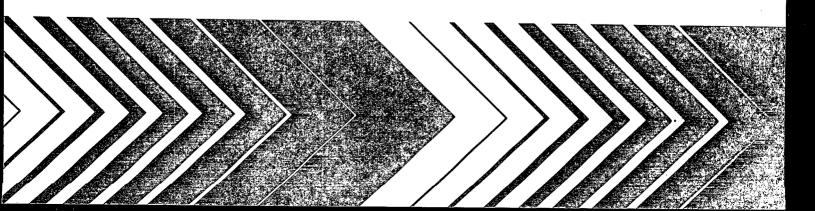
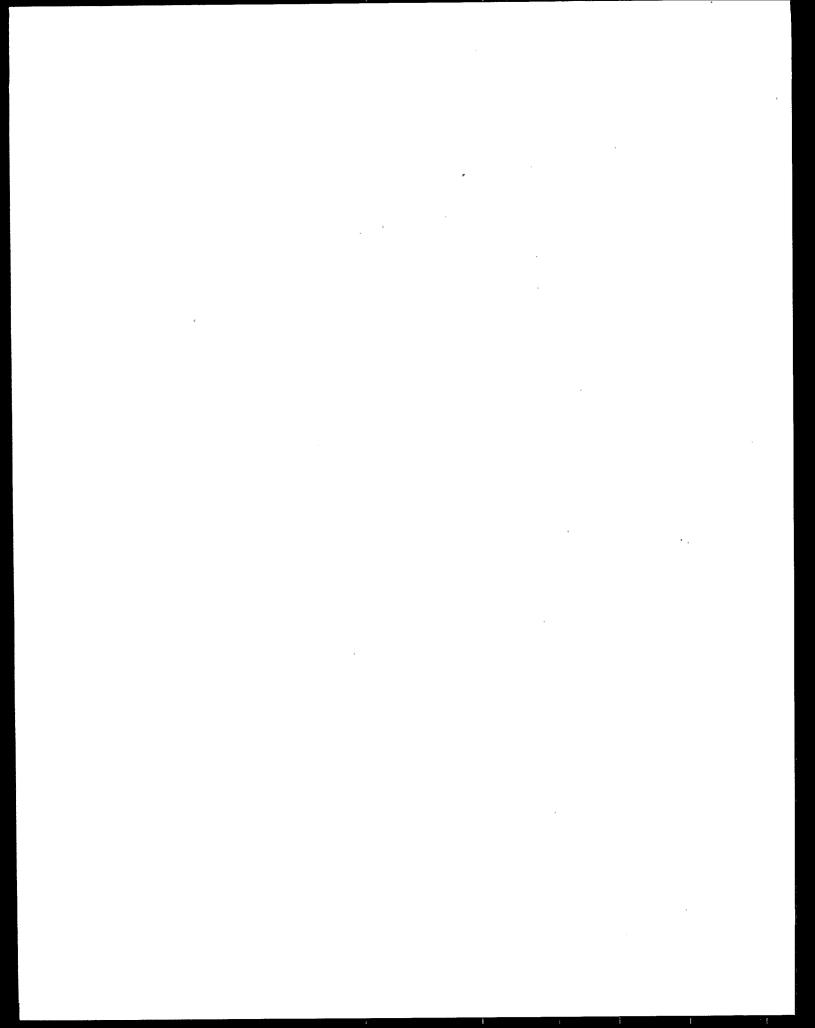


Indoor Air-Assessment

An Inventory of Indoor Air Quality Research in the United States: 1989-1990





INDOOR AIR - ASSESSMENT AN INVENTORY OF INDOOR AIR QUALITY RESEARCH IN THE UNITED STATES: 1989-1990

ENVIRONMENTAL CRITERIA AND ASSESSMENT OFFICE OFFICE OF HEALTH AND ENVIRONMENTAL ASSESSMENT OFFICE OF RESEARCH AND DEVELOPMENT U.S. ENVIRONMENTAL PROTECTION AGENCY RESEARCH TRIANGLE PARK, NC 27111



DISCLAIMER

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PREFACE

In October 1986 Congress passed the Superfund Amendments and Reauthorization Act (SARA, PL 99-499) that includes Title IV—The Radon Gas and Indoor Air Quality Research Act. The Act directs that EPA undertake a comprehensive indoor air research program.

Research program requirements under Superfund Title IV are specific. They include identifying, characterizing, and monitoring (measuring) the sources and levels of indoor air pollution; developing instruments for indoor air quality data collection; and studying high risk building types. The statute also requires research directed at identifying effects of indoor air pollution on human health. In the area of mitigation and control the following are required: development of measures to prevent or abate indoor air pollution, demonstration of methods to reduce or eliminate indoor air pollution, development of methods to assess the potential for contamination of new construction from soil gas, and examination of design measures for preventing indoor air pollution. EPA's indoor air research program is designed to be responsive in every way to the legislation.

In responding to the requirements of Title IV of the Superfund Amendments, EPA's Office of Research and Development has organized the Indoor Air Research Program around the following categories of research: (A) Sources of Indoor Air Pollution, (B) Building Diagnosis and Measurement Methods, (C) Health Effects, (D) Exposure and Risk (Health Impact) Assessment, and (E) Building Systems and Indoor Air Quality Control Options.

EPA is directed to undertake this comprehensive research and development effort not only through in-house work but also in coordination with other Federal agencies, state and local governments, and private sector organizations having an interest in indoor air pollution.

The ultimate goal of SARA Title IV is the dissemination of information to the public. This activity includes the publication of scientific and technical reports in the areas described above. To support these research activities and other interests as well, EPA publishes its results in the INDOOR AIR report series. This series consists of five subject categories: Sources, Measurement, Health, Assessment, and Control. Each report is printed in a limited quantity. Copies may be ordered while supplies last from:

U.S. Environmental Protection Agency Center for Environmental Research Information 26 West Martin Luther King Drive Cincinnati, OH 45268

When EPA supplies are depleted, copies may be ordered from:

National Technical Information Service U.S. Department of Commerce 5285 Port Royal Road Springfield, VA 22161

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ABSTRACT

A survey of indoor air quality (IAQ) research projects in the United States was undertaken using a standard form and keyword list. In response to the request for participation, 134 completed forms were received from 97 principal investigators at 32 institutions. Universities had the largest number of IAQ research projects (23), followed by EPA (20), other Federal agencies (19), states (18), national laboratories (15), and private research organizations (13). The results of this inventory will provide EPA and NATO's Committee on the Challenges of Modern Society with information on the current directions and funding levels of IAQ research in the United States. Although this information is preliminary, it can be useful to EPA in planning future research.

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AUTHORS, CONTRIBUTORS, AND REVIEWERS

This report was written by Dr. Terrence Pierson and Ms. Dana Greenwood, Research Triangle Institute. The Indoor Air Quality Research Inventory was conducted under the technical direction of Dr. Michael Berry (EPA/ECAO). Others providing technical input and review include Norman Childs (EPA/ECAO), Dr. Kevin Teichman (EPA/Office of Research and Development), and Dr. Berndt Seifert (Institute for Water, Soil, and Air Hygiene, Federal Republic of Germany). Reviewers were Drs. Hugh McKinnon, Michael Dourson, and Anne Sergeant, Office of Health and Environmental Assessment.

EXECUTIVE SUMMARY

The North Atlantic Treaty Organization's Committee for Challenges of Modern Society (NATO-CCMS) initiated a Pilot Indoor Air Quality Study in 1988. In conjunction with the CCMS Pilot Study an inventory of ongoing research projects in indoor air quality was conducted by the Commission of European Countries (CEC). This program, Cost 613 Indoor Air Quality and its Impact on Man, developed the COST 613 form and a keyword list to inventory ongoing indoor air quality research projects in all CEC countries. To conduct a similar inventory in the United States, a package of materials was assembled which included the COST 613 form and the keyword list developed for the CEC inventory, a letter requesting voluntary participation in the inventory, and a set of completed COST 613 forms as examples. The packages of materials were mailed in late January and early February of 1990 to 160 individuals who were identified as likely to be conducting or sponsoring research in the field of indoor air quality. In response to the request for participation, 134 completed Cost 613 forms were received from 97 principal investigators located at 32 institutions. It is likely that some indoor air quality research projects may not have been captured by this voluntary request, especially those being conducted by Federal agencies other than EPA, universities, and private research organizations. In addition, some of the EPA program offices which are also conducting indoor air quality projects may not have been captured by this inventory. Of particular note is the absence of radon and asbestos projects that are being conducted through EPA program offices and not as part of the Agency's indoor air research program.

Universities show the largest number of indoor air quality research projects (23) followed by EPA (20), other Federal agencies (18), states (18), national laboratories (15), and private research organizations (12). Although some of the projects being conducted at universities are likely to be funded, at least in part, by one or more of the other institutional categories, no projects were reported by both the funding source institution and a university. Among Federal agencies other than EPA, the National Institute for Occupational Safety and Health and the Department of Energy account for most of the reported projects.

The results of this inventory provide the EPA and the NATO-CCMS with current information on the directions of indoor air quality research in the United States, the funding

levels of the projects, and the institutions conducting this research. Although this information is very preliminary, it can be useful to EPA in planning a future research program as required by the 1989 EPA Report to Congress on Indoor Air Quality. The CCMS Indoor Air Quality Pilot Study can also benefit from this information by identifying research areas being addressed and specific researchers conducting work in a specific area. The inventory also provides information on research topics that are not being adequately addressed. EPA may consider combining these preliminary results with other indoor air quality research summaries evolving from other sources, thereby increasing the scope of the survey.

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INTRODUCTION

The North Atlantic Treaty Organization's Committee for Challenges of Modern Society (NATO-CCMS) initiated a Pilot Indoor Air Quality Study in 1988. The Pilot Study drew support from all member countries and 14 actively participated. Italy and the United States were designated as lead countries for this study. The general program of the Pilot Study approved by the CCMS mainly focuses on collection and presentation of the state-of-the-art methods and strategies for prevention and mitigation of indoor air pollution (Maroni, 1989a). The CCMS has attempted to gain an awareness of programs related to indoor air quality in other national and international agencies and organizations. One such program is an inventory of ongoing research projects in indoor air quality conducted by the Commission of European Countries (CEC). This program, Cost 613 Indoor Air Quality and its Impact on Man, developed and used the COST 613 forms to inventory ongoing indoor air research projects in CEC countries. These same forms were circulated to all national delegates of the CCMS for distribution to institutions and scientists within their respective countries (Maroni, 1989b).

This report presents the results of an inventory of indoor air quality (IAQ) research currently being conducted in the United States. This inventory was initiated by Dr. Michael Berry of the U.S. Environmental Protection Agency's Environmental Criteria and Assessment Office. The inventory follows the same methodology as that used by CEC and thus provides information that can be compared directly with the CEC inventory.

METHODOLOGY

To conduct the inventory, a package of materials was assembled which included the COST 613 forms (Maroni, 1989b) and the keyword list (Seifert, 1989) developed for the CEC inventory, a letter requesting voluntary participation in the inventory, and a set of completed COST 613 forms as examples. The COST 613 form is shown in Figure 1 and the keyword list developed for the CEC inventory is shown in Appendix A.

The packages of materials were mailed in late January and early February of 1990 to 160 individuals who were identified as likely to be conducting or sponsoring research in the field of indoor air quality. The mailing list included representatives from various U.S. EPA research offices, the indoor air quality coordinator in each of the other Federal agencies conducting indoor air quality research, at least one representative from each state or territorial government identified from the *Directory of State Indoor Air Contacts* (U.S. Environmental Protection Agency, 1988) as individuals responsible for research or regulatory programs, and other individuals identified from recent literature and conference proceedings on indoor air quality and from the listing of representatives on indoor air quality committees (Air & Waste Management Association, 1989). The latter list was successful in identifying representatives from research programs at national laboratories, private research organizations, and university-based research programs.

In response to the request for participation, 134 completed Cost 613 forms were received from 97 principal investigators located at 32 institutions. Additional forms were received for projects completed prior to 1989-1990, but these projects have not been included in this report. A number of recipients of the inventory materials responded that no projects were being conducted or sponsored under their supervision. The overall response rate for this voluntary inventory was approximately 50 percent. The largest number of nonrespondents was from state agencies. It is likely that most of the state agencies conducting indoor air quality research responded to this inventory request.

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Keywords (see attached list)	en en la la companya de la companya		
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Figure 1. Form of the Cost 613 Inventory of indoor air research. "Indoor Air Quality and Its Impact on Man" (Cost 613) project inventory

FINDINGS

INSTITUTIONS CONDUCTING IAQ RESEARCH

Respondents to the inventory have been grouped into the following six institutional categories:

- U.S. Environmental Protection Agency (EPA/E)
- Other U.S. Federal Agencies (Federal/F)
- National Laboratories (Nat'l. Labs/N)
- Private Research Organizations (Private/P)
- Universities (U)
- States (S)

Table 1 provides a listing of each of the institutions, Federal agencies, and EPA offices who responded to this inventory grouped by institutional categories. A number of EPA research offices are shown in Table 1; however, some of the EPA program offices which may also be conducting indoor air quality projects have not been captured by this inventory. Of particular note is the absence of radon and asbestos projects that are being conducted through EPA program offices and not as part of the Agency's indoor air research program. A list of respondents, the titles of their projects, the annual funding level, and the anticipated completion date organized according to the institutional categories is provided in Appendix B. The number of projects reported for each of the institutional categories is shown in Figure 2. Universities show the largest number of projects (23) followed by EPA (20), other Federal agencies (18), states (18), national laboratories (15), and private research organizations (12). Although some of the projects being conducted at universities are likely to be funded, at least in part, by one or more of the other institutional categories, no projects were reported by both the funding source institution and a university. Among Federal agencies other than EPA, the National Institute for Occupational Safety and Health and the Department of Energy account for most of the reported projects, seven and six respectively. Among states, the largest number of projects was reported by California (11). Most of the other states reported only one or several ongoing projects. Among national laboratories, the largest number of projects was reported by the Lawrence Berkeley Laboratory (13). The Gas

TABLE 1. INSTITUTIONS RESPONDING TO IAQ RESEARCH INVENTORY, BY INSTITUTIONAL CATEGORY

Institutional Category	Responding Institutions
U.S. Environmental Protection Agency	Air and Energy Engineering Research Laboratory, Atmospheric Research and Exposure Assessment Laboratory Environmental Criteria and Assessment Office Health Effects Research Laboratory
Other Federal Agencies	National Aeronautics and Space Administration, National Institute for Occupational Safety and Health, National Institute of Standards and Technology, U.S. Department of Energy, U.S. Department of Housing and Urban Development, U.S. Department of Transportation
National Laboratories	Argonne National Laboratory, Lawrence Berkeley Laboratory, Lawrence Livermore National Laboratory
Private Research Institutions	Center for Indoor Air Research Dames and Moore; Gas Research Institute; Los Amigos Research and Education Institute, Inc.; Rand Corporation
Universities	Brigham Young University, Harvard School of Public Health, Rutgers University, University of Arizona College of Medicine, University of Illinois at Chicago, University of New Mexico School of Medicine—Cancer Center, University of Pittsburgh, Yale University School of Medicine
States	California Department of Health Services, Maryland Department of the Environment, Minnesota Department of Health, Texas Department of Health, Wisconsin Department of Health and Social Services

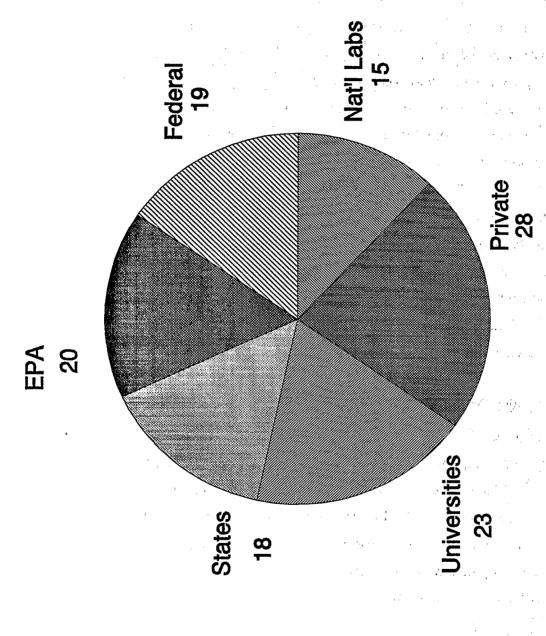


Figure 2. Number of projects, reported for each institutional category.

Research Institute reported eight projects, the largest number among private research organizations.

IAQ RESEARCH FUNDING FOR 1989-1990

The level of funding for the projects was reported in a variety of ways. Most individuals reported annual funding levels. However, several others reported funding on the basis of a fixed period, which was converted to an annual funding figure; and some individuals reported a fixed amount of funding for an ongoing research project with no date of termination. Funding reported in this latter manner was considered, for the purpose of this report, as funding received to-date for the project; and the same rate of annual funding was projected to continue for 1990. The distribution of total annual funding for indoor air quality research among the institutional categories is shown in Figure 3. It must be realized that much of the funding reported by EPA is distributed to extramural projects, and much of the research is actually conducted at universities and private research institutions. This is true of other Federal agencies as well. However, in this inventory no project was reported by more than one institution. For example, EPA-sponsored research was reported by EPA, not by a university conducting the research.

DESCRIPTIONS OF IAQ RESEARCH PROJECTS

An extensive list of keywords was distributed with the Cost 613 forms for the investigators to choose appropriate descriptors for their projects (see Appendix A, Keyword List). The keyword list was developed by CCMS and was used in the CEC inventory. The same list was also used in this study for consistency with the CEC inventory and NATO pilot study. The keywords on the list were distributed among seven general categories of related keywords. These categories were as follows:

- General IAQ Project Objectives
- Sources
- Climate/Ventilation
- Methods
- Indoor Environment
- Effect and Occupant
- Pollutants

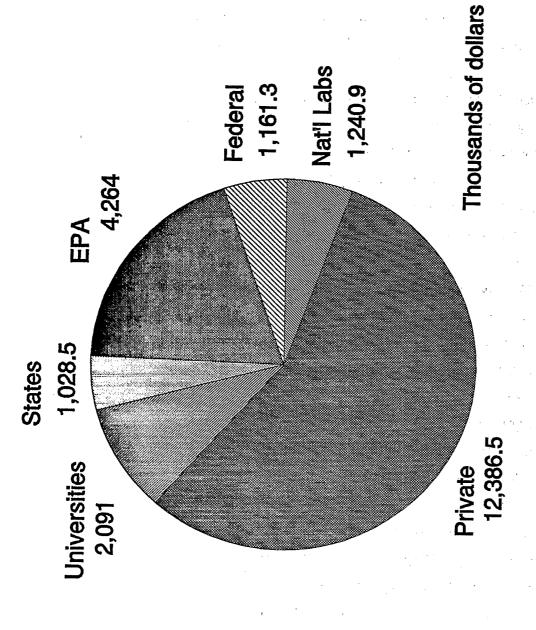


Figure 3. Funding distribution for indoor air research projects, by institutional category

Some responses included key words not listed on the official keyword list. For the purpose of consistency with the CEC inventory, these terms were replaced by similar or inclusive words which do appear on the official keyword list. The actual reported terms for each project can be found on the returned COST 613 forms included in Appendix C to this report.

