clean Air Act Amendments of 1990 (1990 CAAA) list 188 pollutants or chemical groups as hazardous air pollutants. Compared to criteria pollutants, which were identified in the 1970 Clean Air Act, information concerning the ambient concentrations and potential health effects of air toxics is relatively sparse. Most of the data on potential human health effects are derived from experimental toxicological data on animals. Enough evidence exists, however, to conclude that air toxics may pose a risk of harmful effects to public health and the environment.

The 1990 CAAA focuses on air pollution source categories (as opposed to individual pollutants) and establishes a two-phased approach for

based emission standards for identified source categories of air toxics. These technology-based standards are generally referred to as "Maximum Achievable Control Technology" (MACT). After application of the MACT standard to a source category, EPA is to determine whether the source continues to emit air toxics at levels that may pose a potential unacceptable risk to human health or the environment. This second phase is referred to as the "residual" risk determination. To provide the data that EPA needs to develop both the MACT and residual risk standards, Congress specified that research should be conducted to investigate the potential human health and environmental effects of air toxics.

THE NATIONAL URBAN AIR TOXICS RESEARCH CENTER

The Mickey Leland National Urban Air Toxics Research Center (NUATRC or the Center) was established under the 1990 CAAA as a

public/private partnership to sponsor research on the human health effects of air toxics in urban communities. NUATRC was incorporated in 1991 and received its initial funding in 1993. A nine-member Board of Directors, appointed by the President, the Senate Majority Leader, and the Speaker of the House of Representatives, governs the Center. Pursuant to the 1990 CAAA the Board of Directors has appointed a 13-member Scientific Advisory Panel (SAP), composed of nationally-recognized environmental and health scientists.

The Scientific Advisory Panel is responsible for developing the specific elements of the Center's peer-reviewed research program. Funding is from both the public and private sectors.



SAP members (l-r) Drs. Jane Koenig, University of Washington, and Arden Pope III, Brigham Young University

controlling HAPs emissions. Under the first phase, the Environmental Protection Agency (EPA or the Agency) is to issue national, technology-



Board member Dr. Marcus Key, Professor Emeritus, University of Texas-Houston Health Science Center

The overriding interest of the Center is to contribute meaningful and relevant data to the scientific literature on the potential human health effects of air

toxics. NUATRC views this contribution as a fundamental component in the national regulatory effort to develop cost-effective and balanced regulations to protect the public health from the potential risks from air toxics.

The Center began the development of its research agenda by reviewing previous and ongoing air toxics research. As a result of this initial review, the Center decided to pursue research activities that would complement those of other scientific organizations. The Center believes that this approach would be the most efficient use of research dollars by generating new types of information, thereby helping to develop a broader understanding of the public health impacts of air toxics in urban communities. Following this approach the Center decided to focus its research on non-cancer health effects, because of the considerable efforts already underway on studies of carcinogenic health effects and the relative paucity of data on non-cancer health effects. The major research efforts of the Center in this development period are summarized below.

PRIORITY AIR TOXICS

One of the first tasks undertaken by the Center was the formulation of a list of priority air toxics for study. This effort paralleled a Clean Air Act mandated study by EPA to identify the 30 most significant air toxics from among the designated 188 air toxics. The Agency is charged with developing regulations to reduce the public

health risk from these hazardous air pollutants. The EPA effort is still in progress, and the Agency anticipates releasing its list in late 1998.

Air Toxics Prioritization Project

NUATRC, utilizing air monitoring data from governmental and private systems, as well as toxic release data from published sources and data from occupational and laboratory animal studies, identified the air toxics most commonly found in urban atmospheres. The Center then developed a preliminary list of air toxics prevalent in urban environments for which primary route of exposure is inhalation. The list consists primarily of volatile organic compounds (VOC) and aldehydes. An internal NUATRC report documented these findings.

ASTHMA AND AIR TOXICS

The increase in asthma morbidity and mortality in urban areas during the previous two decades has resulted in an increased public focus on this disease. The possible association of this asthma "epidemic" with exposure to air toxics led NUATRC to release a Request for Applications (RFA) in 1993 for a comprehensive review and evaluation of the literature dealing with air toxics and asthma.