Tables 2 through 9 present summaries of the keywords used for projects reported within institutional category. Table 2 shows the number of projects within each institutional category using keywords associated with each of the keyword categories. The subsequent seven tables provide a more detailed summary of the number of projects using specific keywords within a keyword category, also shown by institutional category. The keyword categories with the largest number of reported projects were Methods (90), General IAQ Project Objectives (80), and Pollutants (79). For all three of these categories EPA and universities have the largest number of projects. The general keyword category with the fewest number of reported projects was Climate/Ventilation. Universities (14) and Other Federal Agencies (9) reported the most projects in this category.

The keyword category of General IAQ Project Objective covers a wide variety of specific keywords as shown in Table 3. The keywords associated with the largest number of projects in this category were exposure (34), concentrations (22), emissions (20), and control techniques (18). Exposure was associated most frequently with projects being conducted by universities (9), EPA (7), and national labs (7). Concentrations was associated most frequently with projects being conducted by universities (6), EPA (6), and national labs (6). Emissions was associated most frequently with projects being conducted by universities (10) and EPA (5). Control techniques was associated most frequently with projects being conducted by EPA (6) and other Federal agencies (5).

The keyword category of Climate/Ventilation had the fewest number of associated projects. Table 4 shows the specific keywords in this category and the number of projects associated with each keyword, reported by institutional category. Ventilation was the single keyword associated with the largest number of projects (29). It was associated most frequently with projects being conducted by Other Federal Agencies, such as NIOSH.

The keyword category of Effect and Occupant includes a large number of specific keywords as shown in Table 5. Health and risk are the two keywords in this category most

TABLE 2. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORD CATEGORY

	Institutional Category ¹										
Keyword Category	E	F	N	P	S	U	TOTAL				
General IAQ Project Objectives	17	12	14	7	11	19	80				
Sources	13	5	6	5	9	14	52				
Climate/Ventilation	8	9	6	1	7	14	45				
Methods	20	10	14	11	16 🚊	19	90				
Indoor Environment	5	12	8	2	15	17	59				
Effect and Occupant	11	7	6	4	10	11	49				
Pollutants	18	9	12	6	15	19	79				

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

TABLE 3. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO GENERAL IAQ PROJECT OBJECTIVES

· · · · · · · · · · · · · · · · · · ·			· · . · · · I	nstitutio	onal Cat	egory ¹		
Keyword Category		E	F	N	P	S	,U	TOTAL
Adsorption		2					. 1	3
Annual Exposure				1		1		2
Concentrations	ı	6	1	6		3	6	22
Control	•	1	√ 1	1	1	į	a faller	3 **
Control Strategy				t		2		2
Control Techniques	į	6	· 5	3		1	3	18
Cost/Benefit		, r		<u>*</u> .			1	1
Dose	.,	1	1	1			3	6
Electrostatic Filters	,	2				•	• • • • • • • • • • • • • • • • • • • •	2
Emissions	9 %	-5		2	1	2	10	20
Energy Conservation		er er	, sweething es	3	1000 - 1200	a ment	1	4
Exposure		· 7	3	7	4 .	4	9	34
Guidelines			1	1	ы .	. 1.	19 1 9	4
Indoor/Outdoor Ratios			4 4	1			4 4	5
Reactions			1	2		, ,	1 .	4
Reactive					1		والمراجعة الأمي المر	1
Seasonal Variations				6	1		2,	9
Spatial Variations			2	1			3	6
Standardization						1		1
Standards		1	2	1		1	1	6.
Strategies		3		1	2	1		7
Surfaces					1		2	3
TLV			1				1	2
Validation						1		1
Variations				2	2		3	7

¹Legend to Institutional Category:

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

TABLE 4. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO CLIMATE/VENTILATION

					Inst	itutic	nal Categ	ory ¹	
Keyword Category		Е		F		N,	<u>P</u> .	S	U TOTAL
ACS		4		3			1	1	
Air Infiltration		1		2		3	1		1 8
Air Movement		3		1		2		1	4 11
Climate				1		1			$oldsymbol{2}$
Forced Ventilation			,	2	t,	1		1	5 9
Humidity		2		1		2	1	1	1 628
Measurement									2 2
Meteorological Factors					;	1			3 4
Moisture		1	7		*		1		1 3
Multizonal		1							$oldsymbol{1}_{i_1, i_2, \dots, i_{m-1}}$
Natural Ventilation				1		1			$\hat{2}$
Temperature		2		1	4	2	1	1	3 10
Ventilation	*	5		9	ş	5		5	5 29

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

U = universities

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TABLE 5. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO EFFECT AND OCCUPANT

		() 1,				Ins	titutio	onal Categor	\mathbf{y}^1		
Keyword Category		7.00° 7.	Е	1	F		N	P	S	U,	TOTAL
Airway		. 12 4 5		e di gio	\$0. \$ D	, j .,	's 28	S. W. Arabert . I		2	2 2 4
Allergy									1	1	2
Asthma								1	1	2	
Asthmatic	7	 '	1							1	2 2
Atopic		,								2	
Behavioral Effects		*	2	ď.	1					,	3
Cancer	•		2		1		3		1	1	A F 8 1
Carcinogenic			3							- 7	, y 3
Children	,		1						1	3 ,	5
Comfort			3		2				1	1	7
Complaint Study						- i,				1	1
Complaints			1						1	1	3
Effects		•	2					1	F 4 4,	$\mathcal{I}_{\mathcal{F}_{k}} = \mathcal{F}_{k}$	' 3
Employees			2	:	2	t'				2	· · · · 6 / ·
General Population			1				1		2	2	, , , , , , , , , , , , , , , , , , ,
Health	Charge Park	. Alteria	7		4.		, ,	18. m 2 100	1		14
Hobby Activities									. 1	, ,	1
Hyperreactivity		•						198 3, 6		1	1
Hypersensitivity	*						*	at a first term to be a first	1	2	3
Immunotoxicity			1					••	·· · · · · · · · · · · · · · · · · · ·		1
Infection	, 4								2	2	$\tilde{4}$
Inhalation					•			*	1	1	2
Irritation		• •	5		1				1	1	8
Lung Function	A CONTRACTOR							2		3	5
Mutagenicity			2		1		. '	A-			3
Nasal Function		1	1					٠.			1
Occupants	· · · · · · · · · · · · · · · · · · ·	<i>i</i> .	. 2		2				1	2	. 7
Physiological Reactions			*							1	1
Respiratory			5				1	1 .	1	6	13
Risk			5		1		3	2	2	1	14
Risk Groups			7			•	•	2			2
SBS			2		2		1		2	. 3	10
Sensory Effects			3								3
Susceptible Groups			1				:			2	3
Toxicology		•	1				•				1

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

frequently associated with projects, and EPA is the institution conducting the largest number of these projects. Within this category, only one project is associated with each of the following keywords: toxicology, physiological reactions, nasal function, immunotoxicity, hyperactivity, and complaint studies. Projects associated with specific keywords relating to an exposed group include the following: asthmatic (2), children (5), employees (6), general population (6), occupants (7), risk groups (2), and susceptible groups (3). Ten projects were associated with the keyword SBS (sick-building syndrome).

The keyword category of Indoor Environment addresses different indoor settings where indoor air quality might be a concern. Table 6 presents the specific keywords in this category and the number of projects associated with each keyword, by institutional category. The three most frequently reported keywords in this category were residences (25), buildings (16), and offices (15). The indoor environments with the fewest associated projects were day-care centers (1), hospitals (1), mobile homes (1), and sports establishments (1). Universities, States, and Other Federal Agencies have the most projects associated with keywords in this category.

The keyword category of Methods includes keywords related to methods of measuring pollutants, methods of measuring effects, and analytic methodologies such as modeling. Table 7 presents the specific keywords in this category and the number of projects associated with each keyword, by institutional category. The three most frequently reported keywords in this category were models (24), analysis (20), and environmental monitoring (20). The EPA and universities have the most projects associated with keywords in this category.

The specific keywords included in the keyword category of Pollutants are shown in Table 8 along with the number of projects associated with each keyword, by institutional category. The three most frequently reported pollutants were VOCs (33), particulate matter (21) and nitrogen oxides (19). The institutional category with the most projects associated with VOCs and particulate matter was EPA; whereas, universities and private research organizations (i.e., Gas Research Institute) have the most projects addressing nitrogen oxides. Other pollutants associated with a relatively large number of projects include biologicals (14), ETS (13), formaldehyde (12), and radon (17). The national laboratories have the largest number of radon-related projects; EPA and the states have the largest number of

TABLE 6. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO INDOOR ENVIRONMENT

		, , , , ,	nstitutio				
Keyword Category	•	E F	N	P	S	U	TOTAL
Buildings		4 4	5		. 1	2	16
Day-care Centers		1					1
Dwellings			÷	1		3	4
Hospitals				•	1 .		1
Industrial Buildings		F . 1			•	7	7
Mobile Homes		* · · · · · · · · · · · · · · · · · · ·				1	1
New Buildings		3	1	•	1	1	6
Offices		1 7	1 .		4	2	15
Residences		1 4	4	1	9	6	25
Schools	1	1	1	• •	3		5
Sports Establishments						1	1
Traffic Related	٠,		•	j	1	2	3

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

TABLE 7. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO METHODS

Keyword Category E F N P S U TOTAL Analysis 5 2 3 5 3 2 20 Animal Study 2 1 3 6 2 12 Assessment 1 3 6 2 12 Biological Monitoring 1 1 1 4 Biological Monitoring 1 1 1 4 Chamber Study 5 3 3 11 4 Chamber Study 5 3 3 11 4 1 4 1 4 1 4 1 4 1 1 2 3 3 11 1 2 3 3 1 1 1 1 4 11 1 2 8 2 4 11 1 2 8 2 4 11 1 5 2 2 2 2 5 <th></th> <th></th> <th></th> <th>Institution</th> <th>nal Categ</th> <th>ory¹</th> <th>-104.4</th> <th></th>				Institution	nal Categ	ory ¹	-104.4	
Animal Study	Keyword Category	E	F	N	P	S	U ·	TOTAL
Animal Study		5	2	3	5	3	2	20
Assessment Biological Monitoring 1	Animal Study	2		t.				
Biological Monitoring			1	3	6	2	1	
Biological Monitoring	Bioassay	2		1			1	4
Chamber Study 5 3 3 11 Controlled Exposure 1 2 3 Data Base 3 2 1 2 8 Detection 1 - 1 1 1 Detection Method 2 3 2 4 11 5 Environmental Monitoring 7 2 2 2 2 4 11 5 Environmental Monitoring 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 5 20 Epidemiological Study 1 1 2 2 5 5 20 Epidemiological Study 1 1 2 4 13 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Biological Monitoring	1	٠	1		1		4
Controlled Exposure	Chamber Study	5						11
Data Base 3 2 1 2 8 Detection 1 1 1 1 Development 2 3 2 4 11 Development 4 1 5 20 Environmental Monitoring 7 2 2 2 5 20 Epidemiological Study 1 2 2 5 20 Epidemiological Study 1 2 2 5 20 Epidemiological Study 1 1 2 4 4 1 1 2 4 4 1 1 2 4 4 1 1 2 4 4 1 1 2 4 1 <td< td=""><td>Controlled Exposure</td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td></td<>	Controlled Exposure				1			
Detection 1	Data Base	3	2	1				
Development	Detection							1
Development	Detection Method		2	3		2	4	11.
Environmental Monitoring Epidemiological Study Epidemiological Study I Epidemiological Epidemiological Epidemiological I Evaluation I I I I I I I I I I I I I I I I I I I	Development		· •				•	
Epidemiological Study 1 2 2 5 Epidemiological 1 1 1 2 4 Evaluation 6 1 5 1 13 Field Measurements 1 2 5 3 2 5 18 Field Studies 1 1 2 5 18 1 3 1 1 1 1 3 1 1 1 1 3 1 1 1 1 3 1 2 7 17 1		7.	2		2.		5	
Epidemiological		- 1		, -	_			,
Evaluation 6 1 5 1 13 Field Measurements 1 2 5 3 2 5 18 Field Studies 1 8 1 1 1 1 1 3 1 1 1 3 1 1 1 3 1 1 1 3 1 2 7 17 17 1 1 1 1 1 1 2 6 6 1 1 1 1 1 1 2 6 6 1 2 8 1 1 1 2 1 <			_		1			-
Field Measurements 1 2 5 3 2 5 18 Field Studies 1 3 1 1 1 3 1 1 1 3 1 1 1 1 3 1 2 7 17 17 1 1 1 1 1 1 1 2 6 6 4 3 1 2 7 17 17 1 1 1 2 6 6 4 3 1 2 7 17 17 1 1 1 2 3 1 2 7 17 17 1 1 2 3 1 2 7 17 17 1 1 1 2 3 1 2 7 17 1 1 2 8 1 1 1 2 8		6		1		•		•
Field Studies 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 3 1 1 1 1 3 1 1 1 3 1 1 1 3 1 2 1 1 1 1 3 1 2 7 17 17 1 1 1 1 1 1 1 2 6 6 4 3 1 2 7 17 17 1 1 1 1 1 1 2 6 6 4 3 1 2 7 17 17 1 1 1 1 2 3 1 2 7 17 17 17 10 1 <td>Field Measurements</td> <td></td> <td></td> <td>_</td> <td></td> <td>2.</td> <td></td> <td></td>	Field Measurements			_		2.		
Field Trials 6 1 1 8 In Vitro Study 2 2 Interlab. Comparison 1 1 1 3 Investigations 1 1 1 2 Measurement 1 1 1 1 2 Measurement Methods 4 3 1 2 7 17 Measurements 1 1 1 2 7 17 Measurements 8 1 9 9 Modelods 8 1 9 9 Modeled Approach 4 1 1 2 8 24 Multizonal 1 1 2 1 5 2 6 1 2 8 24 Multizonal 1 1 2 1 4 4 13 13 7 16 3 1 3 7 16 3 3 3 1 3 7 16 3 3 3 3 3 3 3 3<	Field Studies	-	-				•	
In Vitro Study 2 Interlab. Comparison 1 1 1 1 3 Investigations 1 1 1 1 2 Measurement 1 1 1 1 1 2 6 Measurement Methods 4 3 1 2 7 17 Measurements 1 1 1 1 1 2 8 Methods 8 1 Modeled Approach 4 1 1 2 8 Models 5 2 6 1 2 8 24 Multizonal 1 1 2 1 5 Passive Samplers 1 1 2 1 4 4 13 Representative Survey 2 1 2 5 Sampling 2 3 1 1 3 7 16 Standardization 2 5 Subjective Evaluation 1 1 2	Field Trials	6					1 :	
Interlab. Comparison 1 1 1 3 Investigations 1 1 1 2 Measurement 1 1 1 1 2 Measurement Methods 4 3 1 2 7 17 Measurements 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 1 1 1 2 8 2 4 1 1 1 2 8 2 4 1 1 1 2 1 2 1 3 2 3 <		=				•	•	
Investigations 1 1 2 Measurement 1 1 1 1 2 Measurement Methods 4 3 1 2 7 17 Measurements 1 1 2 7 17 Methods 8 1 9 Modeled Approach 4 1 1 2 8 Models 5 2 6 1 2 8 24 Multizonal 1 1 2 1 5 5 2 6 1 2 8 24 Multizonal 1 1 2 1 4 4 13 13 7 16 5 Review 1 1 1 1 2 5 5 5 2 3 1 3 7 16 3 3 3 1 3 7 16 3 3 3 3 3 3 3 3 3 3 3 3 3 3		-		. 1	1		1	
Measurement Methods 1 1 1 1 2 6 Measurement Methods 4 3 1 2 7 17 Measurements 1 1 1 1 1 1 Methods 8 1 9			1 :	•	•	1	1	
Measurement Methods 4 3 1 2 7 17 Measurements 1 1 1 1 Methods 8 1 9 Modeled Approach 4 1 1 2 8 Models 5 2 6 1 2 8 24 Multizonal 1 1 2 1 5 5 2 6 1 2 8 24 Multizonal 1 1 2 1 4 4 13 3 1 3 7 5 5 2 6 1 2 8 24 24 1 1 3 1 3 3 1 3 3 1 3 3 1 3 3 1 3 3 1 1 3 3 1 1 3 3 1 1 3 3 1 3 3 3 1 3 3 3 1 3 3 3 3 3 </td <td></td> <td>•</td> <td></td> <td>1</td> <td>1</td> <td></td> <td>2</td> <td></td>		•		1	1		2	
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Modeled Approach 4 1 1 2 8 Models 5 2 6 1 2 8 24 Multizonal 1 1 2 1 5 5 2 1 5 2 1 3 5 2 1 2 1 4 4 13 3 3 8 2 5 2 5 2 5 2 5 2 5 5 2 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 2 5 5 3 1 3 7 16 3 3 7 16 3		8	1					. —
Models 5 2 6 1 2 8 24 Multizonal 1 1 2 1 5 Passive Samplers 1 1 2 1 4 4 13 Representative Survey 2 1 2 5 Review 1 1 1 2 5 Sampling 2 3 1 3 7 16 Standardization 2 1 3 <td></td> <td></td> <td>•</td> <td>4</td> <td>1</td> <td>1</td> <td>•</td> <td>,</td>			•	4	1	1	•	,
Multizonal 1 1 2 1 5 Passive Samplers 1 1 2 1 4 4 13 Representative Survey 2 1 2 5 Review 1 1 1 2 5 Sampling 2 3 1 3 7 16 Standardization 2 1 3 7 16 Subjective Evaluation 1 2 1 2	Models	5	· 2 :		1	2	Q.	
Passive Samplers 1 1 2 1 4 4 13 Representative Survey 2 1 2 5 Review 1 1 1 2 5 Sampling 2 3 1 3 7 16 Standardization 2 1 3		·				4	0	
Representative Survey 2 1 2 5 Review 1 1 1 2 5 Sampling 2 3 1 3 7 16 Standardization 2 1 3 3 Subjective Evaluation 1 1 2		-			_	4	1	
Review 1 1 1 2 5 Sampling 2 3 1 3 7 16 Standardization 2 1 3 7 16 Subjective Evaluation 1 2 1 3		-				•	7	
Sampling 2 3 1 3 7 16 Standardization 2 1 3 3 Subjective Evaluation 1 1 2			7	1	2	۷.		
Standardization 2 1 3 Subjective Evaluation 1 1 2				* .		2	7 .	
Subjective Evaluation 1 1 2		2, 2,	•	* .	1	.		
	Validation	5	1	3	. 1	1	4	2 14

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

TABLE 8. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY AND KEYWORDS RELATED TO POLLUTANTS

	,		, i	- Jarah G		Institution	nal Catego	ry ¹		
Keyword Category		. ,	ř	E	F	N	P	S	. v =	TOTAL
Aerosols	P	ð		d.	1	1		1	6	9.
Aldehydes				1		2		1	1	977 5 9
Allergens		7		₹. 1 ₉	•			2	1	3
Ammonia									1	1 ' '
Asbestos		• •			1	•		2	1 .	4
Bacteria		V			1			2		3 ' '
Biocides	r		. ;						2	2
Biological				9	3	*		1	1	14
Chemical				6	;			1	2	9
Chlorinated HC		;		3 2	:	2		2	3:	7
CO_2				1	3			1	3	8
ETŚ	pe.	ė ·		3.	1	2		3	4 .	13
Fibers		7	•			_		1	1	2
Food Contamination	'n		1			1		_	1	$\overline{2}$
Formaldehyde	:		5	4	2	1.		3	$\tilde{2}$	12
Fungi		4	.,,	:	1	-		2	1	4
Gases				7	1	4		-	1	13
Halogenated HC				,	•	1			1	2
Home Dust						.1		1	2	4
Inorganic								•	$\frac{2}{2}$	2
Insecticides				2					2	4
Metals	4		- ;	4	,				3	3
MMMF		,						1		1
Mold		3+E			•			2	1	3
N-PAH		•				1:		L		1
NO _x	uis?is	÷	:	. 3		2	· 6	1	7	19
Odors	erte.	:	, ,	2.	1.	2	U	1	,	3
Organic Organic				1.	1 .	3'		1	2	7
Ozone	٠.	ı	:	1	1	,		1	4	6
PAH		4.	Ì	2		4			1	7
PM		•	s/v	11		4		1	5	21
Pollutants				7	1	4		1 4	3	19
Pollution				,	Τ.	1 ⁷		4	.	17 1
POM						2			State 11.	2
			,	*	1′	<i>∠:</i> 1∙			**** 5 **	2
Radioactivity Radon	90, 7	يوا محدد دو العوادديون الأنا الأناس الانتاالي			1. ****/a^****5	ur oraș X area T	marganing of	seesaan e		17
				1	4			4		
SO ₂ Solvents				1		2	•		2:	4
SVOC				1		2 2	TR ph P. P. P	387 T.J.	5	. 1, 19
				4		2	•	21 x 32 t	2	8
Vapors				2	•	7		_	4	22
VOC				13	3	7		6 .	· .4 ···	33

E = Environmental Protection Agency

N = national laboratories

S = states

F = other Federal agencies

P = private research

formaldehyde-related projects; universities, states, and EPA have the majority of ETS-related projects; and EPA has the largest number of biological-related projects.