Literature Review

In August 1993, NUATRC awarded a contract to the University of Cincinnati Medical Center for the study entitled "A Critical Review and Assessment of the Scientific Literature Pertaining to Air Toxics and Asthma," with George Leikauf, Ph.D., as Principal Investigator. The study was to evaluate the information on possible respiratory effects of exposure to certain air toxics. As a result of this literature review, Dr. Leikauf and colleagues identified a group of compounds that appear to have an impact on asthma and respiratory health. However, the researchers concluded



Board members Drs. James Lents, University of California-Riverside, and Patricia Buffler, University of California-Berkeley

that insufficient information on dose-response relationships was available to establish further research directions.

He therefore recommended that future work be focused on the nature and extent of actual human exposures to air toxics. NUATRC published a final project report, "Evaluation of a Possible Association of Urban Air Toxics and Asthma" in 1994.

Asthma Workshop

In February 1994, the Center sponsored a Workshop, "Air Toxics and Asthma: Impacts and Endpoints," which was co-sponsored by the U.S. Environmental Protection Agency, the American Lung Association, the American Lung Association of Texas, and the Society of Toxicology. The Workshop brought together expert faculty of environmental research professionals to review the status of asthma as it relates to environmental exposures, such as air toxics. Dr. George Leikauf presented the preliminary results of the Asthma Study at the Workshop. The presentations of the eight invited speakers and a brief summary were published in *Environmental Health Perspectives* (Volume 103, Supplement 6, September 1995).

PERSONAL EXPOSURE ASSESSMENT

The NUATRC recognized that research into the health effects of air toxics was limited by the lack of adequate technology for estimating individual personal exposures to air toxics. Personal exposure levels are a fundamental component of any effective community air toxics health effects study. Therefore, the Center decided to pursue the development of data on personal exposure to air toxics. Accordingly, the Center developed plans for a feasibility study to evaluate the use of individual samplers for community studies of personal exposure to certain air toxics.

Methods Development

In 1994, NUATRC awarded a contract to The University of Texas-Houston School of Public Health, with Drs. Thomas Stock and Maria Morandi as Principal Investigators, for the study, "A Methods Development Project for a Study of Personal Exposures to Toxic Air Pollutants." The Houston area was chosen for the project because of the availability of ambient air toxics data from State and private networks, the availability of Toxic Release Inventory data, and the presence of a large complex of chemical and petroleum manufacturing facilities in the area. The first phase of the project involved determining the detection levels of these badges for a number of air toxic compounds, primarily VOCs and aldehydes. The investigators developed laboratory procedures for the analysis of low-level samples collected during 24 to 48 hour periods. Candidate monitors for measuring each group of compounds were evaluated and tested before devices are chosen for the study. The results of this work were published as a Center report, "Study of Personal Exposures to Toxic Air Pollutants. Part I, Feasibility Study: Laboratory Evaluation and Field Method Comparison Study" in 1995.

BIOMARKERS

One research area that NUATRC investigated initially, but ultimately chose not to pursue, was the development of biomarkers in air toxics health studies. As part of its investigation of the state of the potential application of biomarkers as indicators of human health effects from environmental exposures, the Center convened a major scientific symposium.

Biomarkers Symposium

On April 27-28, 1995, the Symposium entitled "Biomarkers in Environmental Applications, a Symposium on Air Toxics," was held in Houston. It was sponsored by the Center and co-sponsored by the National Center for Environmental Health at the Centers for Disease Control and Prevention, National Institute of Environmental Health Sciences, Society of Toxicology and the U.S. Environmental Protection Agency. The 21 invited speakers were asked to address the applicability of existing biomarker technology to a list of air toxics, which represented a subgroup of the 188 air toxics identified in the 1990 CAAA.

Symposium Working Groups were asked to address specific air toxics that might be incorporated into future studies and they presented summaries of their recommendations to all Symposium participants. Symposium participants concluded that currently, insufficient methods exist for identifying the biomarkers for exposure to air toxics, were unlikely to be developed in the near future, and that the necessary research would be extremely expensive. Based on these results, Symposium participants recommended that NUATRC delay any biomarker research until such time as the field was more sufficiently developed. However, the participants noted that the exercise in evaluating the current state of biomarker research was an extremely

useful one to the scientific community. Based on these recommendations, the Center decided to delay biomarker research. Symposium presentations and Working Group recommendations were published in the report "Air Toxics: Biomarkers in Environmental Applications," published in *Environmental Health Perspectives* (Volume 104, Supplement 5, October 1996).

STRATEGIC RESEARCH PLAN

In late 1994, NUATRC prepared a "Strategic Research Plan: 1996-2000." The Strategic Research Plan is designed to implement the following research goals of the Center:

- To foster a broader understanding of the actual research needs and the development of improved research designs.
- To encourage cooperation among stakeholders.
- To effectively leverage private and public funding in creating a cost-effective research program; and
- To increase the involvement of interested communities, including the public health community, in these studies.



Board member Dr. Gerald van Belle, University of Washington

The major elements of the Strategic Plan are Ambient Air Toxics, Community Air Toxics Monitoring, Indoor/Personal Monitoring, Health Effects; and Human Health Risk Assessment. The Center intends the Strategic Plan to be a working document that will be reviewed and updated on an annual basis to reflect ongoing research advances.

THE YEARS 1996 AND 1997 IN REVIEW



(from l-r) Director of Research Dr. Andrij Holian, University of Texas Medical School, SAP members Drs. Arden Pope III, Brigham Young University, and Annette Guiseppe-Elie, Exxon Biomedical Sciences, Inc.

RESEARCH PRIORITIES

In early 1996, the NUATRC's Scientific Advisory Panel set two major research priorities for implementing the Center's Strategic Research Plan. The first was to continue the ongoing work being supported by the Center on personal exposure assessment, and to widen the scope of this effort by developing research projects that would expand our understanding of personal exposures to certain air toxics in communities. The second was to investigate the properties of air toxics on particles, especially metals, and their potential human health effects.

PERSONAL EXPOSURE ASSESSMENT

Methods Development

Continuation of the initial Methods Development Project, based on the performance of personal exposure monitors, was a high priority

for the Center. In expanding on the personal exposure work, the Center awarded another contract to the University of Texas researchers to test the personal exposure monitors in both the field and in a community setting.

In the field, VOC badges were co-located with existing monitoring equipment under typical ambient conditions and their measurement performance was evaluated over a period of several months against standard air monitoring technology. Later, a pilot study was conducted to investigate personal, indoor, and outdoor exposures to VOCs in a community setting. Two groups of volunteers, one residing in an urban area in close proximity to known sources of VOCs and the other residing in an urban area considered to be relatively free of VOC sources, participated in a pilot test of the feasibility of using the monitors to determine VOC exposures over short-term periods.



SAP members Drs. Meryl Karol, University of Pittsburgh, and David Warheit, DuPont Haskell Laboratory

The work was successfully completed in 1997, and the final report, "Personal Exposures to Toxic Air Pollutants," was published by the Center in February 1998. Manuscripts describing this work have also been submitted for publication to the peer-reviewed literature.

National Survey of Personal Exposures to Volatile Organic Compounds

In early 1996, the Center submitted a project proposal to the National Center for Health Statistics for inclusion in the Fourth National Health and Nutrition Examination Survey (NHANES IV). The national survey, scheduled to begin data collection in 1999, will gather information via household interviews and standardized physical examinations about the prevalence of selected health conditions among the U.S. population. The Center's component of the overall project will measure personal exposures to VOCs for the Phase I period (1999-2002).

The VOC Project, "A Study of Personal Exposure to Air Toxics Among a Subset of the Residential U.S. Population," is designed to characterize the distribution of short-term personal exposures to VOCs in a group of 1000 individuals, a representative subset of the NHANES population. Personal exposure estimates will be obtained for 48-hour periods, using passive personal exposure monitors. This collaborative study will make it possible to examine the relationships between personal exposure to VOCs and various demographic, economic, and behavioral characteristics

identified by the NHANES survey. In addition, this collaboration will provide an opportunity to correlate personal exposure data with health status data obtained by NHANES.

Workshop on Personal Exposure/Health Effects of Air Toxics

In April 1997, the NUATRC sponsored a Workshop in Reston, Virginia to identify and prioritize significant research needs concerning air toxics risk assessment. The specific goals of the Workshop were to bring together scientists with diverse backgrounds to discuss key questions regarding air toxics and to arrive at clear definitions of what is known, what are the highest priority areas to pursue, and what tools might be used or developed to achieve these goals. The Center anticipated that the outcome of the Workshop would provide topics for future research and symposia dealing with the public health risks associated with air toxics.