Table 9 presents the specific keywords included in the keyword category Source and the number of projects associated with each of the keywords, by institutional category. The three most frequently reported sources were combustion (15), outdoor air (12), and building materials (11). Universities and EPA have the largest number of combustion-related projects; universities have the largest number of outdoor-air-related projects; and EPA has the largest number of projects related to building materials.

TABLE 9. NUMBER OF PROJECTS BY INSTITUTIONAL CATEGORY
AND KEYWORDS RELATED TO SOURCES

	Institutional Category ¹										
Keyword Category	Е	F	N	P	S	U	TOTAL				
Building Equipment						1	1				
Building Materials	5	2	1	•	3	1	11				
Combustion	5	2	1	1	3	5	15				
Drinking Water	J		2	•	1	1	4				
Dry Cleaning Shops			_		•	1	1 1				
Filter Systems	3	1					4				
Furniture	2					1	3				
Gas Cookers				2		3	5				
Harbor Sludge						1	1				
Home Textiles	1				1		2				
Household Products	3	÷			1	1	5				
Outdoor Air	1	3	2	2		4	12				
Soil	1		3				4				
Soil Characteristics			2			1	3				
Sources	6		4		3	4	17				
UFFI					2	1	3				
Water				•		. 2	2				

¹Legend to Institutional Category:

E = Environmental Protection Agency

F = other Federal agencies

N = national laboratories

P = private research

S = states

U = universities

SUMMARY

The results of this inventory provide the EPA and the NATO-CCMS with information on the directions of indoor air quality research in the United States, the funding levels of the projects, and the institutions conducting this research. This information can be useful to EPA in planning a future research program as required by the 1989 Report to Congress on Indoor Air Quality. The CCMS Indoor Air Quality Pilot Study can also benefit from this information by identifying research areas being addressed and specific researchers conducting work in a specific area. The inventory also provides information on research topics which are not being adequately addressed.

REFERENCES

- 1. Maroni, M. (1989a), "Background and Scope of the NATO-CCMS Pilot Study on Indoor Air Quality," in Pilot Study on Indoor Air Quality, Report on a meeting held in Erice, Italy, February 13-17, 1989.
- 2. Maroni, M. (1989b), "Inventory of Research and Regulations for Indoor Air Quality in NATO Countries," in Pilot Study on Indoor Air Quality, Report on a meeting held in Erice, Italy, February 13-17, 1989.
- 3. The Cost 613 form was obtained from Reference 2.
- 4. The keyword list used in the CEC inventory was obtained from Berndt Seifert, of the Institute for Water, Soil, and Air Hygiene, Federal Republic of Germany.
- 5. U.S. Environmental Protection Agency (1988), Directory of State Indoor Air Contacts. Washington, D.C.: Public Health Foundation.
- 6. Air and Waste Management Association Directory and Resource Book 1988-1989. Pittsburgh: Air and Waste Management Association.

APPENDIX A. KEYWORD LIST

GENERAL-PROJECT-OBJECTIVES-RELATED KEYWORDS

adsorption
annual exposure
bioaccumulation
concentrations
control
control techniques
cost/benefit (evaluations or calculations)
diurnal
dose
electrostatic filters
emissions
energy conservation

exposure guidelines

reactions reactive

standards

indoor/outdoor ratios

seasonal variations spatial variations

(control) strategies surfaces TLV (threshold limit values) variations (of concentrations/exposure)

SOURCE-RELATED KEYWORDS

sources (of pollution; if possible specify source) building equipment building materials combustion (sources) dogs drinking water dry cleaning shops external sources filter systems furniture gas cookers harbor sludge hobby activities hobby products outdoor air paints paraffin heaters pets plants refuse shots renovation

screen printing plants soil soil characteristics UFFI (urea formaldehyde foam insulation) water waterborne

CLIMATE/VENTILATION-RELATED KEYWORDS

ACS (air conditioning system)
air infiltration
air movement
climate (temperature and humidity)
condensation
forced ventilation
humidity
meteorological factors
meteorology

METHOD-RELATED KEYWORDS

analysis
animal study
assessment
bioassay
biochemical monitoring
biological monitoring
chamber study

(human) controlled exposure (study)

database

moisture

temperature ventilation

natural ventilation

detection (of any parameter)

detection methods

development

environmental monitoring

epidemiological study

epidemiology

evaluation

field measurements

field trials

interlaboratory comparison

inventory

investigations

in vitro study

measurement (of any parameter)

measurement methods

methods

mice

modeled approach

models

multizonal

passive samplers representative survey review sampling standardization subjective evaluation validation

INDOOR-ENVIRONMENT-RELATED KEYWORDS

buildings (specify further if possible)
day-care centers
developing countries
dwellings
hospitals
industrial buildings
mobile homes
new buildings
offices
residences
schools (including nursery schools, universities, etc.)
sport establishments
swimming halls
temporary building
traffic related (environments, including cars)
underground

EFFECT- AND-OCCUPANT-RELATED KEYWORDS

airway allergy asthma asthmatic atopic (neuro) behavioral effects biochemical effects bronchoreactivity cancer carcinogenic chemical sensitivity children CNSLD comfort complaint study complaints (study, investigation) effects (add further specification if possible) elderly employees general population (other) genotoxicity health hyperreactivity

hypersensitivity immunotoxicity

infection

infestation inhalation irritation (mucous membranes, eyes, skin) lung function mutagenicity
nasal function nasal function neurotoxicity non-respiratory nurses occupants other immune effects other systemic (diseases)
physiological (reactions)
respiratory (effects)
risk assessment, estimate, calculation analysis) risk groups SBS (sick-building syndrome investigation) sensory effects susceptible groups toxicological toxicology in the second control of the second control

POLLUTANT-RELATED KEYWORDS

aerosols aldehydes allergens ammonia asbestos bacterial biocides biological (pollution) charged particles chemical chloramines chlorinated dioxins chlorinated H(vdro)C(arbons) chlorine CO_2 dioxin ETS (environmental tobacco smoke) food contamination formaldehyde fungi gamma radiation gases halogenated H(ydro)C(arbons) HCHO (formaldehyde) home dust inorganic (chemical) insecticides ions isocyanates lindane metals mites MMMF (man-made mineral fibers) mold noise NO_x (NO_2 , NO) N-PAH odors organic (chemical) other microorganisms PAH (polycyclic aromatic hydrocarbons) PCB (polychlorinated biphenyls)

PCP (pentachlorophenol)

perchloroethylene PM (particulate matter) pollution pollutants POM (particulate organic matter, organics extractible from particulate matter) radioactivity radon SO₂ solvents styrene suspended particulates SVOC (semivolatile organic compounds) tetrachloroethylene (perchloroethylene) vapors VOC (volatile organic compounds)

RECEIVED TO SERVICE

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APPENDIX B. 1990 INDOOR AIR QUALITY RESEARCH PROJECTS

INSTITUTION: AIR AND ENERGY ENGINEERING RESEARCH LABORATORY

FORM NO.E001

PRINCIPAL INVESTIGATOR: JACKSON, MERRILL D. END DATE: ONGOING

TITLE: EVALUATION OF SOURCE MANAGEMENT OPTIONS FOR IAQ

CONTROL

200 K/YR FUNDING:

FORM NO.E002

PRINCIPAL INVESTIGATOR: SPARKS, LESLIE E. END DATE: 1993

TITLE: METHODS DEVELOPMENT FOR IAQ CONTROL

FUNDING: 250 K/YR

FORM NO.E003

PRINCIPAL INVESTIGATOR: SPARKS, LESLIE E. END DATE: ONGOING

TITLE: EVALUATION OF AIR CLEANERS FOR IAQ CONTROL

FUNDING: 300 K/YR

FORM NO.E004

PRINCIPAL INVESTIGATOR: TUCKER, W. GENE END DATE: 1995

TITLE: METHODS DEVELOPMENT FOR SOURCE CHARACTERIZATION

FUNDING: 300 K/YR

FORM NO.E005

PRINCIPAL INVESTIGATOR: SPARKS, LESLIE E. END DATE: ONGOING

TITLE: EVALUATION OF VENTILATION FOR IAQ CONTROL

FUNDING: 100 K/YR

FORM NO.E006

PRINCIPAL INVESTIGATOR: TICHENOR, BRUCE A. END DATE: ONGOING

TITLE: SOURCE CHARACTERIZATION RESEARCH

FUNDING: 500 K/YR

FORM NO.E007

PRINCIPAL INVESTIGATOR: TUCKER, W. GENE END DATE: ONGOING

TITLE: INDOOR AIR SOURCE CHARACTERIZATION

FUNDING: 508 K/YR

FORM NO.E008

PRINCIPAL INVESTIGATOR: TUCKER, W. GENE END DATE: ONGOING

TITLE: INDOOR AIR QUALITY CONTROL

FUNDING: 338 K/YR

TOTAL FUNDING FOR INSTITUTION: 2496 K/YR

INSTITUTION: ATMOSPHERIC RESEARCH AND EXPOSURE ASSESSMENT LABORATORY

FORM NO.E009

PRINCIPAL INVESTIGATOR: IRWIN, JOHN S. , END DATE: ONGOING

TITLE: DEVELOP AND VALIDATE CONPUTER ASSISTED SOFTWARE FOR

UPGRADED NIST INDOOR DISPERSION/VENTILATION MODEL

FUNDING: 0 K/YR

FORM NO.E010

PRINCIPAL INVESTIGATOR: BENNETT, BERNE I. END DATE: ONGOING

TITLE: DEVELOP AND VALIDATE QUALITY ASSURANCE STANDARDS

FUNDING: 27 K/YR

FORM NO.E011

PRINCIPAL INVESTIGATOR: MCELROY, FRANK END DATE: ONGOING

TITLE: COMPENDIUM OF INDOOR AIR QUALITY METHODS FUNDING: 43 K/YR

FORM NO.E012

PRINCIPAL INVESTIGATOR: HIGHSMITH, ROSS END DATE: ONGOING TITLE: MONITORING METHODS DEVELOPMENT FUNDING: 55 K/YR

FORM NO.E013

END DATE: ONGOING PRINCIPAL INVESTIGATOR: WILSON, NANCY K.

Registration

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大大大学,**是**对于一个基础,但我们的对于一个的一个数据的。 对于 1

TITLE: ANALYTICAL METHODS DEVELOPMENT

80 K/YR FUNDING:

FORM NO.E014

PRINCIPAL INVESTIGATOR: HIGHSMITH, ROSS
TITLE: LARGE BUILDING STUDIES

END END DATE: ONGOING

FUNDING: 345 K/YR

the state of the s

TOTAL FUNDING FOR INSTITUTION: 549 K/YR

END DATE: ONGOING

END DATE: ONGOING

END DATE: ONGOING

INSTITUTION: ENVIRONMENTAL CRITERIA AND ASSESSMENT OFFICE

FORM NO.E015

PRINCIPAL INVESTIGATOR: BERRY, MICHAEL A.

TITLE: INDOOR AIR PROGRAM MANAGEMENT, COORDINATION AND

RESEARCH COMMUNITY SUPPORT

FUNDING: 75 K/YR

FORM NO.E016

PRINCIPAL INVESTIGATOR: BERRY, MICHAEL A.

TITLE: RISK CHARACTERIZATION METHODOLOGY AND RISK

ASSESSMENT

FUNDING: 155 K/YR

FORM NO.E017

PRINCIPAL INVESTIGATOR: CHILDS, NORMAN E.

TITLE: PUBLICATION OF THE INDOOR AIR REFERENCE

BIBLIOGRAPHY

FUNDING: 15 K/YR

TOTAL FUNDING FOR INSTITUTION: . 245 K/YR

INSTITUTION: HEALTH EFFECTS RESEARCH LABORATORY

FORM NO.E018

PRINCIPAL INVESTIGATOR: GOLDSTEIN, GEORGE M. END DATE: ONGOING

TITLE: NEUROBEHAVIORAL, RESPIRATORY AND SENSORY IRRITANT

EFFECTS OF COMPLEX VOC MIXTURES IN HUMANS

FUNDING: 500 K/YR

FORM NO.E019

PRINCIPAL INVESTIGATOR: LEWTAS, JOELLEN

END DATE: ONGOING

TITLE: BIOLOGICAL MARKERS FOR ENVIRONMENTAL TOBACCO SMOKE

(ETS) EXPOSURE AND DOSIMETRY IN CHILDREN AND ADULTS

315 K/YR FUNDING:

FORM NO.E020

PRINCIPAL INVESTIGATOR: GOLDSTEIN, GEORGE M.

END DATE: ONGOING

TITLE: TOXICOLOGICAL EFFECTS OF VOC MIXTURES IN ANIMAL AND

IN VITRO SYSTEMS

159 K/YR FUNDING:

TOTAL FUNDING FOR INSTITUTION: 974 K/YR

TOTAL FUNDING FOR E: 4264 K/YR

INSTITUTION: NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

FORM NO.FO01

PRINCIPAL INVESTIGATOR: HURRELL, JOSEPH J.

END DATE: FY91

TITLE: DEVELOPMENT OF SURVEY ASSESSMENT INSTRUMENT FOR IAQ

FUNDING: 25 K/YR

FORM NO.FO02

PRINCIPAL INVESTIGATOR: RENTOS, PETE

END DATE: ONGOING

TITLE: EDUCATIONAL MODULES FOR TRANSFERRING RESEARCH

RESULTS

FUNDING: 70 K/YR

FORM NO.FOO3

PRINCIPAL INVESTIGATOR: SUNDIN, DAVID

END DATE: ONGOING

TITLE: HEALTH HAZARD EVALUATIONS ON INDOOR AIR QUALITY

FUNDING: · 150 K/YR

FORM NO.FOO4

PRINCIPAL INVESTIGATOR: CRANDALL, MICHAEL

END DATE: FY90

TITLE: LIBRARY OF CONGRESS INDOOR AIR QUALITY STUDY

FUNDING: 120 K/YR

FORM NO.FO05

PRINCIPAL INVESTIGATOR: BURKHART, GRET A.

END DATE: ONGOING

TITLE: FEASIBILITY OF CONDUCTING EPIDEMIOLOGIC STUDIES OF

BUILDING RELATED ILLNESS

FUNDING: 10 K/YR

FORM NO.FOO6

PRINCIPAL INVESTIGATOR: KENNEDY, EUGENE

END DATE: FY92

TITLE: METHOD FOR SAMPLING AND ANALYSIS OF INDOOR AIR FOR

ORGANIC COMPOUNDS

FUNDING: 17 K/YR

FORM NO.FOO7

PRINCIPAL INVESTIGATOR: ANASTAS, MAZEN

END DATE: FY91

TITLE: METHODS FOR EVALUATING INDOOR AIR VENTILATION

SYSTEMS

FUNDING: 30 K/YR

TOTAL FUNDING FOR INSTITUTION: 422 K/YR

INSTITUTION: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

FORM NO.FOO8

PRINCIPAL INVESTIGATOR: PERSILY, ANDREW K. END DATE: FY90

TITLE: EFFICIENCY OF GASEOUS CONTAMINANT REMOVAL DEVICES

FUNDING: 33 K/YR

FORM NO.FO09

PRINCIPAL INVESTIGATOR: PERSILY, ANDREW K. 1988 1988 END DATE: ONGOING

TITLE: INFILTRATION AND VENTILATION IN LARGE BUILDINGS

FUNDING: 29 K/YR

FORM NO.FO10

PRINCIPAL INVESTIGATOR: PERSILY, ANDREW K.

END DATE: ONGOING

TITLE: INDOOR AIR POLLUTION CONCENTRATION MODEL

FUNDING: 31 K/YR

TOTAL FUNDING FOR INSTITUTION:

94 K/YR

END DATE: 1993

END DATE: 1992

END DATE: 1992

END DATE: 6/1990

END DATE: 6/1991

END DATE: 3/1991

INSTITUTION: U.S. DEPARTMENT OF ENERGY

FORM NO. FO11

PRINCIPAL INVESTIGATOR: JACKSON, MARK

TITLE: RESIDENTIAL VENTILATION RESEARCH PROJECT

FUNDING: 184 K/YR

FORM NO.F012

PRINCIPAL INVESTIGATOR: JACKSON, MARK

TITLE: SINGLE FAMILY VENTILATION CASE STUDIES

FUNDING: 80 K/YR

FORM NO.F013

PRINCIPAL INVESTIGATOR: JACKSON, MARK

TITLE: SUPER GOOD CENTS MULTIFAMILY VENTILATION

FUNDING: 170 K/YR

FORM NO.F014

PRINCIPAL INVESTIGATOR: STEELE, TIM

TITLE: ADOPTION AND INTERPRETATION OF ASHRAE STANDARD

62-1989

FUNDING: 0 K/YR

FORM NO.F015

PRINCIPAL INVESTIGATOR: EASTWOOD, CHARLES

TITLE: DEVELOPMENT OF AN EXPERT SYSTEM FOR RESIDENTIAL

RADON MITIGATION

FUNDING: 72 K/YR

FORM NO.F016

PRINCIPAL INVESTIGATOR: EASTWOOD, CHARLES

TITLE: INFLUENCE OF SUBSLAB AGGREGRATE PERMEABILITY ON THE

PERFORMANCE OF RADON SUBSLAB VENTILATION MITIGATION

SYSTEMS

FUNDING: 70 K/YR

TOTAL FUNDING FOR INSTITUTION: 576 K/YR

INSTITUTION: U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

FORM NO.F017

PRINCIPAL INVESTIGATOR: ARNOLTS, CONRAD C.