Discussions in this Workshop were framed around the broad areas of "Air Toxics Research and Policy Directions," "Personal Exposure Assessment Research," and "Air Toxics Health Research and Risk Assessment." The Workshop participants identified the following key future research areas: (1) the continued work on the assessment of personal exposure to classes of air toxics; (2) studies of the relationships between ambient levels/sources of air toxics and personal exposures; (3) development of appropriate screening strategies for the selection of air toxics for study; (4) development of measurement technologies for reactive air toxics and closure of data gaps; and (5) investigation of potential mechanisms by which air toxics may contribute to human disease. A summary of the presentations and recommendations of the Workshop participants, "Personal Exposure/Health Effects of Air Toxics," was published by the NUATRC in 1997.

Personal Exposures to Air Toxics in Urban Environments

The Center's most extensive research effort was launched with the release of RFA 96-01, developed to expand the knowledge of personal exposures to selected groups of VOCs, aldehydes, and metals among urban populations in various geographic areas. With the feasibility of obtaining estimates of individual exposures through the use of personal exposure badges having been demonstrated, researchers were challenged to use the technology to gather exposure data on residential populations. The Center also focused this research effort on developing a better understanding of the relative importance of indoor and outdoor environments on personal exposure. In addition, for outdoor air toxics, it was anticipated that useful data could be obtained by apportioning air toxics effects identified in the studies to point sources, area sources and/or mobile sources in their communities.

Two awards were made in 1996 for multi-year studies. One study is being directed by Principal Investigator Dr. Clifford Weisel at the Environmental & Occupational Health Sciences Institute (EOHSI), in New Jersey. The second study is being conducted by investigators at Columbia University School of Public Health, New York, with Dr. Patrick Kinney as Principal Investigator.

TOXIC METALS

By 1996, the Center was considering another important class of air toxics--metals--and their potential human health effects. Early in 1996, the Center's Scientific Advisory Panel was briefed on the results of a preliminary report on known or suspected health effects of the following air toxics metals: arsenic, beryllium, cadmium, cobalt, chromium, lead, manganese, mercury, nickel, selenium, and vanadium.



SAP member Dr. John Vandenberg, U.S. EPA - NHEERL

In line with its strategic goals, the health effects associated with metals that are of primary interest to the Center are those related to the respiratory and immune systems. Presently, there is no conclusive evidence that air toxics metals at environmental concentrations are the primary cause of either respiratory or immune system effects. However, there is concern that they may exacerbate existing cases of these illnesses.

There continues to be considerable public interest in the health effects of airborne particulate matter, since these fine particles can penetrate to the deepest parts of the lung, and deposit in the alveolar spaces where greatest injury can occur. Because an association between fine particles and certain air toxics has been recognized for some time, in 1997, the Center narrowed its focus on toxic metals to those that are associated with fine particles.

In developing plans for future studies, the Center's Scientific Advisory Panel recommended two new research areas where work was needed to gain a better understanding of the risks posed by air toxics metals. The first investigation was targeted at potential health effects of these air toxics metals, either individually or in combinations. The SAP members also recognized that the lack of a lightweight, portable measuring device for estimating individual exposures to fine particles could continue to hamper efforts by researchers to obtain personal exposure data needed for health effects studies. The need for such technology was also identified during the Center's Workshop on Personal Exposures/Air Toxics.

CURRENT ACTIVITIES - 1998

ONGOING RESEARCH

Air Toxics in Urban Environments

The two studies presently in progress on the potential health effects of toxics in urban environments are being conducted by investigators at the Environmental and Occupational Health Sciences Institute (EOHSI) and Columbia University. Pilot studies were initiated in mid-1998. After review of these pilot study results, the comprehensive research studies will begin in early 1999.

The research at the Columbia University School of Public Health, directed by Dr. Patrick Kinney, will be carried out in New York City and Los Angeles, with the primary focus on personal exposures to urban air toxics among groups of students in each city. The study will provide information on the roles of seasons and days of the week, varied meteorologic conditions and daily activities on personal exposures to VOCs, aldehydes and metals on particles. Source apportionment among area, point and mobile sources will be investigated. Exposure measurements will be made in indoor, outdoor and personal environments.

The EOHSI Study, under the direction of Dr. Clifford Weisel, will gather data on personal exposures to urban air toxics for residents of 100 homes in urban areas in New Jersey, California, and Texas. One of the major objectives of the study is to estimate the fraction that outdoor sources contribute to indoor and personal air concentrations of VOCs, aldehydes, and respirable particulate matter in these geographic areas. Investigators will also attempt to demonstrate the importance of residential air exchange rates, in conjunction with outdoor air concentrations, in estimating indoor and personal exposures to these air toxics. Source apportionment will be included in this assessment.

In order to expand the data collection plans for the studies, efforts are being made by the Leland Center and investigators at both institutions to secure additional funding from other agencies or institutes. If this leveraging of funds is successful, the scope of these studies could be increased substantially.



*NUATRC Advisor Brenda Gehan, SAP member
Dr. Neil C. Hawkins, Dow Chemical Company*

NHANES VOC STUDY

The NUATRC's VOC Project, in collaboration with the National Health and Nutrition Examination Study (NHANES IV), was initiated with a pilot study during the summer of 1998. After review of pilot study results, and a "dress rehearsal" in late 1998, the NHANES study will begin full data collection activities in March 1999.

Requests for Proposals have been announced by the Center to identify expert researchers who will perform laboratory analyses and epidemiologic data analyses for the VOC Project under contracts with the Center. The Center anticipates selecting the researchers in late 1998.



(from l-r) SAP members Dr. Mary Jane Selgrade, U.S. EPA - NHEERL, NUATRC Advisor Brenda Geban, Director of Research Dr. Andrij Holian

RESEARCH PLANNING

Air-Toxic Metals and Human Health Effects

The continuing national scientific emphasis on the potential association between air toxic metals in fine particulate matter and human health effects has resulted in the Center's developing additional research studies in these areas. In mid-1998, the Center released a Request for Applications to investigate whether air toxic metals present in ambient fine particles play a role in the observed increase in human morbidity and mortality believed to be associated with particulate exposure. The metals of interest are those listed as toxics in the 1990 CAAA. Specific issues to be studied include whether the toxic metals present in fine particulate contribute to the development or cause the exacerbation of adverse respiratory, immune, or cardiovascular system health effects in susceptible populations.

Personal Monitoring Devices for Fine Particulate Matter

Related to health effects of toxic metals, there is a need for improved monitoring devices that can be used to measure personal exposures to fine particulate matter. Existing devices are bulky, expensive, and difficult to use in community settings. The NUATRC, in an effort to advance the knowledge of personal exposures to air toxic metals on fine particles, announced a Request for Applications for the development of a personal monitoring device for these fine particles. The development of an accurate, low-cost and user-friendly personal monitoring device will facilitate the design of studies of health effects of air toxics metals in large populations.

In addition to requiring that new personal monitoring devices be lightweight and unobtrusive, the Center has stipulated that these devices should also allow separation of particles by size, and should be suitable for chemical analysis of toxic metals. The Center has challenged researchers to design a device to sample short-term exposures. Time periods of 24-48 hours are the most convenient for population studies. These specifications are consistent with those used in the prior personal exposure development work on VOCs and aldehydes sponsored by the NUATRC.

Small Grants Program

The NUATRC has introduced a new Small Grants Program in 1998. This program will support projects that are community-oriented, and projects that are developed by new investigators will receive special consideration. Through the program, young investigators will be encouraged to focus on local environmental health issues, and smaller institutions, many in urban areas, can become better scientific resources for their communities.

The Small Grants Program shares the overall goals of NUATRC's research program, which are to identify and address health risks associated with air toxics. The approach in this program is to support investigators in developing and conducting short-term projects dealing with health effects of air toxics, such as pilot projects, projects that test new techniques, or innovative, high-risk projects that could serve as a basis for more extended research. The program will award grants for two-year periods, with the possibility of extension for a third year.

PARTICIPATION IN ISEE/ISEA JOINT CONFERENCE

In August 1998, the Center participated in the joint meeting of the International Society of Environmental Epidemiology and the International Society for Exposure Assessment (ISEE/ISEA) in Boston, Massachusetts. The Center hosted a Symposium on Air Toxic Metal Health Risks in the Urban Community. Four speakers delivered presentations designed to establish a better understanding of the actual health risks posed to urban populations by the presence of air toxic metals in the atmosphere.