END DATE: 12/1990

TITLE: RADON TESTING AND EVALUATION IN MULTISTORY

RESIDENTIAL BUILDINGS

70 K/YR FUNDING:

> TOTAL FUNDING FOR INSTITUTION: 70 K/YR

INSTITUTION: U.S. DEPARTMENT OF TRANSPORTATION

FORM NO.F018

PRINCIPAL INVESTIGATOR: NAGDA, NIREN

END DATE:

Service of the Congress of the Service of

TITLE: AIRLINER CABIN ENVIRONMENT: CONTAMINANT MEASURES,

HEALTH RISKS, AND MITIGATION OPTIONS

FUNDING: 0 K/YR

TOTAL FUNDING FOR INSTITUTION:

0 K/YR

INSTITUTION: NASA - STENNIS SPACE CENTER

FORM NO.F019

PRINCIPAL INVESTIGATOR: JOHNSON, ANNE H.

TITLE: REDUCTION OF VOCS BY FOLIAGE PLANTS AND ASSOCIATED

MICROBIAL POPULATIONS

FUNDING:

0 K/YR

TOTAL FUNDING FOR INSTITUTION: 0 K/YR

END DATE: ONGOING

TOTAL FUNDING FOR F: 1161 K/YR

END DATE: ONGOING

INSTITUTION: ARGONNE NATIONAL LABORATORY

FORM NO.NOO1

PRINCIPAL INVESTIGATOR: SCHLENKER, ROBERT A.
TITLE: ASSESSMENT OF THORON AND THORON DAUGHTER PRODUCTS

FUNDING: 94 K/YR

> TOTAL FUNDING FOR INSTITUTION: 94 K/YR

The second section is the second section in

END DATE: ONGOING

INSTITUTION: LAWRENCE BERKELEY LABORATORY

FORM NO.NOO2
PRINCIPAL INVESTIGATOR: NERO, ANTHONY V.

PRINCIPAL INVESTIGATOR: NERO, ANTHONY V.
TITLE: AIR POLLUTANT EXPOSURES IN BUILDINGS

FUNDING: 15 K/YR

FORM NO.NOO3
PRINCIPAL INVESTIGATOR: DAISEY, JOAN M. END DATE: ONGOING

TITLE: INFILTRATION, VENTILATION AND INDOOR AIR QUALITY

FUNDING: 67 K/YR

FORM NO.NOO4
PRINCIPAL INVESTIGATOR: DAISEY, JOAN M. END DATE: ONGOING

TITLE: INDOOR ATMOSPHERIC CHEMISTRY: INTERACTIONS OF RADON

WITH OTHER GASEOUS POLLUTANTS

FUNDING: 81 K/YR

FORM NO.NOO5
PRINCIPAL INVESTIGATOR: DAISEY, JOAN M. END DATE: ONGOING

TITLE: MECHANISM-BASED RISK ASSESSMENT FOR INDOOR AIR

EXPOSURES

FUNDING: 50 K/YR

FORM NO.NOO6

PRINCIPAL INVESTIGATOR: SHERMAN MAX H. END DATE: ONGOING

PRINCIPAL INVESTIGATOR: SHERMAN, MAX H. TITLE: VENTILATION MEASUREMENT TECHNIQUES

FUNDING: 38 K/YR

FORM NO.NOO7
PRINCIPAL INVESTIGATOR: MODERA, MARK P. END DATE: ONGOING

TITLE: AIR LEAKAGE IN BUILDINGS

FUNDING: 15 K/YR

FORM NO.NOO8
PRINCIPAL INVESTIGATOR: FEUSTEL, HELMUT E. END DATE: ONGOING

TITLE: AIR FLOW MODELLING

FUNDING: 20 K/YR

FORM NO.NO09
PRINCIPAL INVESTIGATOR: TRAYNOR, GREGORY W. END DATE: FY92

TITLE: DEVELOPMENT OF A CARBON MONOXIDE PASSIVE SAMPLER

FUNDING: 90 K/YR

FORM NO.NO10

END DATE: FY91

PRINCIPAL INVESTIGATOR: TRAYNOR, GREGORY W.
TITLE: CONCENTRATIONS OF INDOOR POLLUTANTS (CIP) DATA BASE

FUNDING: 40 K/YR

FORM NO.NO11

PRINCIPAL INVESTIGATOR: TRAYNOR, GREGORY W.

END DATE: FY97

TITLE: SIMULATION MODELING OF INDOOR AIR POLLUTANT

CONCENTRATIONS (MACROMODEL)

FUNDING: 200 K/YR

FORM NO.NO12

END DATE: FY91

PRINCIPAL INVESTIGATOR: DAISEY, JOAN M.
TITLE: ASSESSMENTS OF EXPOSURES TO CANDIDATE VOLATILE

ORGANIC CONTAMINANTS IN INDOOR AIR

FUNDING: 40 K/YR

FORM NO.NO13

PRINCIPAL INVESTIGATOR: SEXTRO, R.G.

END DATE: ONGOING

TITLE: EXPERIMENTAL AND THEORETICAL INVESTIGATIONS OF

RADON AVAILABILITY, TRANSPORT, AND ENTRY

FUNDING: 250 K/YR

FORM NO.NO14

PRINCIPAL INVESTIGATOR: NERO, ANTHONY V.

END DATE: ONGOING

TITLE: CHARACTERIZATION OF AIRBORNE RADON CONCENTRATIONS

FUNDING: 41 K/YR

TOTAL FUNDING FOR INSTITUTION: 947 K/YR

END DATE: ONGOING

INSTITUTION: LAWRENCE LIVERMORE NATIONAL LABORATORY

FORM NO.NO15

PRINCIPAL INVESTIGATOR: MCKONE, THOMAS E.

TITLE: EVALUATION OF RESIDENTIAL EXPOSURE TO ORGANIC

CHEMICALS IN TAP WATER AND SOIL

FUNDING: 200 K/YR

TOTAL FUNDING FOR INSTITUTION: 200 K/YR

TOTAL FUNDING FOR N: 1241 K/YR

INSTITUTION: DAMES AND MOORE

FORM NO.POO1

PRINCIPAL INVESTIGATOR: TOTZKE, DENNY TITLE: HUMIDITY/AIR EXCHANGE STUDY IN MOBILE HOMES

FUNDING: 50 K/YR

TOTAL FUNDING FOR INSTITUTION:

50 K/YR

INSTITUTION: GAS RESEARCH INSTITUTE

FORM NO.POO2

END DATE: 10/1990 PRINCIPAL INVESTIGATOR: NAGDA, N.

TITLE: QUANTIFICATION OF FACTORS AFFECTING INDOOR AIR

QUALITY

FUNDING: 371 K/YR

FORM NO.POO3

END DATE: 3/1991 PRINCIPAL INVESTIGATOR: COERR, STANTON

TITLE: REGULATORY EVALUATION OF INDOOR AIR QUALITY ISSUES

AND TECHNOLOGY TRANSFER

FUNDING: 96 K/YR

FORM NO.POO4

PRINCIPAL INVESTIGATOR: GRUMBLY, T. TITLE: NITROGEN DIOXIDE EXPOSURE AND SUSCEPTIBILITY TO END DATE: 6/1992

RESPIRATORY INFECTIONS

FUNDING: 238 K/YR

FORM NO.PO05

END DATE: 4/1990 PRINCIPAL INVESTIGATOR: REUTHER, J.

END DATE: 7/1992

TITLE: EVALUATION OF NO2 PROTOCOL AND BURNER EMISSIONS

FUNDING: 111 K/YR

FORM NO.POO6

PRINCIPAL INVESTIGATOR: LESLIE, N.

TITLE: CONVENTIONAL ENERGY RESEARCH HOUSE

FUNDING: 254 K/YR

FORM NO.POO7

PRINCIPAL INVESTIGATOR: SPENGLER, J.D. END DATE: 5/1990

TITLE: ASSESSMENT OF PUBLIC TOTAL EXPORURE TO SELECTED

EMISSIONS SPECIES CONTRIBUTED IN PART BY INDOOR

SOURCES

FUNDING: 398 K/YR

FORM NO.POO8

PRINCIPAL INVESTIGATOR: SPICER, C.W. END DATE: 3/1991

TITLE: INVESTIGATION OF NITROGEN DIOXIDE REMOVAL FROM

INDOOR AIR

FUNDING: 89 K/YR

FORM NO.POO9

PRINCIPAL INVESTIGATOR: WALKINSHAW, D. TITLE: PARTIAL FUNDING FOR 5TH INTERNATIONAL CONFERENCE ON END DATE: 9/1990

INDOOOR AIR QUALITY FUNDING: 25 K/YR

TOTAL FUNDING FOR INSTITUTION: 1581 K/YR

INSTITUTION: LOS AMIGOS RESEARCH AND EDUCATION INSTITUTE, INC.

FORM NO.PO10

PRINCIPAL INVESTIGATOR: HACKNEY, JACK D.

END DATE: 1992

TITLE: FIELD STUDIES OF RESPIRATORY HEALTH STATUS AND

IRRITANT EXPOSURES IN ASTHMATIC VOLUNTEERS

FUNDING: 75 K/YR

FORM NO.PO11

PRINCIPAL INVESTIGATOR: HACKNEY, JACK D.

END DATE: 1990

TITLE: EFFECTS OF NO2 IN VOLLULNTEERS WITH CHRONIC

OBSTRUCTIVE PULMONARY DISEASE - A COMBINED FIELD

MONITORING AND CHAMBER EXPOSURE STUDY

FUNDING: 180 K/YR

TOTAL FUNDING FOR INSTITUTION: 255 K/YR

INSTITUTION: RAND CORPORATION

FORM NO.P012

PRINCIPAL INVESTIGATOR: DUAN, NAIHUA

TOTAL FUNDING FOR INSTITUTION:

TITLE: STUDY ON STATISTICS AND ENVIRONMENTAL FACTORS IN

HEALTH

FUNDING: 35 K/YR

35 K/YR

TOTAL FUNDING FOR I: 1921 K/YR

INSTITUTION: CENTER FOR INDOOR AIR RESEARCH

FORM NO.PO13

PRINCIPAL INVESTIGATOR: GREENFIELD, S. M. END DATE: 8/1990

TITLE: DEVELOPING ENHANCED INDOOR AIR QUALITY MODELS

FUNDING: 35 K/YR

FORM NO.PO14

PRINCIPAL INVESTIGATOR: BASCOM, REBECCA END DATE: 1/1994

TITLE: ETS: NASAL RESPONSE AND AEROSOL DEPOSITION EFFECT

FUNDING: 123 K/YR

FORM NO.PO15

PRINCIPAL INVESTIGATOR: AREY, JANET END DATE: 5/1991

TITLE: INDOOR FATE AND TRANSFORMATION OF SELECTED

NITROGENOUS ORGANIC COMPOUNDS

FUNDING: 180 K/YR

FORM NO.P016

PRINCIPAL INVESTIGATOR: DAVIS, JERRY K. END DATE: 3/1993

TITLE: EFFECTS OF ETS AND NO2 ON RESPIRATORY INFECTION:

MURINE MODEL DEVELOPMENT

FUNDING: 151 K/YR

FORM NO.PO17

PRINCIPAL INVESTIGATOR: ETAUGH, DELBERT J. END DATE: 1/1992

TITLE: MUTAGENICITY OF GAS AND PARTICULATE PHASE COMPOUNDS

IN ETS: DEVELOPMENT OF AN SFE/SFC-BIOASSAY

ANALYTICAL TECHNIQUE

FUNDING: 113 K/YR

FORM NO.P018

PRINCIPAL INVESTIGATOR: GUNNISON, ALBERT T. END DATE: 12/1992

TITLE: EFFECTS OF 03, NO2, AND ETS ON PULMONARY FUNCTION

AND EICOSANOID METABOLISM

FUNDING: 284 K/YR

FORM NO.P019

PRINCIPAL INVESTIGATOR: HALEY, NANCY J. END DATE: 6/1993

TITLE: DETERMINATION OF NICOTINE METABOLITES BY

IMMUNOCHEMICAL METHODS

FUNDING: 96 K/YR

FORM NO.PO20

PRINCIPAL INVESTIGATOR: BOWMAN, K. O.

END DATE: 3/1993

TITLE: EFFICIENT LABORATORY EXPERIMENTS FOR TESTING

MUTAGENICITY OF COMPONENTS OF INDOOR AMBIENT AIR

FUNDING: 69 K/YR

FORM NO.PO21

PRINCIPAL INVESTIGATOR: KLEEBERGER, STEVEN R.

END DATE: 6/1993

TITLE: SUSCEPTIBILITY OF OZONE-INDUCED AIRWAY INFLAMMATION

FUNDING: 152 K/YR

FORM NO.PO22

PRINCIPAL INVESTIGATOR: LAST, JEROLD A.

END DATE: 12/1992

TITLE: TOXICOLOGICAL INTERACTIONS BETWEEN THE INDOOR AIR

POLLUTANT NO2 AND 03

FUNDING: 297 K/YR

FORM NO.PO23

END DATE: 12/1991

PRINCIPAL INVESTIGATOR: LAY, JACKSON O. TITLE: DEVELOPMENT OF FAST ATOM BOMBARDMENT MASS SPECTRAL

TECHNIQUES FOR THE IDENTIFICATION OF UNKNOWN

CARCINOGEN-NUCLEOSIDE ADDUCTS

FUNDING: 133 K/YR

FORM NO.PO24

END DATE: 12/1992

END DATE: 12/1992

PRINCIPAL INVESTIGATOR: LEHRER, SAMUEL B. END DATE: 12/1992
TITLE: PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EXPOSURE

ON ASTHMATIC SUBJECTS

FUNDING: 325 K/YR

FORM NO.PO25

PRINCIPAL INVESTIGATOR: LEIKAUF, GEORGE D.

TITLE: INDOOR ALDEHYDES AND BRONCHIAL HYPERACTIVITY

FUNDING: 264 K/YR

FORM NO.PO26

PRINCIPAL INVESTIGATOR: MERCER, ROBERT R.

PRINCIPAL INVESTIGATOR: MERCER, ROBERT R. END DATE: 6/1993
TITLE: INJURY IN GAS EXCHANGE UNITS DUE TO LOW LEVEL
NITROGEN DIOXIDE
FUNDING: 167 K/YR

NITROGEN DIOXIDE G: 167 K/YR

FUNDING: 167 K/YR

FORM NO.PO27

PRINCIPAL INVESTIGATOR: O'ROURKE, MARY KAY

TITLE: INDOOR BIOLOGICAL AGENTS: EXPOSURES AND RESPONSES

IN ALLERGY AND ASTHMA

FUNDING: 229 K/YR

B-22

FORM NO.P028

PRINCIPAL INVESTIGATOR: PENN, ARTHUR

END DATE: 12/1992

TITLE: DOES ETS PROMOTE ARTERIOSCLEROSIS OR ACT AS A

CO-ATHEROGEN

FUNDING: 253 K/YR

FORM NO.PO29

PRINCIPAL INVESTIGATOR: PINKERTON, KENT E.

END DATE: 12/1992

TITLE: EFFECTS OF ETS ON PRENATAL AND PERINATAL LUNG

DEVELOPMENT

FUNDING: 268 K/YR

FORM NO.PO30

PRINCIPAL INVESTIGATOR: POSTLEWAITE, EDWARD M.

END DATE: 6/1993

TITLE: PULMONARY REACTIVE UPTAKE OF INHALED TOXIC

CONTAMINANTS

FUNDING: 122 K/YR

FORM NO.PO31

END DATE: 3/1993

PRINCIPAL INVESTIGATOR: PRITCHARD, J. N. TITLE: THE REGIONAL DEPOSITION OF ETS AND ITS INFLUENCE ON

RADON DOSIMETRY

FUNDING: 80 K/YR

FORM NO.PO32

END DATE: 4/1991

PRINCIPAL INVESTIGATOR: PRITCHARD, J. N.
TITLE: THE FATE OF NICOTINE DURING "AGING" OF ENVIRONMENTAL TOBACCO SMOKE

FUNDING: 120 K/YR

FORM NO.PO33

PRINCIPAL INVESTIGATOR: RYAN, P. BARRY

END DATE: 6/1993

TITLE: INVESTIGATIONS OF OZONE CHEMISTRY IN INDOOR

ENVIRONMENTS

FUNDING: 109 K/YR

FORM NO.PO34

PRINCIPAL INVESTIGATOR: RYLANDER, RAGNER

END DATE: 6/1991

TITLE: INFLAMMATORY RESPONSES AFTER INDOOR EXPOSURE TO

AIRBORNE GLUCAN AND ENDOTOXIN

FUNDING: 103 K/YR

FORM NO.PO35

FORM NO.PO35
PRINCIPAL INVESTIGATOR: SHAUGHNESSY, RICHARD J. END DATE: 8/1992
TITLE: EVALUATION OF EFFECTIVENESS OF PORTABLE INDOOR AIR

CLEANING SYSTEMS

FUNDING: 107 K/YR

END DATE: 6/1993

END DATE: 6/1993

END DATE: 8/1993

FORM NO.PO36

PRINCIPAL INVESTIGATOR: SOLOMON, JEROME J.

TITLE: GENOTOXICITY OF EPOXIDE INDUCED 3-HYDROXYALKYL

URACIL

FUNDING: 243 K/YR

FORM NO.PO37

PRINCIPAL INVESTIGATOR: WILLEKE, KLAUS

TITLE: NEW BIOAEROSOL SAMPLING TECHNIQUES FOR INDOOR

ENVIRONMENTS

FUNDING: 167 K/YR

FORM NO.P038

PRINCIPAL INVESTIGATOR: WITSCHI, HANSPETER

TITLE: NEUROENDORINE LUNG CANCER: MECHANISTIC STUDIES

FUNDING: 172 K/YR

TOTAL FUNDING FOR INSTITUTION: 4360 K/YR

TOTAL FUNDING FOR P: 4360 K/YR

END DATE: ONGOING

END DATE: ONGOING

END DATE: 6/1990

END DATE: 1/1991

END DATE: 1/1991

END DATE: 3/1991

END DATE:

INSTITUTION: CALIFORNIA DEPARTMENT OF HEALTH SERVICES

FORM NO.SOO1

PRINCIPAL INVESTIGATOR: ALEVANTIS, LEON

TITLE: STUDIES OF VENTILATION EFFICIENCY

FUNDING: 20 K/YR

FORM NO.SO02

PRINCIPAL INVESTIGATOR: HAYWARD, STEVEN B.

TITLE: INDOOR AIR QUALITY INTERAGENCY WORKING GROUP

FUNDING: 0 K/YR

FORM NO.SOO3

PRINCIPAL INVESTIGATOR: GIRMAN, JOHN R. END DATE: ONGOING

TITLE: BAKE-OUT OF OFFICE BUILDINGS TO REDUCE EMISSIONS OF

VOLATILE ORGANIC COMPOUNDS

FUNDING: 30 K/YR

FORM NO.SO04

PRINCIPAL INVESTIGATOR: GIRMAN, JOHN R.

TITLE: EMISSIONS AND MODELING EXPOSURES OF TCE FROM

CORRECTION FLUID

FUNDING: 130 K/YR

FORM NO.SOO5

PRINCIPAL INVESTIGATOR: GIRMAN, JOHN R.

TITLE: VOC EMISSIONS FROM ART-SUPPLIES

FUNDING: 130 K/YR

FORM NO.SOO6

PRINCIPAL INVESTIGATOR: GIRMAN, JOHN R.