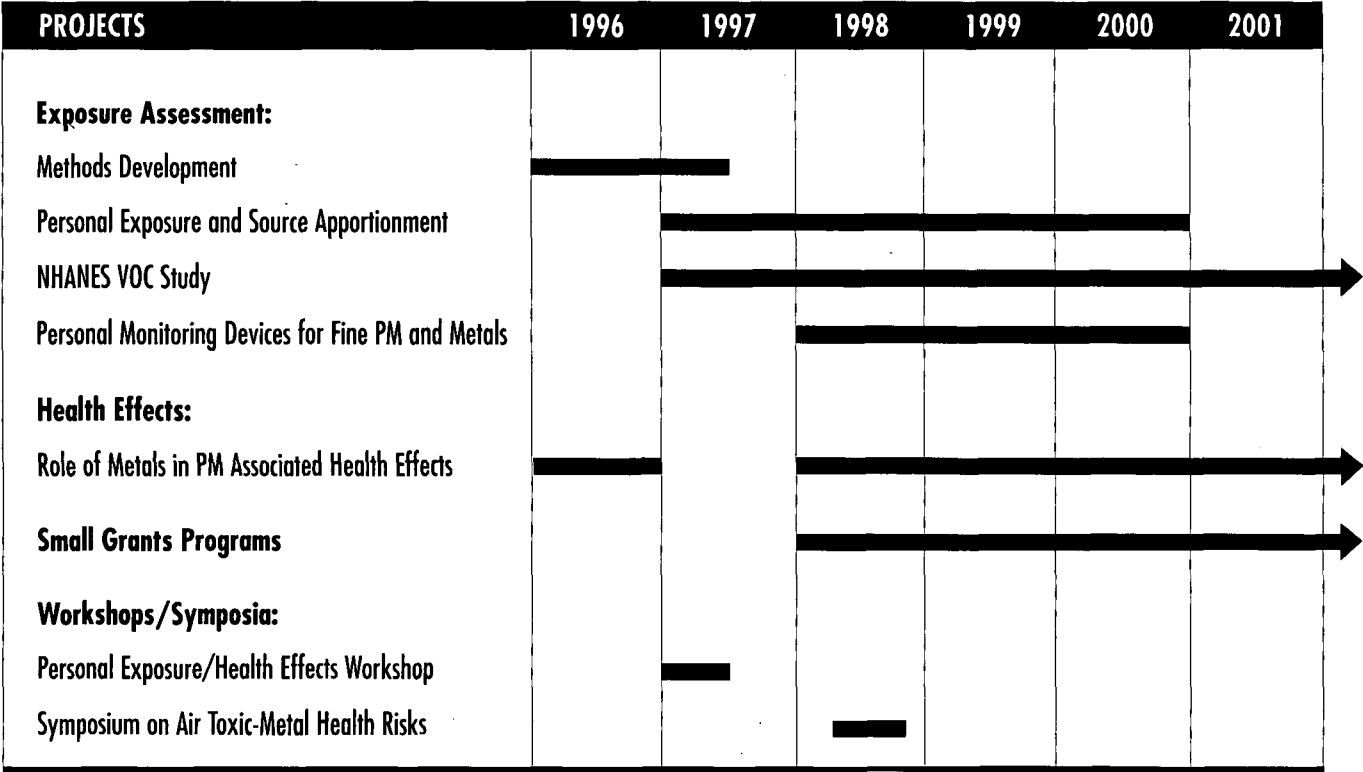
FUTURE RESEARCH EMPHASIS

During its first five years, the Leland Center has relied upon an active Board of Directors and committed Scientific Advisory Panel to establish

a presence for the Center within the environmental health research community.

A research planning process has been formulated, responsibilities have been clarified, and, most significantly, a focused and relevant research program has been initiated. The Center's research agenda has been coordinated with that of EPA, and linkages with both private industry and academic scientists have provided useful input. The overriding emphasis in the Center's research program is to obtain meaningful data that are applicable to the emerging government regulatory program, i.e., information that can be used directly in developing cost-effective and balanced environmental regulations. Over the next few years, the Center will strive to build on these programs and continue to improve our knowledge of the spectrum of exposures to air toxics that affect populations, and thus help define the public health risks associated with air toxics.

NUATRC Research Timeline



Legend: ██████ Research Development Phase
 ██████ Contract Research Phase

FINANCIAL REPORT FOR 1996 AND 1997

In 1991, The Mickey Leland National Urban Air Toxics Research Center was incorporated under the Texas Nonprofit Corporations Act. In 1992 it received its initial funding from private sector sources, and in early 1993, the first federal grant monies became available, allowing operations to begin. The Center is exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code and is classified as a public charity under Section 509(a)(1) and Section 170(b)(1)(A)(vi).

The Leland Center is a public-private partnership where public funds are leveraged by donations from private sources. Both government and private sector management officials may, under this arrangement, jointly fund a research agenda that meets their objectives of investigating and documenting the risks to public health posed by air toxics.

Support for the Center has consisted of grants from the EPA and contributions from private sector corporations. Awards from the EPA have ranged from the initial award of \$300,000 to a 1997 award in the amount of \$1.1 million. During the 1992-1997 period, EPA grants support totaled nearly \$3 million. Contributions from the private sector have increased over the same period, and the number of contributors has continued to increase as well.

The Center has been successful in keeping operating costs low by contracting with The University of Texas-Houston Health Science

Center for office space and administrative services at their facilities at the Texas Medical Center. The NUATRC also contracts with The University of Texas for its staff, all of whom are employees of The University of Texas, while devoting 100% of their time to NUATRC activities. The Center utilizes expert consultants from Texas Medical Center organizations. This arrangement is advantageous to the Center in that the facilities of the Texas Medical Center are available to Center staff. Office equipment is purchased and maintained by the NUATRC.

The list of NUATRC Corporate Contributors includes companies that have provided support continuously or intermittently over the period 1992-1997. The Center continues to seek additional corporate supporters to provide greater breadth to the research program.

Plans are under way in 1998 for the formation of a Development Committee composed of Board members and corporate executives. As the research program has expanded and as new areas of research interest are being identified, additional sources of funding will be needed. New contacts will be sought among industries and trade organizations, as well as private foundations. State regulatory agencies are a potential source of "in-kind" assistance as collaborators for projects where monitoring data and/or analytical services are required.

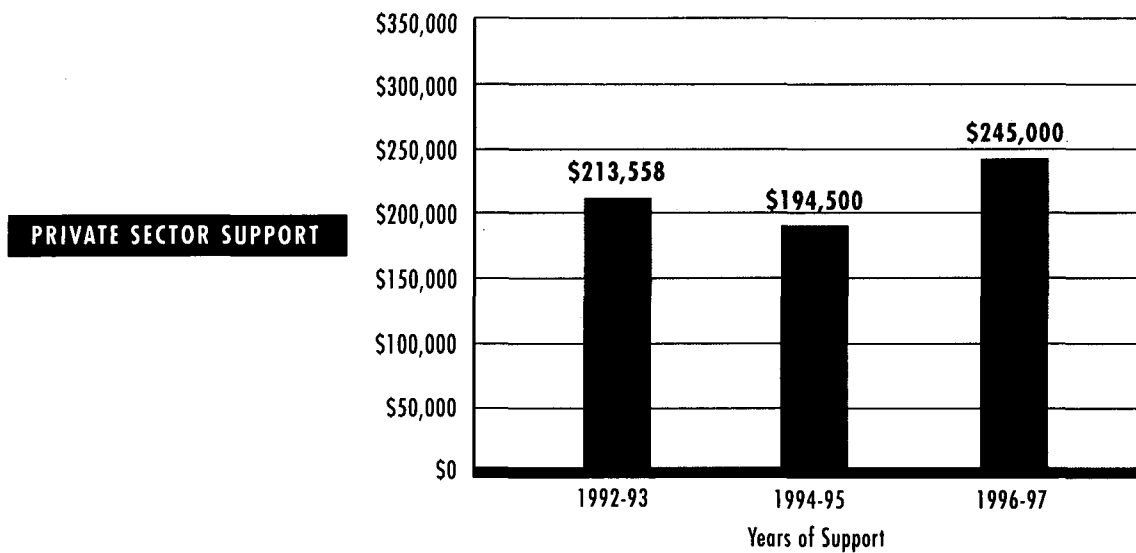
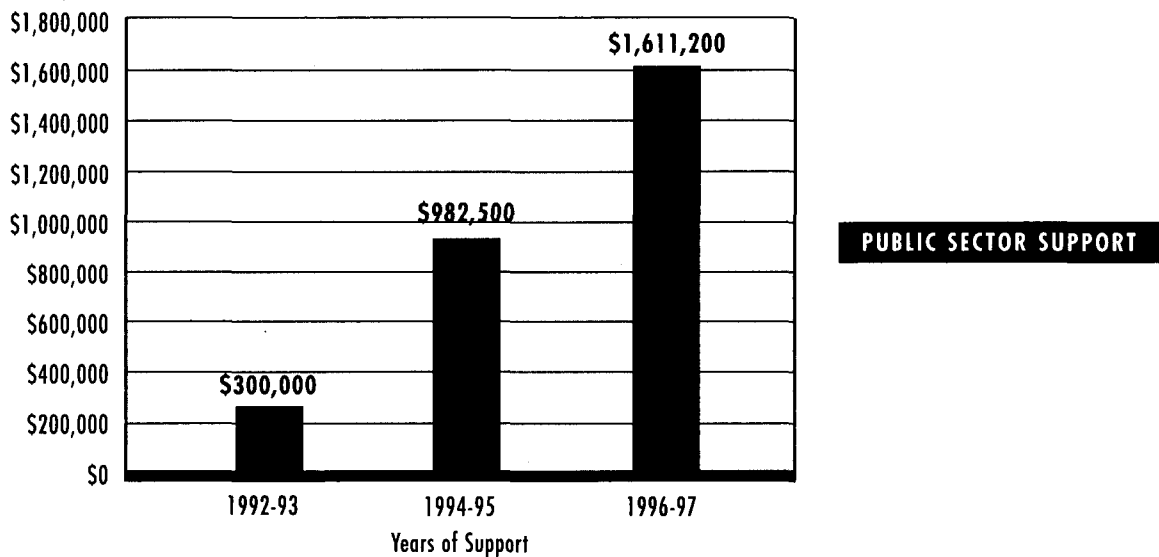
NUATRC Corporate Contributors**SUSTAINING SUPPORTERS**