TITLE: VOC SAMPLING AND ANALYSIS METHOD DEVELOPMENT

FUNDING: 60 K/YR

FORM NO.SOO7

PRINCIPAL INVESTIGATOR: GIRMAN, JOHN R.

TITLE: CAUSES OF ACCIDENTAL CARBON MONOXIDE POISONINGS IN

CALIFORNIA

FUNDING: 100 K/YR

FORM NO.SOO8

PRINCIPAL INVESTIGATOR: KAI-SHEN, LIU

TITLE: ESTIMATING DISTRIBUTIONS OF RADON EXPOSURE IN

CALIFORNIA

FUNDING: 100 K/YR

FORM NO.SO09

PRINCIPAL INVESTIGATOR: HAYWARD, STEVEN B.

END DATE: 10/1990

TITLE: RADON CONCENTRATIONS IN RESIDENCES IN VENTURA COUNTY AND NORTHWESTERN LOS ANGELES COUNTY

FUNDING: 100 K/YR

FORM NO.SO10

PRINCIPAL INVESTIGATOR: MACHER, JANET

END DATE: ONGOING

TITLE: STUDIES OF THE EFFECTIVENESS OF UV RADIATION FOR TB

CONTACT

FUNDING: 30 K/YR

FORM NO.SO11

PRINCIPAL INVESTIGATOR: MACHER, JANET

END DATE:

TITLE: STUDIES OF INDOOR MICROBIOLOGICAL CONTAMINATION

FUNDING: 30 K/YR

TOTAL FUNDING FOR INSTITUTION: 730 K/YR

INSTITUTION: MARYLAND DEPARTMENT OF THE ENVIRONMENT

FORM NO.S012

PRINCIPAL INVESTIGATOR: FARRELL, KATHERINE P.

END DATE: 4/1990 TITLE: MARYLAND INDOOR AIR QUALITY TASK FORCE REPORT
"INDOOR AIR QUALITY, A COMMON SENSE APPROACH"
FUNDING: 10 K/YR

TOTAL FUNDING FOR INSTITUTION:

10 K/YR

- 1. (412-1170 - 1412-1424) - 2014 (413-1424) - 2014 (413-1424) - 2014 (413-1424) (1012-141-141 - 1424) - 東京地方 (413-1424) - 413-141 (413-1424) (1014-1414) - 413-1414 (413-1424)

INSTITUTION: MINNESOTA DEPARTMENT OF HEALTH

FORM NO.SO13

PRINCIPAL INVESTIGATOR: OATMAN, LAURA

TITLE: INDOOR AIR QUALITY ASSESSMENT PROTOCOL

FUNDING: 54 K/YR

FORM NO.SO14

PRINCIPAL INVESTIGATOR: MARBURY, MARIAN C.

TITLE: EPIDEMIOLOGY OF RESPIRATORY ILLNESS AND INDOOR

POLLUTION

FUNDING:

88 K/YR

TOTAL FUNDING FOR INSTITUTION: 142 K/YR

END DATE: 6/1991

END DATE: 1993

INSTITUTION: NEW JERSEY DEPARTMENT OF HEALTH

FORM NO.SO15

PRINCIPAL INVESTIGATOR: MILLER, STEVEN M.

TITLE: ASSESSMENT OF NEW JERSEY'S COMMERCIAL LABORATORY

INDOOR AIR ANALYSIS CAPABILITIES

FUNDING: 25 K/YR

FORM NO.S016

PRINCIPAL INVESTIGATOR: SCHOENBERG, JANET B.

TITLE: CASE CONTROL STUDY OF RADON AND LUNG CANCER IN NEW

JERSEY WOMEN

FUNDING: 120 K/YR

TOTAL FUNDING FOR INSTITUTION:

145 K/YR

END DATE: FY91

END DATE: FY91

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INSTITUTION: TEXAS DEPARTMENT OF HEALTH

FORM NO.SO17

PRINCIPAL INVESTIGATOR: STAHL, QUADE R. TITLE: INDOOR AIR PROGRAM (MAINLY SURVEILLANCE)

FUNDING: 0 K/YR

TOTAL FUNDING FOR INSTITUTION:

O K/YR

END DATE: ONGOING

法国际建筑基础 医线电影 医二氯甲基二氯甲基 INSTITUTION: WISCONSIN DEPARTMENT OF HEALTH AND SOCIAL SERVICES

FORM NO.SO18

END DATE: 1990

PRINCIPAL INVESTIGATOR: OTTO, WILLIAM H. END DATE: 1990
TITLE: INHALATION EXPOSURE FROM VOLATILE ORGANIC COMPOUNDS

FOUND IN DRINKING WATER

FUNDING: 2 K/YR

TOTAL FUNDING FOR INSTITUTION:

2 K/YR

TOTAL FUNDING FOR S: 1029 K/YR

END DATE: 6/1990

END DATE: 6/1990

INSTITUTION: BRIGHAM YOUNG UNIVERSITY

FORM NO.U001

PRINCIPAL INVESTIGATOR: EUTAGH, DELBERT J.

TITLE: EXPOSURE-DOSE RELATIONSHIPS FOR ENVIRONMENTAL

TOBACCO SMOKE

FUNDING: 150 K/YR

FORM NO.U002

PRINCIPAL INVESTIGATOR: EUTAGH, DELBERT J. TITLE: AIR QUALITY IN COMMERCIAL AIRCRAFT

FUNDING: 113 K/YR

TOTAL FUNDING FOR INSTITUTION: 263 K/YR

END DATE: 2010

INSTITUTION: HARVARD SCHOOL OF PUBLIC HEALTH

FORM NO.U003

PRINCIPAL INVESTIGATOR: SPENGLER, JOHN

TITLE: SEVERAL EXPOSURE AND HEALTH STUDIES RELATED TO A

VARIETY OF CONTAMINANTS AND MICROENVIRONMENTS

(HOMES, OFFICES, VEHICLES, ETC.)

FUNDING: 500 K/YR

FORM NO.U004

PRINCIPAL INVESTIGATOR: KOUTRAKIS, PETROS

END DATE: 3/1991

TITLE: INVESTIGATIONS OF PHYSICAL AND CHEMICAL PROCESSES

AFFECTING INDOOR HUMAN EXPOSURES TO ACIDS AND OTHER

RELATED POLLUTANTS

FUNDING: 200 K/YR

> TOTAL FUNDING FOR INSTITUTION: 700 K/YR

END DATE: 10/1992

END DATE: ONGOING

"我们是我们的人,我们还有的人,你不能被称为了你。"

INSTITUTION: RUTGERS UNIVERSITY

FORM NO.U005
PRINCIPAL INVESTIGATOR: FENSKE, RICHARD
TITLE: PESTICIDE EXPOSURE TO CHILDREN IN THE HOME

FOLLOWING INDOOR PESTICIDE APPLICATIONS

FUNDING: 100 K/YR

FORM NO.U006

FORM NO.U006
PRINCIPAL INVESTIGATOR: FENSKE, RICHARD
TITLE: MINIMIZING DERMAL AND RESPIRATORY EXPOSURES TO

PESTICIDES IN GREENHOUSES

FUNDING: 33 K/YR

FORM NO.U007

PRINCIPAL INVESTIGATOR: LIOY, PAUL J.

TITLE: RESEARCH ON TOTAL EXPOSURE

FUNDING: 200 K/YR

TOTAL FUNDING FOR INSTITUTION: 333 K/YR

INSTITUTION: UNIVERSITY OF ARIZONA COLLEGE OF MEDICINE

FORM NO.U008

PRINCIPAL INVESTIGATOR: LEBOWITZ, MICHAEL D.

END DATE: ONGOING

TITLE: PM, OZONE, INDOOR POLLUTANTS AND RESPIRATORY

RESPONSE - TO STUDY ACUTE HEALTH, SUB-CHRONIC, AND

CHRONIC EFFECTS OF INDOOR/OUTDOOR EXPOSURES

FUNDING: 250 K/YR

FORM NO.U009

PRINCIPAL INVESTIGATOR: LEBOWITZ, MICHAEL D.

END DATE: ONGOING

TITLE: NO2, PM AND RESPIRATORY RESPONSES IN ASTHMATICS TO

STUDY INDOOR/OUTDOOR AND TOTAL EXPOSURES TO SHORT

TERM NO2 AND DAILY PM: AND RESPIRATORY

FUNCTION/SYMPTOMS IN SUSCEPTIBLE INDIVIDUALS

FUNDING: 150 K/YR

FORM NO.U010

PRINCIPAL INVESTIGATOR: O'ROURKE, MARY KAY

END DATE: 12/1994

TITLE: INDOOR BIOLOGICAL AGENTS: EXPOSURE AND RESPONSE IN

ALLERGY AND ASTHMA

FUNDING: 150 K/YR

TOTAL FUNDING FOR INSTITUTION:

550 K/YR

INSTITUTION: UNIVERSITY OF ILLINOIS AT CHICAGO

FORM NO.U011

END DATE: ONGOING PRINCIPAL INVESTIGATOR: WADDEN, RICHARD A.

TITLE: EMISSION FACTORS FOR VAPOR DEGREASERS

FUNDING: 0 K/YR

FORM NO.U012

PRINCIPAL INVESTIGATOR: FRANKE, JOHN E. END DATE: ONGOING

TITLE: SOME OBSERVATIONS OF EDDY DIFFUSIVITIES IN

INDUSTRIAL SETTINGS

FUNDING: 0 K/YR

FORM NO.U013

PRINCIPAL INVESTIGATOR: FRANKE, JOHN E. END DATE: ONGOING

TITLE: ACTIVITY BASED EMISSION FACTORS FOR INDOOR SOURCES

FUNDING: 0 K/YR

FORM NO.U014

PRINCIPAL INVESTIGATOR: SCHEFF, PETER A. END DATE: ONGOING

TITLE: TRACE ELEMENT ANALYSIS IN AN ELECTROPLATING AND

METAL FINISHING SHOP

FUNDING: 0 K/YR

FORM NO.U015

END DATE: ONGOING

PRINCIPAL INVESTIGATOR: SCHEFF, PETER A.
TITLE: EMISSIONS OF FREON FROM TWO OPEN TOP VAPOR

DEGREASERS

FUNDING: 0 K/YR

FORM NO.U016

PRINCIPAL INVESTIGATOR: WADDEN, RICHARD A. END DATE: 6/1990

TITLE: INDOOR AIR POLLUTION

FUNDING: 0 K/YR

FORM NO.U017

PRINCIPAL INVESTIGATOR: WADDEN, RICHARD A. END DATE: 8/1990

TITLE: ETHANOL EMISSIONS FROM GLAZING DURING CANDY

PRODUCTION

FUNDING: O K/YR

FORM NO.U018

PRINCIPAL INVESTIGATOR: CONROY, LORRAINE M. END DATE: 7/1991

TITLE: CAPTURE EFFICIENCY OF LACAL EXHAUST HOODS

FUNDING: 15 K/YR

FORM NO.U019

PRINCIPAL INVESTIGATOR: CONROY, LORRAINE M.

END DATE: 6/1990

TITLE: EFFECTS OF BUOYANT SOURCES ON CAPTURE EFFICIENCY OF

SLOT HOODS

FUNDING:

8 K/YR

FORM NO.U020

PRINCIPAL INVESTIGATOR: CONROY, LORRAINE M.

END DATE: 9/1992

TITLE: FIELD STUDY OF LOCAL EXHAUST VENTILATION

PERFORMANCE

FUNDING: 47 K/YR

TOTAL FUNDING FOR INSTITUTION:

70 K/YR

INSTITUTION: UNIVERSITY OF NEW MEXICO SCHOOL OF MEDICINE, CANCER CENTER

FORM NO.U021

PRINCIPAL INVESTIGATOR: SAMET, JONATHAN M. END DATE: 6/1992
TITLE: NO2 AND RESPIRATORY INFECTIONS IN INFANTS

FUNDING: 0 K/YR

TOTAL FUNDING FOR INSTITUTION:

0 K/YR

$(-1)^{-1} = (-1)^{-1} + (-1)$ 1990 INDOOR AIR RESEARCH PROJECTS

INSTITUTION: UNIVERSITY OF PITTSBURGH

FORM NO.U022
PRINCIPAL INVESTIGATOR: ANDELMAN, JULIAN B. END DATE: ONGOING TITLE: INHALATION EXPOSURE IN THE HOME TO VOLATILE ORGANIC

CONSTITUENTS OF DRINKING WATER

FUNDING: 150 K/YR

TOTAL FUNDING FOR INSTITUTION: 150 K/YR

INSTITUTION: YALE UNIVESITY SCHOOL OF MEDICINE

FORM NO.U023
PRINCIPAL INVESTIGATOR: STOLWIJK, JAN A.J.
TITLE: INDOOR AIR QUALITY AND PRODUCTIVITY
FUNDING: 25 K/YR

END DATE: 1/1991

TOTAL FUNDING FOR INSTITUTION:

25 K/YR

TOTAL FUNDING FOR U: 2091 K/YR

APPENDIX C. COST 613 FORMS RECEIVED FOR 1990 IAQ RESEARCH PROJECTS

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Institute, address			
Indoor Air Branch Air and Energy Engineering Research U.S. EPA (MD-54) Research Triangle Park, NC 27711	h Laboratory		ja b
Name of principal investigator	·	Telepho	one No.
Merrill D. Jackson, Indoor Air Branc	ch		541-2559
Descriptive project title: EVALUATIO IAQ CONTR	ON OF SOURCE	MANAGEME	ENT OPTIONS FOR
 Test House Studies of Materials Test House Studies of Activities 	(Jackson) (Jackson)		en e
Keywords (see attached list)			
Control techniques, building material compounds), biological (pollution), ga	ls, household pro ases, particles, ar	oducts, VOC (value of the delta	olatile organic
Project start	(Envisa	ged) project er	nd %
1988		Continuing	
Patrice	Estimat	ed cost	
Estimated manpower	Lamat		

Institute, address		 a
Indoor Air Branch Air and Energy Engineering Research Labor U.S. EPA (MD-54) Research Triangle Park, NC 27711	ratory	
Name of principal investigator	:	Telephone No.
Leslie E. Sparks, Indoor Air Branch		(919) - 541-2458
Descriptive project title: METHODS DEVI	ELOPMENT F	OR IAQ CONTROL
- IAQ Model for Comparing Exposure Redu - Air Cleaner Testing Methods	ctions	
Keywords (see attached list)		
Control techniques, electrostatic filters, filte VOC (volatile organic compounds), gases, p standardization.	r systems, biolo particles, ventila	ogical (pollution) ation, methods, models, and
Project start	(Envisaged)	project end
1987	1993	
Estimated manpower	Estimated c	ost
1.0 FTE (EPA personnel)	\$250 K/yr	(extramural)

Institute, address		a
Indoor Air Branch Air and Energy Engineering Research La U.S. EPA (MD-54) Research Triangle Park, NC 27711	boratory	b :
Name of principal investigator	,	Telephone No.
Leslie E. Sparks, Indoor Air Branch Merrill D. Jackson, Indoor Air Branch	• .	(919) - 541-2458 (919) - 541-2559
Descriptive project title: EVALUATION	OF AIR CLEA	NERS FOR IAQ CONTROL
 Laboratory Testing: Particle Control De Laboratory Testing: Gaseous Control De Test House and Field Studies of Air Cle 	evices (Sparks)	
Keywords (see attached list)		
Adsorption, control techniques, electrost compounds), biological (pollution), gase	atic filters, filter sy s, particles, ventil	ystems, VOC (volatile organic lation and field trials.
Project start	(Envisaged)	project end
1989	Conti	and the second of the second o
•		
Estimated manpower	Estimated co	ost .
1.5 FTE (EPA presonnel)	300 К/ут (e:	xtramural)
•		

Institute, address		
		a
Indoor Air Branch		The property of the second
Air and Energy Engineering Research Labora	atory	
U.S. EPA (MD-54)		b
Research Triangle Park, NC 27711		
'		<u> </u>
	Т	
Name of principal investigator		Telephone No.
W. Gene Tucker, Chief, Indoor Air Branch	ı	(919) - 541-2746
Bruce A. Tichenor, Indoor Air Branch	1	(919) - 541-2991
Descriptive project title: METHODS DEVEI	OPMENT E	OP SOURCE
CHARACTERIZAT		OR SOURCE
A COTTACT A Control of	(TC: -1	
 ASTM Method for Chemical Emission Rate Response - Based Testing of Emissions (Tu 	es (lichenor)	
- Emissions from Biocontaminated Sources (7)	Cichenor)	
- Limbsions from Diocontamination courses (richemor)	
	•	
Keywords (see attached list)		
Emissions, biological (pollution), VOC (vola	tile organic co	ampounds) googs mortisles
comfort, irritation (mucuous membranes, eyes	nie Organic co s. skin), respira	atory (effects) sensory effects
chamber study, methods, and standardization		citity (enoug), sensory enoug,
Constraints of the Constraints o		
Project start	(Envisaged)	project end
1984	1995	
Estimated manpower	Estimated co	ost
1.5 FTE (EPA personnel)	\$300K/yr	(extramural)
C-7		

Institute, address	a
Indoor Air Branch Air and Energy Engineering Research U.S. EPA (MD-54) Research Triangle Park, NC 27711	h Laboratory b
Name of principal investigator	Telephone No.
Leslie E. Sparks, Indoor Air Branch	(919) - 541-2458
	en de la companya de La companya de la companya del companya de la companya del companya de la c
A . 11 A = -	
 Studies of Pollutant Sources in HVA Studies of Ventilation Effectiveness 	AC Systems (w/ASHRAE) (w/ASHRAE)
- Studies of Ventilation Effectiveness Keywords (see attached list) Control techniques, biological (polls)	ution) VOC (volatile organic compounds),
- Studies of Ventilation Effectiveness Keywords (see attached list) Control techniques, biological (polligases, particles, comfort, irritation (ution) VOC (volatile organic compounds), (mucuous membranes, eyes, skin), respiratory a and field trials.
- Studies of Ventilation Effectiveness Keywords (see attached list) Control techniques, biological (polligases, particles, comfort, irritation (effects), sensory effects, ventilation	ution) VOC (volatile organic compounds),
- Studies of Ventilation Effectiveness Keywords (see attached list) Control techniques, biological (polligases, particles, comfort, irritation (effects), sensory effects, ventilation Project start	ution) VOC (volatile organic compounds), (mucuous membranes, eyes, skin), respiratory and field trials. (Envisaged) project end

Institute, address			a .
Indoor Air Branch Air and Energy Engineering Research Labora	itory		
U.S. EPA (MD-54) Research Triangle Park, NC 27711	, ;	1	b
Name of principal investigator		Telepho	one No.
Bruce A. Tichenor, Indoor Air Branch James B. White, Indoor Air Branch			541-2991 541-1189
Descriptive project title: SOURCE CHARA - "Sink" Effect of Indoor Surfaces - Technical Support Studies - Database of Indoor Air Pollutant Sources - Field Studies of Combustion Sources	(Tichenor) (Tichenor) (White) (White)	ON RES	EARCH
Keywords (see attached list)			· · · · · · · · · · · · · · · · · · ·
Adsorption, emissions, building materials, control biological (pollution), VOC (volatile organic data base, and field measurements.	ombustion (so compounds), (urces), ho gases, par	ousehold products, ticles, chamber stud
Project start	(Envisaged) project	end
1985	Con	tinuing	
Estimated manpower	Estimated	cost	
	1		

• • • •	ongoing	to the control of the	3/6.1
Project start FY90	(Envisaged) p	roject end	
Keywords (see attached list) Emission, methods, sources, pollutants, but combustion, biological, temperature, humid model, furniture, health, occupant, organic risk, irritation, chamber study, animal study.	ity, air intiltr	ation, data base,	
Descriptive project title Indoor Air Source Characterization			7
Name of principal investigator W. Gene Tucker, Chief Indoor Air Branch Combustion and Indoor Air Division	(lephone No. (919) 541-2746 (FTS) 629-2746	
	í	b	
U.S. EPA MD-54 Research Triangle Park, NC 27711	atory	a.	

Form of the COST 613 Inventory of Indoor Air Research. CONCERTED ACTION "INDOOR AIR QUALITY AND ITS IMPACT ON MAN" (COST 613) PROJECT INVENTORY

Institute, address Air and Energy Engineering Research Laborate U.S. EPA MD-54 Research Triangle Park, NC 27711	ory	a
, ve		b
Name of principal investigator W. Gene Tucker, Chief Indoor Air Branch Combustion and Indoor Air Division		e No. 541-2746 629-2746
Descriptive project title Indoor Air Quality Control		
Keywords (see attached list) Models, occupant, exposure, pollutants, PM, strategies, ACS, control techniques, emissi concentrations, source, air movement, filte building, soil, insecticides, moisture, rad	ons, combustion, out rs, gases, ozone, El	uoor air,
Project start FY90	(Envisaged) projections ongoing	et end
Estimated manpower FTE 2.0	Estimated cost \$338.4K	

Institute, address Atmospheric Research and	Exposure Assessment Labora	tory
U.S. EPA MD-80 Research Triangle Park,		
	•	<u> </u>
		b
Name of principal investigation John S. Irwin	ator	Telephone No. (919) 541-1323 (FTS) 629-1323
Descriptive project title Develop and Validate Comp Dispersion/Ventilation	outer Assisted Software for	Upgraded NIST Indoor
Develop and Validate Comp Dispersion/Ventilation Keywords (see attached list	Nodel	
Develop and Validate Comp Dispersion/Ventilation Keywords (see attached list	ding air movement multipe	
Develop and Validate Comp Dispersion/Ventilation Keywords (see attached list Ventilation, models, buil	ding, air movement, multizon, evaluation.	nal, ACS, pollutants,

Institute, address Atmospheric Research and Exposure Assess U.S. EPA MD-77B Research Triangle Park, NC 27711	à	
		b
Name of principal investigator Berne I. Bennett		No. 541-2366 529-2366
Descriptive project title Develop and Validate Quality Assurance S	Standards	
Keywords (see attached list) Pollutants, concentrations, VOCs, chemic review, environmental monitoring, vapors	cal, sampling, analysis, s, PM, methods, validatio	SVOCs, standards, on, evaluation.
Project start FY90	(Envisaged) project ongoing	end .
Estimated manpower FTE 0.2	Estimated cost \$26.5K	

Institute, address Atmospheric Research and Exposure Assessmen U.S. EPA MD-77 Research Triangle Park, NC 27711	nt Laboratory	a
		b
Name of principal investigator Frank McElroy, Act. Chief Ambient Methods Standardization Branch Quality Assurance Division	j	lephone No. (919) 541-2622 (FTS) 629-2622
Descriptive project title Compendium of Indoor Air Quality Methods		
Keywords (see attached list) Methods, VOCs, CO ₂ , NO _x , formaldehyde, aldebiologicals, environmental monitoring, analy	hyde, PAH, inso ysis, evaluatio	ecticides, ACS, PM, on, air movement.
Project start FY90	(Envisaged) p	project end

Institute, address Atmospheric Research and Exposure Assess U.S. EPA MD-56 Research Triangle Park, NC 27711	ment Laboratory
	b
Name of principal investigator Ross Highsmith (Microenvironmental)	Telephone No. (919) 541-7828 (FTS) 629-7828
James D. Mulik (PSD)	(919) 541-3067 (FTS) 629-3067
Keywords (see attached list) PM, VOCs, SVOCs, exposure, pollutants, chumidity, temperature, ACS, formaldehyde	, environmental monitoring,
PM, VOCs, SVOCs, exposure, pollutants, c	, environmental monitoring,

Institute, address Atmospheric Research and Exposure Assessm U.S. EPA MD-44 Research Triangle Park, NC 27711	ent Laboratory	a
		b
Name of principal investigator Nancy K. Wilson, Chief Analytical Methods Research Section Methods Research Branch		ne No. 541-4723 629-4723
James D. Mulik	(919) (FTS)	541-3067 629-3067
Descriptive project title Analytical Methods Development		
Keywords (see attached list) Sampling, analysis, VOCs, source, SVOCs, Penvironmental monitoring.	AH, formaldehyde, car	cinogenic,
Project start FY90	(Envisaged) projection	t end
	Į.	,

Institute, address Atmospheric Research and Exposure Assessme U.S. EPA MD-56 Research Triangle Park, NC 27711	ent Laboratory
	b
Name of principal investigator Ross Highsmith	Telephone No. (919) 541-7828 (FTS) 629-7828
Descriptive project title Large Building Studies	
Keywords (see attached list) Building, chemical, residence, offices, ex VOCs, SVOCs, environmental monitoring, and validation, complaint, health, multi-zonal	alysis, sources, representative survey,
Project start FY90	(Envisaged) project end ongoing
Estimated manpower FTE 1.0	Estimated cost \$345K

1172

Institute, address Environmental Criteria and U.S. EPA MD-52 Research Triangle Park, NC	Assessment Office		
			b
·	s		e de la companya del companya de la companya del companya de la co
Name of principal investigate Michael A. Berry, Deputy D Environmental Criteria and	or irector Assessment Office	1	elephone No. (919) 541-4172 (FTS) 629-4172
Descriptive project title	and the second s		<u> </u>
Descriptive project title Indoor Air Program Manageme	ent, Coordination ar	d Research	Community Support
Descriptive project title	ent, Coordination are alth, sources, stration.	d Research	Community Support
Descriptive project title Indoor Air Program Manageme Keywords (see attached list) Risk, models, buildings, he	ent, Coordination ar	d Research	Community Support
Descriptive project title Indoor Air Program Manageme Keywords (see attached list) Risk, models, buildings, he	ent, Coordination are alth, sources, stration.	d Research	Community Support vironmental monitoring, project end
Descriptive project title Indoor Air Program Manageme Keywords (see attached list) Risk, models, buildings, he control techniques, combust Project start	ent, Coordination are alth, sources, stration.	tegies, en	Community Support vironmental monitoring, project end

Institute, address Environmental Criteria and Assessment Office U.S. EPA MD-52 Research Triangle Park, NC 27711	The second second	- .	Line in the second in
energia de la companya del companya de la companya del companya de la companya de			b
*	,	·	
Name of principal investigator Michael A. Berry, Deputy Director Environmental Criteria and Assessment Office	*****	(919) 5	541-4172 520-4172
Descriptive project title Risk Characterization Methodology and Risk A	Assessment		ing a second
Keywords (see attached list) Risk, health, pollutants, asthmatic, NO _x , be methods, ETS, combustion, emissions, general	iological, (population	carcinogen	ic, formaldehyde, extiles.
Project start	(Envisaged ongoing	198 S S 198	end (**)
Estimated manpower FTE 1.5	Estimated \$155K	38	

Institute, address Environmental Criteria and Assessment Of U.S. EPA MD-52 Research Triangle Park, NC 27711	fice		a	· .
•			Ъ	
			·	
Name of principal investigator Norman E. Childs, Act. Chief Environmental Media Assessment Branch Environmental Criteria and Assessment Of	fice		L e No. 541-2229 529-2229	,
Descriptive project title' Publication of the Indoor Air Reference	Bibliography			
Keywords (see attached list) Database.				
Keywords (see attached list) Database.		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Database.	(Envisaged ongoing		: end	

Institute, address Health Effects Research Laboratory U.S. EPA MD-58 Research Triangle Park, NC 27711		a
		b
Name of principal investigator George M. Goldstein	Telepho (919)	ne No. 966-6200
David A. Otto	(919)	966-6226
Descriptive project title Neurobehavioral, Respiratory and Sensory Ir Mixtures in Humans	ritant Effects of c	omplex VOC
Keywords (see attached list) Exposure, VOC, SBS, employees, pollutants, effects, validation, susceptible groups, ch respiratory, sensory effects, irritation, s odors, concentrations, field trials.	emical. carcinogeni	c. behavioral.
Project start FY90	(Envisaged) proje ongoing	ct end
Estimated manpower FTE 1.0	Estimated cost \$500K	

Institute, address Health Effects Research Laboratory U.S. EPA MD-68 Research Triangle Park, NC 27711			a
			b
Name of material descriptions			2 y 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Name of principal investigator Joellen Lewtas, Chief Genetic Bioassay Branch Genetic Toxicology Division			No. 541-3849 529-3849
George M. Goldstein		(919)96	6-6204
Descriptive project title Biological Markers for Environmental Tobacc Dosimetry in Children and Adults	o Smoke (ET	S) Exposur	e and
		A STATE OF THE STA	de la la companya di Santa di Santa di Santa di Sa
Keywords (see attached list) ETS, bioassay, methods, biological monitoring evaluation, dose, risk, health, effects, can study, field trials, daycare center, environg concentrations, in vitro study.	ng, childre	n, validat	ion, exposure,
Project start FY90	(Envisaged ongoing	i) project	end
The state of the s	•		en et agent it by district
Estimated manpower	Estimated \$315K	cost	in in the second section of the section

Institute, address Health Effects Research Laboratory U.S. EPA MD-58			a .
Research Triangle Park, NC 27711	ر قر	4 *	
			b
			
Name of principal investigator George M. Goldstein		Telepho (919)	o ne No.) 966-6200
Keywords (see attached list) Toxicology, VOC, animal studies, in vitro effects, exposure, irritation, mutagenici	study, immun	otocity,	behavioral
comfort, health, respiratory, bloassay, c	ancer, chambe	r study.	
Project start	7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	d) proje	ect end
and the second of the second o			ne portinente de la compansión de la compa La compansión de la compa

Institute, address			a	,
Science and Technology Laboratory NASA - Stennis Space Center Stennis Space Center, MS 39529-6000				•
			b	
Name of principal investigator		Telephone	≥ No.	
Anne H. Johnson, Research Microbiologist Science and Technology Laboratory		(601) 688 (FTS) 494		
Descriptive project title Reduction of VOCs by foliage plants and	associated micr	obial popu	lations	
Keywords (see attached list)		,		
plants, soil, biological monitoring, bac	teria, fungi, o	rganics		
	(Envisage	d) project	end	
Project start	, ,			
FY 87	Continui	ng		

Institute, address		÷ .	a	
Division of Biomedical and Behavioral Science National Institute for Occupational Safety at 4676 Columbia Parkway			4	
Cincinnati, Ohio 45226			b	
,	<u>.</u>			
Name of principal investigator		Telephon	e No.	•
Joseph J. Hurrell, Jr. Applied Psychology and Ergonomics Branch	;	(513) 533 FTS 684		
Applied raychology and bigonomics blanch				
Descriptive project title			······································	
Descriptive project title	for IAQ			
Descriptive project title	······································			
Descriptive project title Development of Survey Assessment Instrument : Keywords (see attached list) reactions, buildings (office), employees, meas	surement met	hods		
Descriptive project title Development of Survey Assessment Instrument : Keywords (see attached list) reactions, buildings (office), employees, measurement in the second	surement met			
Descriptive project title Development of Survey Assessment Instrument of Survey Assessment In	surement met	hods		
Descriptive project title Development of Survey Assessment Instrument : Keywords (see attached list) reactions, buildings (office), employees, measurement in the second	Surement met	hods	t end	

Institute, address	a 40. 3 3 30.
Division of Training and Manpower Development National Institute for Occupational Safety and He 4676 Columbia Parkway Cincinnati, Ohio 45226	ealth
Name of principal investigator	Telephone No.
Pete Rentos, Ph.D. Educational Resource Development Branch	(513) 533-8251 FTS 684-8251
Descriptive project title	
Educational Modules for Transferring Research Res	sults
Educational Modules for Transferring Research Res	a formal debute 11.1
Keywords (see attached list) control techniques, guidelines, building material offices, new buildings, employees, health, SBS, v asbestos, radon, sampling	s, formaldehyde, biological, ventilation, assessment, outdoor,
Keywords (see attached list) control techniques, guidelines, building material offices, new buildings, employees, health, SBS, v asbestos, radon, sampling Project start (E	a formal debute 11.1

Institute, address				
Division of Surveillance, Hazard Evaluations : National Institute for Occupational Safety and 4676 Columbia Parkway Cincinnati, Ohio 45226		tudies	b	
Name of principal investigator		Telepho	ne No.	
David Sundin Hazard Evaluations and Technical Assistance Branch			41-4382 84-4382	
Descriptive project title				
Descriptive project title				
Descriptive project title Health Hazard Evaluations on Indoor Air Quality	ty			
	ty			
Health Hazard Evaluations on Indoor Air Quality	······································	schools,	VOC	
Health Hazard Evaluations on Indoor Air Quality Keywords (see attached list)	······································	schools,	Voč	
Health Hazard Evaluations on Indoor Air Quality Keywords (see attached list)	e, health,	schools,		
Health Hazard Evaluations on Indoor Air Quality Keywords (see attached list) buildings (office), comfort, CO ₂ , formaldehyde	e, health,	ed) proje		
Health Hazard Evaluations on Indoor Air Quality Keywords (see attached list) buildings (office), comfort, CO ₂ , formaldehyde	e, health,	ed) proje		

Institute, address	a	الناه المشار
Division of Surveillance, Hazard Evaluations a National Institute for Occupational Safety and 4676 Columbia Parkway Cincinnati, Ohio 45226	and Field Studies d Health	; ;
	b	
Name of principal investigator	Telephone No.	
Michael Crandall Anne Fidler, Ph.D. Hazard Evaluations and Technical Assistance B	(513) 841-4382 FTS 684-4382 Branch	
Descriptive project title		
Library of Congress Indoor Air Quality Study		
Keywords (see attached list)		
biological, building (library), comfort, CO ₂ spatial variations, VOC	, exposure, health, psycho-social,	
Project start	(Envisaged) project end	
FY 89	FY 90	
Estimated manpower	Estimated cost	
1.2 FIE	\$120K	

Institute, address Division of Surveillance, Hazard Evaluations and Field Studies National Institute for Occupational Safety and Health 4676 Columbia Parkway Cincinnati, Ohio 45226			a b	
		and the second		
Name of principal investigator Gret A. Burkhart, M.D., M.S. Industrywide Studies Branch Epidemiology I Section			Telephon	e No.
Keywords (see attached list)				
epidemiologic study, exposure, h outdoor air, representative surv	ealth, non-res	idential b sk analysi	uildings, s, SBS	occupants,
Project start		(Envisage	ed) proje	ct end
FY 90	governor or o	Ongoing		
Estimated manpower		Estimate	d cost	
FTE 0.25 per year		\$10K per	year	

Institute, address DIVISION OF PHYSICAL SCIENCES AND ENGINEERING NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND 4676 COLUMBIA PARKWAY CINCINNATI, OHIO 45226	D HEALTH
	b
Name of principal investigator	Telephone No.
EUGENE KENNFDY, PH.D. ORGANIC METHODS DEVELOPMENT SECTION METHODS RESEARCH BRANCH	(513) 841-4402 FTS 684-4402
Descriptive project title METHOD FOR SAMPLING AND ANALYSIS OF INDOOR AIR	FOR ORGANIC COMPOUNDS
Keywords (see attached list) ANALYSIS, DETECTION, DETECTION METHODS, ENVIRONEW BUILDINGS, OFFICES, MEASUREMENT, MEASUREMENT SAMPLING, TLV, VOC	ONMENTAL MONITORING, EXPOSURE, NT METHODS, METHODS, POLLUTANTS,
Project start	(Envisaged) project end
FY 89	FY 92
Estimated manpower	Estimated cost and the second second
FTE 4.0	\$50,000

Institute, address DIVISION OF PHYSICAL SCIENCES AND ENGINEERING NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND 4676 COLUMBIA PARKWAY CINCINNATI, OHIO 45226) ID HEALTH	97	a b
Name of principal investigator MAZEN ANASTAS CONTROL RESEARCH SECTION MONITORING AND CONTROL RESEARCH BRANCH	(elephone 513) 841 FTS 684	-4319
Descriptive project title METHODS FOR EVALUATING INDOOR AIR VENTILATION	SYSTEMS	•	
Keywords (see attached list) ACS, AIR INFILTRATION, AIR MOVEMENT, CLIMATE FORCED VENTILATION, NEW BUILDINGS, OFFICES, T	, CONTROL, CON EMPERATURE, VE	TROL TEC	HNIQUES, N
Project start FY 89	(Envisaged) FY 91	project	end end
Estimated manpower FTE 4.0	Estimated c	ost	

National Institute of Standards and Tech Center for Building Technology Building Environment Division Building 226, Room A313 Gaithersburg, Maryland 20899	nology		b
Name of principal investigator		Telephone	No.
Andrew K. Persily, Ph.D.	k	301) 975-	
Descriptive project title			
Efficiency of Gaseous Contaminant Removal	Devices		
	•	,	
Keywords (see attached list) control techniques, standards, filter sys	items, gases,	measureme	nt methods,
control techniques, standards, filter sys	tems, gases,		nt methods,
	(Envisaged		

Institute, address	a
National Institute of Standards and Tec Center for Building Technology Building Environment Division Building 226, Room A313	hnology
Gaithersburg, Maryland 20899	b
Name of principal investigator	Telephone No.
Andrew K. Persily, Ph.D.	(301) 975-6418
as a productive and the second	
Descriptive project title	
Infiltration and Ventilation in Large !	Buildings
Keywords (see attached list) outdoor air,offices, air conditioning system ventilation, natural ventilation, field measurement methods, multize	urements, environmental monitoring,
Project start FY 84	(Envisaged) project end ongoing
gant of the second of the seco	
Estimated manpower	Estimated cost
FTE: 1.5	\$175K

Institute, address National Institute of Standards and Technolog Center for Building Technology Building Environment Division Building 226, Room A313 Gaithersburg, MD 20899	y		a b
Name of principal investigator		Telephone	No.
Andrew K. Persily, Ph.D.		(301) 975	-6418
Descriptive project title			
Indoor Air Pollution Concentration Model		¥ + ¥	e de la companya de l
Keywords (see attached list)	2		
models validation			
	•		
Project start .	(Envisage	d) project	end
FY 86	ongoing		
Estimated manpower	Estimated	cost	
FTE 1.0	\$125K	-	

Institute, address		a
Bonneville Power Administration U.S. Department of Energy P.O. Box 3621		
Portland, OR 97208-3621		b
•		
Name of principal investigator	Telepho	ne No.
Mark Jackson RMRD	(503) FTS	230-3098 429-3098
•		
Descriptive project title		
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t	itute and various ver	rative utilation
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t Keywords (see attached list)	itute and various ver	rative utilation
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t	itute and various ver	rative utilation
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t Keywords (see attached list)	itute and various ver	rative utilation
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t Keywords (see attached list)	itute and various ver	itilation
Residential Ventilation Research Project project with Electric Power Research Inst equipment manufacturers) (See attached t Keywords (see attached list) Ventilation, buildingsresidential	itute and various ver wo-page summary.)	itilation