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Mobil Oil Corporation
Texaco Foundation
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Monsanto Company
Phillips Petroleum Corporation
Rohm & Haas Company
Shell Foundation
Sun Company
Texas Eastman Company
Westlake Polymers Corporation

Contributions for 1992-97 from the Private and Public Sectors



Mickey Leland National Urban Air Toxics Research Center

STATEMENT OF FINANCIAL POSITION

for the Years Ended December 31, 1997 and 1996

Assets	1997	1996
Cash and Cash Equivalents	\$ 166,673	\$ 176,732
Federal Grants Receivable and Other Contributions	96,021	267,720
Fixed and Other Assets	14,361	9,378
Total Assets	\$ 277,055	\$ 453,830
Liabilities		
Accounts Payable and Accrued Liabilities	\$ 98,553	\$ 286,538
Unrestricted Net Assets	178,502	167,292
Total Liabilities	\$ 277,055	\$ 453,830

STATEMENT OF ACTIVITY

for the Years Ended December 31, 1997, and 1996

Revenue		
Federal Grants	\$ 441,589	\$ 320,440
Private Sector Contributions	85,000	160,000
Other Revenue	2,390	2,871
Total Revenue	\$ 528,979	\$ 483,311
Scientific Program Expenses		
Research contracts	\$ 49,026	\$ 61,614
Scientific consultants	20,323	15,327
Other research related expenses	114,111	64,806
General and Administrative Expenses	\$ 334,308	\$ 305,226
Total Program, General and Administrative Expenses	\$ 517,768	\$ 446,973
Change in Net Assets Unrestricted	\$ 11,211	\$ 36,338

Financial Audits of the Mickey Leland National Urban Air Toxics Research Center have been conducted by the firm of Blazek & Vetterling of Houston, Texas. Copies of recent Auditor's Reports may be requested by contacting the NUATRC offices, at P. O. Box 20286, Houston, Texas 77225-0286.

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GEORGE THOMAS "MICKEY" LELAND

U.S. Representative George Thomas "Mickey" Leland (D-TX) was an effective and involved advocate and spokesman for community interests. While most recognized for his international work to alleviate hunger, he also focused his attention on public health issues and rallied support for both public and private sector actions to address risks posed to the community. His Congressional district in Houston bordered on areas with high densities of oil and petrochemical facilities and many of his constituents worked in these plants. Thus he was keenly sensitive to the socio-economic aspects of environmental laws and regulations, while still being vitally interested in the occupational and public health concerns of his constituents. Rep. Leland was a prominent participant in the Clean Air Act Amendment debates of 1988-89, while serving on the House Commerce Committee subcommittee on Health and Environment, and actually introduced the amendment that was eventually incorporated in the legislation to establish the National Urban Air Toxics Research Center.

Rep. Leland was killed in a plane crash in Ethiopia in 1989, while on a mission to provide life-sustaining food and supplies to refugees fleeing civil strife in that area. Congress named the NUATRC after Rep. Leland following his death.



The Mickey Leland National Urban
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Authorized by Clean Air Act Amendments of 1990 (Title III, Section 301(p))