Institute, address		3	a
Bonneville Power Adminstration U.S. Department of Energy P.O. Box 3621 Portland, OR 97208-3621			
101014114; OK 37200-3021		· · · · · ·	b
Name of principal investigator		Telephon	e. No.:
Mark Jackson RMRD		(503) ; FTS	230-3098 429-3098
Descriptive project title		,	
Single Family Ventilation Case Studies	(See attached 1	-page pro	oject.)
Keywords (see attached list)			A , 3 &
Ventilation, buildingssingle family n	residential	. 13. 1 9.	
Project start	(Envisaged) project	t endra de grange semi
1990		1992	WW.
Estimated manpower BPA0.20 FTE/yr.	Estimated	cost \$160K	es de la frata porta de la como Cara de la Cara de la como de La como de la c

Institute, address			a
Bonneville Power Administration U.S. Department of Energy P.O. Box 3621			
Portland, OR 97208-3621		•	b
Name of principal investigator		Telephon	e No.
Mark Jackson RMRD			230-3098 429-3098
Descriptive project title			
Descriptive project title Super Good Cents Multifamily Ventilation innovative ventilation systems in new ene housing projects) (See attached brochure Keywords (see attached list)	ergy efficien	six diffe t multifam	rent ily
Super Good Cents Multifamily Ventilation innovative ventilation systems in new ene housing projects) (See attached brochure	ergy efficien	six diffe t multifam	rent ily
innovative ventilation systems in new ene housing projects) (See attached brochure Keywords (see attached list)	ergy efficien	six diffet multifam	11 ly
Super Good Cents Multifamily Ventilation innovative ventilation systems in new ene housing projects) (See attached brochure Keywords (see attached list) Ventilation, buildingsmultifamily	ergy efficien	t multifam	11 ly
Super Good Cents Multifamily Ventilation innovative ventilation systems in new ene housing projects) (See attached brochure Keywords (see attached list) Ventilation, buildingsmultifamily Project start	ergy efficien	ed) projec	111y

Institute, address			a		
Bonneville Power Administration P.O. Box 3621 Portland, OR 97206-3621					
			b	<u> </u>	
					•
Name of principal investigator	1	elephon	e No.	· · ·	
Tim Steele		503 2 FTS 4	30-3303 29-3303	٠.	
Descriptive project title				, , , , , , , , , , , , , , , , , , ,	
Adoption and Interpretation of ASHRAE Stand (See attached description.)	lard 62-1989	· •		*	ì
Keywords (see attached list)	·				
Ventilation, standards				g 1 .	
Ventilation, standards Project start	-	1 2 2			* 6, 1
	(Envisaged)	1 2 2	end		**************************************
Project start	-	project	end		7 (5) (1) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4

Institute, address		1 × 4	. a :*
Bonneville Power Administration P.O. Box 3621 Portland, OR 97208-3621			
			b .
Name of principal investigator		Telephor	e No.
Charles Eastwood RMRD		503 230 FTS 429	
Descriptive project title			
Development of an Expert System for Res (See attached description.)	idential Radon	Mitigatio	
Development of an Expert System for Res (See attached description.) Keywords (see attached list)		Mitigatio	
(See attached description.)			
(See attached description.) Keywords (see attached list) Radon, Expert System, Artificial Intell	igence, Mitiga	tion	
(See attached description.) Keywords (see attached list) Radon, Expert System, Artificial Intell	igence, Mitiga	tion ed) projec	
(See attached description.) Keywords (see attached list) Radon, Expert System, Artificial Intell Project start	igence, Mitiga (Envisage 6-91	tion ed) projec	t end

Institute, address	a
Bonneville Power Administration P.O. Box 3621 Portland, OR 97208-3621	
	b
Name of principal investigator	Telephone No.
Charles Eastwood RMRD	503 230-4992 FTS 429-4992
Descriptive project title	
Influence of Subslab Aggregrate Permea Radon Subslab Ventilation Mitigation S (See attached description.)	ability on the Performance of Systems
Keywords (see attached list)	
Aggregrate, Gravel, Subslab Ventilatio	on, Radon, Mitigation
Project start	(Envisaged) project end
5/90	3/91
Estimated manpower	Estimated cost
2.0	\$70,000

Institute, address U.S. Department of Housing and Urban Developme Office of Policy Development and Research 451 7th Street, SW Washington, DC 20410	nt		a
			b
Name of principal investigator		Telephone	No.
Conrad C. Arnolts (HUD) - Michael Boyd (EPA)		(202) 755-	-5528-(202) 382-4353
Descriptive project title	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
	. 11		
Radon Testing and Evaluation in Multistory Res	idential Bu	ildings	
Keywords (see attached list)			
	•		
Spatial variations, concentrations, radon, res requirements	idential bu	ildings, c	occupants, field
Project start	(Envisage	d) project	end
April, 1990	December,	1990	
Estimated manpower	Estimated	cost	
	&70,000		

F018

Form of the COST 613 Inventory of Indoor Air Research.

Institute, address		a
U.S. Department of Transportation (Office of the Secretary, P-15) Washington, D.C. 20590 (Arnold G. Konheim)		b
Name of principal investigator	Telephone	e No.
Dr. Niren NAGDA, Geomet Technologies, Inc.	301-4	128-9898
Descriptive project title Airliner Cabin environment: Contaminan and Mitigation options. Keywords (see attached list)	t Measures, Healt	h Risks,
Aerosols, bacteria, biological (pollut (Environmental Tobacco Smoke), fungi, cancer, irritation (mucous membranes, ACS (Air Conditioning System), humidit detection methods, models, passive sam	odors, ozone, rad eyes, skin), muta y, ventilation, d	lgenicity,
Project start	(Envisaged) project	
Estimated manpower	Estimated cost	

Institute, address Argonne National Laboratory 9700 South Cass Avenue	
Argonne, IL 60439	
	b
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	A CONTROL OF THE TAIL AND A CONTROL OF THE
Name of principal investigator	Telephone No.
Robert A. Schlenker and Richard E. Toohey	708-972-4180
Environment, Safety, and Health Department	
Marvin Wesely, Environmental Research Divi	sion
Assessment of Thoron and Thoron Daughter	
Keywords (see attached list) Thoron, radon, seasonal variations, concentrations, residences, climate, meteorological fatemperature, humidity, ventilation, environme monitoring, models	ctors,
Project start	(Envisaged) project end
FY88	Ongoing
Estimated manpower	Estimated cost

Institute, address		44	a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkelely, CA 94720	tue N		
			b
•	6 og for sake kilomer skir general i skir general	novement generale e na april	i 1953 - The high of the form
Name of principal investigator	*,	Telephone	No.
Anthony V. Nero Joan M. Daisey	ar .	FTS: 451-	-7491 7491) 486-6658
	The second secon		
Air Pollutant Exposures in Buildi	ngs	***************************************	
Air Pollutant Exposures in Buildin Keywords (see attached list)	ngs		*
	ngs integration, mo	dels, buil	dings, radon, i.e.
Keywords (see attached list) population exposures, data analyses and	integration, mo	dels, buil	dings, radon,
Keywords (see attached list) population exposures, data analyses and volatile organic compounds, ETS, PAH, CO	integration, mo	dels, buil s, NO ₂ , SO	dings, radon,
Keywords (see attached list) population exposures, data analyses and volatile organic compounds, ETS, PAH, CO Project start	integration, mo, PM, pollutant	dels, buils, NO ₂ , SO	dings, radon,

Institute, address	a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720	b
Name of principal investigator	Telephone No. (415) 486-7491
Joan M. Daisey	FTS 451-7491 FAX: (415) 486-6658
	Andrew Communication and the second of the s
Descriptive project title Infiltration, Ventilation and Indoor	
Infiltration, Ventilation and Indoor Keywords (see attached list) air infiltratural ventilation, ventilation, build offices, residences, schools, passive same monoxide). ETS, formaldehyde, N-PAH, organization, o	Air Quality ation, air movement, forced ventilation, ings and energy usage, new buildings, mplers, aerosols, aldehydes, CO (carbon anic chemical, PAH, pollution, pollutants, ques, exposure, emissions, energy conser-
Keywords (see attached list) air infiltration, ventilation, build offices, residences, schools, passive samonoxide), ETS, formaldehyde, N-PAH, organization, solvents, SVOC, VOC, control technic	Air Quality ation, air movement, forced ventilation, ings and energy usage, new buildings, mplers, aerosols, aldehydes, CO (carbon anic chemical, PAH, pollution, pollutants, ques, exposure, emissions, energy conser-
Keywords (see attached list) air infiltrantural ventilation, ventilation, build offices, residences, schools, passive samonoxide), ETS, formaldehyde, N-PAH, organomy, solvents, SVOC, VOC, control techniquation, seasonal and spatial variations,	Air Quality ation, air movement, forced ventilation, ings and energy usage, new buildings, mplers, aerosols, aldehydes, CO (carbon anic chemical, PAH, pollution, pollutants, ques, exposure, emissions, energy conserguidelines, reactions, SBS

Institute, address				a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720				
			ating and Later	b .
Name of principal investigator Joan M. Daisey			FTS 45	No. 486-7491 L-7491 L5) 486-6658
Descriptive project title				
Indoor Atmospheric Chemistry:	Interactions	of Radon w	ith Other	Gaseous Pollutants
		5		
Keywords (see attached list)				
Keywords (see attached list) chemical reactions, radon, VOO particulate matter	C, organic co	mpounds, PAI	l ₎ radiolys	is,
chemical reactions, radon, VOC	c, organic co	mpounds, PAI	ⁱ ,r adi olys	is,
Keywords (see attached list) chemical reactions, radon, VOO particulate matter Project start	C, organic co	mpounds, PAI		And the second of the second o
chemical reactions, radon, VOO particulate matter	C, organic co			And the second of the second o

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Institute, address	e i i i i i i i i i i i i i i i i i i i	
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720		b
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Name of principal investigator		ephone No.
Joan M. Daisey	FTS: FAX:	451-7491
The state of the s	× · · · · · · · · · · · · · · · · · · ·	
Descriptive project title	•	
Mechanism-based Risk Assessment for Indo	or Air Exposures	taes to the second of the seco
Descriptive project title	or Air Exposures	taes to the same
Mechanism-based Risk Assessment for Indo Keywords (see attached list) biological monitoring, bioassay, develop	or Air Exposures	rmacokinetics,
Mechanism-based Risk Assessment for Indo Keywords (see attached list)	or Air Exposures	rmacokinetics,
Mechanism-based Risk Assessment for Indo Keywords (see attached list) biological monitoring, bioassay, develop cancer, exposure, risk estimate, VOC	or Air Exposures	rmacokinetics,
Mechanism-based Risk Assessment for Indo Keywords (see attached list) biological monitoring, bioassay, develop cancer, exposure, risk estimate, VOC	ment, models, phar	cmacokinetics,
Mechanism-based Risk Assessment for Indo Keywords (see attached list) biological monitoring, bioassay, develop cancer, exposure, risk estimate, VOC Project start	ment, models, phar	rmacokinetics,

Institute, address			a 500
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720	1 m		
, , , , , , , , , , , , , , , , , , ,			b
•			
Name of principal investigator	vr · · · · · · · · · · · · · · · · · · ·	Telephone	No.
Max H. Sherman	(-	415)486-4 TS: 451-4 AX:(415)4	022 022
Descriptive project title		- · ·	
Ventilation Measurement Techniques			
Keywords (see attached list)		7	ing the second of the second o
air infiltration, ventilation, field measur multizonal, development, concentrations		rement me	
Project start	(Envisaged) project	end
FY '86	Ongoing	-	Charles and the second
Estimated manpower	Estimated	cost	
1 FTE	\$150 K	•	

Institute, address			a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720			
berkerey, CA 34720			b
Name of principal investigator	· • • • • • • • • • • • • • • • • • • •	Telephon	e No.
Mark P. Modera		(415) 486- FTS: 451-4 FAX: (415)	-4678 1678) 486-6658
Descriptive project title			
Air Leakage in Buildings		e de la companya de La companya de la co	
and the second s		.	en e
Keywords (see attached list)	·		\$\frac{5}{2} \cdot \frac{1}{2}
energy conservation, seasonal variations, field measurements	standards,	air infilt	ration,
Project start	(Envisag	ed) projec	t end
FY '80	Ongoing		
and the second of the second o			
Estimated manpower	Estimate	d cost	
1 FTE	\$150 K		

Institute, address		
Indoor Environment Program	a . 1	n en
Applied Science Division Lawrence Berkeley Laboratory		
Berkeley, CA 94720	b	10

Name of principal investigator	Telephone No.	Section 1985
Helmut E. Feutsel	(415)486-4021 FTS: 451-4021 FAX: (415)486-	
Descriptive project title		
Air Flow Modelling	ergen i johannen en	
Keywords (see attached list)		
•	The state of the s	
ventilation, multizonal, air movement, mo	The state of the s	ment
ventilation, multizonal, air movement, mo control techniques	delling, validation, develop	ment
ventilation, multizonal, air movement, mo control techniques Project start	delling, validation, development (Envisaged) project end Ongoing	ment

Institute, address			a .
Indoor Environment Program Applied Science Division			
Lawrence Berkeley Laboratory Berkeley, CA 94720		•	b
			,
Name of principal investigator		Telephone (415) 486-	
Gregory W. Traynor		FTS: 451-5 FAX: (415)	5729
Descriptive project title			
Development of a Carbon Monoxide Passive	Sampler		
Keywords (see attached list)			
Keywords (see attached list) CO, concentrations, detection methods, de outdoor air, passive samplers	velopment, m		
CO, concentrations, detection methods, de			methods,
CO, concentrations, detection methods, de outdoor air, passive samplers		easurement	methods,
CO, concentrations, detection methods, de outdoor air, passive samplers Project start	(Envisag	easurement	methods,

Institute, address		· · · · · · · · · · · · · · · · · · ·	
			a.
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory			
Berkeley, CA 94720			b
			•
Name of principal investigator		ephon	
Gregory W. Traynor	FTS	5) 486 : 451- : (415	
Descriptive project title		ı	
Concentrations of Indoor Pollutants (CIP)	Data Base	•	
Keywords (see attached list)		- 1	
buildings, concentrations, data base, fiel review	d measurements,	pollui	tants,
Project start	(Envisaged) p		
		rojeci	. end
FY '87	FY '91		
Estimated manpower	Estimated cos	t	
0.25 FTE	\$40 K/year		

Institute, address		a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory	en de la companya de La companya de la co	
Berkeley, Ca 94720		b
Name of principal investigator	Tele	phone No.
Gregory W. Traynor	FTS:	486-5729 451-5729 (415) 486-6658
Descriptive project title		
Descriptive project title Simulation Modeling of Indoor Air Pollutant (also called "Macromodel")	Concentrations	
Simulation Modeling of Indoor Air Pollutant	control, combust ons, energy conser odels, NO _v , outdoo	ration, exposure, rair, PAH, PM,
Simulation Modeling of Indoor Air Pollutant (also called "Macromodel") Keywords (see attached list) annual exposure, assessment, buildings, CO, concentrations, control strategies, emissio indoor/outdoor ratios, modeled approach, mo pollutants, POM, Rn, seasonal variations, s	control, combust ons, energy conser odels, NO _v , outdoo	vation, exposure, r air, PAH, PM, , variations (of
Simulation Modeling of Indoor Air Pollutant (also called "Macromodel") Keywords (see attached list) annual exposure, assessment, buildings, CO, concentrations, control strategies, emissio indoor/outdoor ratios, modeled approach, mo pollutants, POM, Rn, seasonal variations, s concentrations/exposures), VOC	control, combust ons, energy conser odels, NO _X , outdoo cources, SO ₂ , SVOC	vation, exposure, r air, PAH, PM, , variations (of
Simulation Modeling of Indoor Air Pollutant (also called "Macromodel") Keywords (see attached list) annual exposure, assessment, buildings, CO, concentrations, control strategies, emissio indoor/outdoor ratios, modeled approach, mo pollutants, POM, Rn, seasonal variations, s concentrations/exposures), VOC Project start	control, combust ons, energy conser odels, NO _X , outdoo cources, SO ₂ , SVOC (Envisaged) pr	vation, exposure, r air, PAH, PM, , variations (of roject end

Institute, address		a
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720		b
Name of principal investigator		ne No.
Joan M. Daisey Alfred T. Hodgson	(415)486 FTS: 451 FAX: (41	
Descriptive project title		and the second s
Assessments of Exposures to Candidate Volatindoor Air	ile Organic Contamin	ants in
Keywords (see attached list)		
aldehydes, chlorinated hydrocarbons, halogena N-nitrosamines, phenols, solvents, volatile o	ated hydrocarbons, organic compounds	est to the control of
Project start	(Envisaged) projec	rt end
FY '90	FY '91	7
Estimated manpower	Estimated cost	
0.25	\$40 K	2 ⁵ 4 4 4

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Institute, address			a		1
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory Berkeley, CA 94720			b	ma _k at	
Name of principal investigator R. G. Sextro W. J. Fisk H. A. Wollenberg, T. N. Narisimhan	(F	Telephon 415) 486 TS: 451- AX: (415	-6591 6591	58	.v
Descriptive project title Experimental and Theoretical Investigation Transport, and Entry	ns of Radon Av	ailabili	ty,		
Experimental and Theoretical Investigation	ns of Radon Av	/ailabili	ty,		
Experimental and Theoretical Investigation Transport, and Entry	measurement m	nethods, n, exposu	models,		
Experimental and Theoretical Investigation Transport, and Entry Keywords (see attached list) analysis, assessment, field measurements, modeled approach, validation, residences,	measurement m	methods, n, exposu cs	models, re,		
Experimental and Theoretical Investigation Transport, and Entry Keywords (see attached list) analysis, assessment, field measurements, modeled approach, validation, residences, seasonal variations, sources, soil, soil of	measurement m cancer, radon characteristic	methods, n, exposu cs	models, re,		
Experimental and Theoretical Investigation Transport, and Entry Keywords (see attached list) analysis, assessment, field measurements, modeled approach, validation, residences, seasonal variations, sources, soil, soil of the Project start	measurement m cancer, radon characteristic	nethods, n, exposu cs d) projec	models, re,		

Institute, address			a	
Indoor Environment Program Applied Science Division Lawrence Berkeley Laboratory				
Berkeley, CA 97420			b	
	and the second			
Name of principal investigator		Telephone	e No.	
A. V. Nero		(415)486-(FTS: 451-(FAX: (415)	6591 6591	•
Decementive present title		<u> </u>		
Descriptive project title		•		'
	ations	,		
Characterization of Airborne Radon Concentr	rations	· · · · · · · · · · · · · · · · · · ·		
	ironmental deled appro	ach, buildi	ngs, cand	er,
Keywords (see attached list) analysis, assessment, detection methods, env measurements, interlaboratory comparison, mo risk estimate, radon, particulate matter, ex seasonal variations, building materials, dri	ironmental deled appro posure, con nking water	ach, buildi	ngs, cand ques, 1	er,
Characterization of Airborne Radon Concentration (see attached list) analysis, assessment, detection methods, envinces measurements, interlaboratory comparison, morisk estimate, radon, particulate matter, exseasonal variations, building materials, dricharacteristics	ironmental deled appro posure, con nking water	ach, buildi trol techni , soil, soi	ngs, cand ques, 1	er,
Characterization of Airborne Radon Concentration (see attached list) analysis, assessment, detection methods, envinces measurements, interlaboratory comparison, morisk estimate, radon, particulate matter, exseasonal variations, building materials, dricharacteristics Project start	ironmental deled approposure, connking water	ach, buildi trol techni , soil, soi	ngs, cand ques, 1	er,

Institute, address			a .
Environmental Sciences Division Lawrence Livermore National Laboratory P.O. Box 5507, L-453 Livermore, CA 94550			
	· · · · · · · · · · · · · · · · · · ·		b
	š .		
Name of principal investigator		Telephone	e No.
Thomas E. McKone	e	(415) 42	2-7535
		ļ	
Descriptive project title Evaluation of Residential Exposure to Organic	Chemicals	in Tap Wa	ater and Soil
Evaluation of Residential Exposure to Organic		in Tap Wa	ater and Soil
Evaluation of Residential Exposure to Organic	s, drinkir urement,	ng water, s	soil, residences,
Keywords (see attached list) Exposures, concentrations, variations, source	s, drinkir urement, ne dust.	ng water, s	soil, residences, lidation,
Keywords (see attached list) Exposures, concentrations, variations, source risk, humidity, temperature, ventilation, measuchlorinated HC, VOC, food contamination, hor	s, drinkir urement, ne dust.	ng water, s models, val ged) projec	soil, residences, lidation,
Keywords (see attached list) Exposures, concentrations, variations, source risk, humidity, temperature, ventilation, measuchlorinated HC, VOC, food contamination, hor	s, drinkir urement, ne dust.	ng water, s models, val ged) projec	soil, residences, lidation,

		1	
Institute, address		•	a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090			
(301) 684-3777 FAX (301) 684-3729		And the second	b
• .		r. Save ale	
Name of principal investigator		Telephone	No.
Dr. S. M. Greenfield, Dr. Gerald Anderso San Rafael California - Systems Applicat	on Lions	415-472-	
Descriptive project title		<u> </u>	
DEVELOPING ENCHANCED INDOOR AIR QUALITY	MODELS		
Keywords (see attached list)			
	3		
•		en e	e e e
Project start	(Envisage	ed) project	end
4-90		8–90	
Estimated manpower	Estimated	cost	As a second second
2.0 FTE		\$35,000	en e

Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	
Name of principal investigator Rebecca Bascom, MD University of Maryland School of Medicine	301–235–1613
Descriptive project title ETS: Nasal Response and Aerosol Depositi	
Keywords (see attached list) ETS, Upper Respiratory Tract, Aerosal Depe	
Project start 10-90	(Envisaged) project end
Estimated manpower 1.5 FTE	Estimated cost \$401,000

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Institute, address			a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090			
(301) 684-3777 FAX (301) 684-3729			b :
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Name of multi-day 1.1	A CONTRACTOR AND A CONTRACTOR		en e
Name of principal investigator	••	Telephone	
Janet Arey, Ph.D. University of California at Davis	e de la companya de l	714–787–	5124
Descriptive project title	· · · · · · · · · · · · · · · · · · ·		
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INDOOR FATE AND TRANSFORMATION OF SELECTED	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTED Keywords (see attached list)	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTED	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTED Keywords (see attached list)	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTED Keywords (see attached list) Nitrogenous Organics, Gas-Phase Transform	D NITROGENOUS	ORAGANIC Co	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTER Keywords (see attached list) Nitrogenous Organics, Gas-Phase Transform Project start	D NITROGENOUS	ORAGANIC CO	OMPOUNDS
INDOOR FATE AND TRANSFORMATION OF SELECTED Keywords (see attached list) Nitrogenous Organics, Gas-Phase Transform	D NITROGENOUS	ORAGANIC Co	OMPOUNDS end
INDOOR FATE AND TRANSFORMATION OF SELECTER Keywords (see attached list) Nitrogenous Organics, Gas-Phase Transform Project start	D NITROGENOUS	r Lifetimes ed) project 5-91	OMPOUNDS end

Institute, address	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	b
	·
Name of principal investigator	Telephone No.
Dr. Jerry K. Davis, Ph.D. University of Alabama at Birmingham	205-934-2117
	FECTION: MURINE MODEL DEVELOPMENT
EFFECTS OF ETS AND NO 2 ON RESPIRATORY IN	
EFFECTS OF ETS AND NO ₂ ON RESPIRATORY IN Keywords (see attached list)	FECTION: MURINE MODEL DEVELOPMENT
EFFECTS OF ETS AND NO 2 ON RESPIRATORY IN	FECTION: MURINE MODEL DEVELOPMENT
Keywords (see attached list)	FECTION: MURINE MODEL DEVELOPMENT
EFFECTS OF ETS AND NO ₂ ON RESPIRATORY IN Keywords (see attached list) ETS, NO ₂ , Animal Models	FECTION: MURINE MODEL DEVELOPMENT

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Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777	
FAX (301) 684-3729	b
	·
Name of principal investigator	Telephone No.
Delbert J. Eatough, Ph.D. Brigham Young University	801–378–6040
Descriptive project title	
	Facility of the property of the second
Mutagenicity of Gas and Particulat Development of an SFE/SFC-Bioassay Keywords (see attached list)	e PhaseCompounds in ETS: Analytical Technique
Mutagenicity of Gas and Particulat Development of an SFE/SFC-Bioassay	e PhaseCompounds in ETS: Analytical Technique
Mutagenicity of Gas and Particulat Development of an SFE/SFC-Bioassay	e PhaseCompounds in ETS: Analytical Technique
Mutagenicity of Gas and Particulat Development of an SFE/SFC-Bioassay Keywords (see attached list) Project start	e PhaseCompounds in ETS: Analytical Technique
Mutagenicity of Gas and Particulat Development of an SFE/SFC-Bioassay Keywords (see attached list) Project start	e PhaseCompounds in ETS: Analytical Technique (Envisaged) project end

Institute, address	a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	b
Name of principal investigator	Telephone No.
Dr. Albert T. Gunnison NYU Medical Center	914-351-4235
FFFFCTS OF O NO AND ETS ON PHILMONARY	FUNCTION AND ELCOSANOID METABOLISM
EFFECTS OF O ₃ , NO ₂ , AND ETS ON PULMONARY I	FUNCTION AND EICOSANOID METABOLISM
EFFECTS OF O ₃ , NO ₂ , AND ETS ON PULMONARY I	FUNCTION AND EICOSANOID METABOLISM
	FUNCTION AND EICOSANOID METABOLISM
Keywords (see attached list)	FUNCTION AND EICOSANOID METABOLISM
Keywords (see attached list)	FUNCTION AND EICOSANOID METABOLISM (Envisaged) project end
Keywords (see attached list) Ozone, Eicosanoid, Lung Function	
Keywords (see attached list) Ozone, Eicosanoid, Lung Function Project start 1-90	(Envisaged) project end
Keywords (see attached list) Ozone, Eicosanoid, Lung Function Project start	(Envisaged) project end

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Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729			b
Name of principal investigator	P 2 1	Telepho	one No.
Nancy J. Haley, Ph.D. American Health Foundation		914–5	92-2600 EXT. 314
Descriptive project title	A TELL TO		
Descriptive project title Determination of Nicotine Metabo	•	Immunochemic	cal Methods
	•		cal Methods
Determination of Nicotine Metabo Keywords (see attached list)	lites by	Agrico (Nac.)	

Institute, address			a	• • • • •
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090				
(301) 684-3777 FAX (301) 684-3729			b	
	grant and the second		a ta na pari tan	
Name of principal investigator		Telephone	e No.	7
Dr.Marvin A. Kastenbaum - Bayse, Virginia Dr.K. O. Bowman - Oak Ridge National Laborat	ory			
Descriptive project title				
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR	ING MUTAGENIC	ITY OF COM	PONENTS OF	INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST	ING MUTAGENIC	ITY OF COM	PONENTS OF	INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR	ING MUTAGENIC	ITY OF COM	PONENTS OF	INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR Keywords (see attached list)				INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR		ITY OF COM		INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR Keywords (see attached list)				INDOOR
EFFICIENT LABORATORY EXPERIMENTS FOR TEST AMBIENT AIR Keywords (see attached list) Project start		ed) projec 3-93		INDOOR

Institute, address		a . 2.89
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090		
(301) 684-3777 FAX (301) 684-3729		b
	•	
Name of principal investigator	Telep	hone No.
Steven R. Kleeberger, Ph.D. Johns Hopkins University	301-	-955-3515
Descriptive project title	· · · · · · · · · · · · · · · · · · ·	
Susceptibility to Ozone-Induced Air	way Inflammation	en e
Susceptibility to Ozone-Induced Air Keywords (see attached list)		
Keywords (see attached list) Ozone, Susceptibility, Genetics Project start		
Keywords (see attached list) Ozone, Susceptibility, Genetics		
Keywords (see attached list) Ozone, Susceptibility, Genetics Project start	(Envisaged) proj	

Institute, address	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090	
(301) 684-3777 FAX (301) 684-3729	b
	والأراب المراجع والمراجع
Name of principal investigator	Telephone No.
Jerold A. Last, Ph.D. University of California at Davis	916-752-6230
Descriptive project title	n the Indoor Air Pollutant NO ₂ & O ₃
Descriptive project title Toxicological Interactions betwee Keywords (see attached list)	n the Indoor Air Pollutant NO ₂ & O ₃
Descriptive project title Toxicological Interactions betwee	n the Indoor Air Pollutant NO ₂ & O ₃
Descriptive project title Toxicological Interactions betwee Keywords (see attached list) Fibrosis (lung), Collagen (lung), Synergi	n the Indoor Air Pollutant NO ₂ & O ₃
Descriptive project title Toxicological Interactions betwee Keywords (see attached list) Fibrosis (lung), Collagen (lung), Synergi	n the Indoor Air Pollutant NO ₂ & O ₃
Descriptive project title Toxicological Interactions betwee Keywords (see attached list) Fibrosis (lung), Collagen (lung), Synergi Project start	n the Indoor Air Pollutant NO ₂ & O ₃ stic Interactions (Envisaged) project end

Institute, address		·	a 20 2 2 3 4 5
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777			
FAX (301) 684-3729		•	b
Name of principal investigator		Telephone	: No.
Jackson O. Lay, Jr., Ph.D. University of Arkansas at Little Rock		501-544	-4364
Descriptive project title			
Development of Fast Atom Bombardment the Identification of Unknown Carcin	t Mass Spect	ral Tochni	ques for ts
Keywords (see attached list)	lander de la companya de la company		
Fast Atom Bombardment, Mass Spectrometry, Ca	arcinogen-Nu	cleoside	
Project start	(Envisaged	i) project	end 'AAAAAAA
1–90		12-91	**
	1		L
Estimated manpower	Estimated	cost	

Institute, address	,	a ,
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729		b
Name of principal investigator		Telephone No.
Samuel B. Lehrer, Ph.D. Tulane University Medical Center		en en gran en de la companya en
•		
Descriptive project title PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EX		STHMATIC SUBJECTS
PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EX		STHMATIC SUBJECTS
PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EX		STHMATIC SUBJECTS
Keywords (see attached list)		STHMATIC SUBJECTS
PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EX		ASTHMATIC SUBJECTS
PULMONARY EFFECTS OF ENVIRONMENTAL SMOKE EXCEPTION (See attached list) Project start	(Envisag	ed) project end

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Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	b
Name of principal investigator	Telephone No.
George D. Leikauf, Ph.D. University of Cincinnati	513-558-0035
Descriptive project title	<u>and and an annian and a second and an annian and an annian and an </u>
Indoor Aldehydes and Bronchial Hype	erractivity
Keywords (see attached list)	
Keywords (see attached list) Formaldehyde, Airway Epithelium, Asthma	
Keywords (see attached list) Formaldehyde, Airway Epithelium, Asthma	

Institute, address	a .
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	b
Name of principal investigator	Telephone No.
Robert R. Mercer, Ph.D. Duke University Medical Center	919-684-2341
Descriptive project title	
Descriptive project title INJURY IN GAS EXCHANGE UNITS DUE TO LOW LE	
INJURY IN GAS EXCHANGE UNITS DUE TO LOW LE	VEL NITROGEN DIOXIDE
INJURY IN GAS EXCHANGE UNITS DUE TO LOW LE Keywords (see attached list)	VEL NITROGEN DIOXIDE
INJURY IN GAS EXCHANGE UNITS DUE TO LOW LE Keywords (see attached list)	VEL NITROGEN DIOXIDE
INJURY IN GAS EXCHANGE UNITS DUE TO LOW LE Keywords (see attached list) Dosimetry, Morphometry, Nitrogen Dioxide	VEL NITROGEN DIOXIDE

Institute, address			a	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090				
(301) 684-3777 FAX (301) 684-3729			þ	
Name of principal investigator	· · · · · · · · · · · · · · · · · · ·	Telephon	e No.	
Mary Kay O'Rourke, Ph.D. University of Arizona College of Medicine		602–62	6-6379	
Descriptive project title			•.	
Indoor Biological Agencts: Exposures a	nd Rsponse	s in Aller	gy and As	thma
	nd Rsponse	s in Aller	gy and As	thma
Indoor Biological Agencts: Exposures a Keywords (see attached list)		s in Aller		thma
Indoor Biological Agencts: Exposures a Keywords (see attached list) Aeroallergens, Allergy, Asthma				thma
Indoor Biological Agencts: Exposures a Keywords (see attached list) Aeroallergens, Allergy, Asthma Project start		d) project 12-92		thma

			
Institute, address	•		a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090			
(301) 684-3777 FAX (301) 684-3729			b
Name of principal investigator		Telephon	e No.
Arthur Penn, Ph.D. NYU Medical Center		914-351	-5126
Descriptive project title	,		1
Does ETS Promote Arteriosclerosis or A	ct as a Co-	-Atherogen	
Keywords (see attached list)			
Arteriosclerosis, promotion, co-athergen			
Project start	(Envisage	ed) project	t end
1–90		12-92	
Estimated manpower	Estimated	cost	
1.85 FTE		\$506,082	2
	 		

Institute, address	,		a	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090				
(301) 684-3777 FAX (301) 684-3729			b	
Name of principal investigator		Telephone	No.	,
Kent E. Pinkerton. Ph.D. University of California at Davis		916-75	2-8334	
		i .		
Descriptive project title				
Descriptive project title Effects of ETS on Prenatal and Perin	natal Lung D	evelopment		
• • •	natal Lung D	evelopment		
Effects of ETS on Prenatal and Perin	· · · · · · · · · · · · · · · · · · ·	evelopment		
Effects of ETS on Prenatal and Perin Keywords (see attached list)	· · · · · · · · · · · · · · · · · · ·			
Effects of ETS on Prenatal and Perin Keywords (see attached list)				
Effects of ETS on Prenatal and Perin Keywords (see attached list) ETS, lung development, rats				
Effects of ETS on Prenatal and Perin Keywords (see attached list) ETS, lung development, rats Project start		ed) project 12-92		

Institute, address			: a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729			b
Name of principal investigator		Telephon	No.
Edward M. Postlethwait, Ph.D. University of Texas Medical Branch	v	409–761	-3120
PULMONARY REACTIVE UPTAKE OF INHALED TOXI	C CONTAMINANT	S	
	sa a sa	** * * * * * * * * * * * * * * * * * * *	
Keywords (see attached list)	tota anno anno attenta anno anno anno anno anno anno anno a		
Keywords (see attached list) Pulmonary, Reactive Uptake, Oxidants			
	(Envisage	ed) projec	t end
Pulmonary, Reactive Uptake, Oxidants	(Envisage		t end
Pulmonary, Reactive Uptake, Oxidants Project start	(Envisage	ed) projec 6 - 93	t end

Institute, address			a	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090				
(301) 684-3777 FAX (301) 684-3729			b	
Name of principal investigator		Telephone	. No.	
J.N. Pritchard, Ph.D. Harwell Laboratories, England		,	235–434331	
Descriptive project title				
Descriptive project title The Regional Deposition of ETS and		e on Radon	Dosimetry	
Descriptive project title	its Influenc		•	
The Regional Deposition of ETS and	its Influend			
The Regional Deposition of ETS and	its Influend		•	
The Regional Deposition of ETS and Keywords (see attached list)	its Influend			
The Regional Deposition of ETS and Keywords (see attached list)	its Influend			
The Regional Deposition of ETS and Keywords (see attached list) ETS, Deposition, Radon	its Influend			
The Regional Deposition of ETS and Keywords (see attached list) ETS, Deposition, Radon Project start	its Influend	ed) project 3-93		

Institute, address			a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090			
(301) 684-3777 FAX (301) 684-3729			b ·
	•	·	
Name of principal investigator		Telephon	e No.
J.N. Pritchard, Ph.D. Harwell Laboratories, England		011-44-	-235–434331
	· · · · · · · · · · · · · · · · · · ·	<u> </u>	
Descriptive project title		L	
	Environment	al Tobacco) Smoke
Descriptive project title	Environment	al Tobacco	Smoke
Descriptive project title The Fate of Nicotine During "Aging" of	Environment	al Tobacco	Smoke
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list)	Environment	al Tobacco) Smoke
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list)			
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list)		al Tobacco	
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list) ETS, Nicotine Behavior			
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list) ETS, Nicotine Behavior Project start 5-90	(Envisag	ed) projec 4 - 91	
Descriptive project title The Fate of Nicotine During "Aging" of Keywords (see attached list) ETS, Nicotine Behavior Project start		ed) projec 4 - 91	

Institute, address			. a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777			
FAX (301) 684-3729			b
		: No	and the second second second second
Name of principal investigator		Telephon	e No.
P. Barry Ryan, Ph.D. Harvard University		617–43	2–1167
Descriptive project title			
INVESTIGATIONS OF OZONE CHEMISTRY IN INDOOR	R ENVIRONMEN	rs 	e de la companie de
Keywords (see attached list)	,	,	April 1987 pe
Modeling, Indoor Air Quality, Chemistry			
		par .	• 6 6 145 7 144 2 2 2 2 2
Project start	(Envisage	i) project	t end
7–90		6-93	
Estimated manpower	Patrick	, u 1	
1.75 FTE	Estimated	\$328,20	

Institute, address	
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729	
Name of principal investigator	Telephone No.
Ragnar Rylander, M.D. University of Gothenburg, Sweden	031-853601
Inflammatory Responses after Indoo	r Exposure to Airborne Glucan and Endotoxi
	r Exposure to Airborne Glucan and Endotoxi
Inflammatory Responses after Indoo	r Exposure to Airborne Glucan and Endotoxi
Inflammatory Responses after Indoo	r Exposure to Airborne Glucan and Endotoxi
Inflammatory Responses after Indoo Keywords (see attached list)	r Exposure to Airborne Glucan and Endotoxi
Inflammatory Responses after Indoo Keywords (see attached list) Project start	r Exposure to Airborne Glucan and Endotoxio

Institute, address			a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090			
(301) 684-3777 FAX (301) 684-3729			b
	•		
Name of principal investigator	. er	Telephone	No.
Richard J. Shaughnessy, Ph.D. University of Tulsa		918-749-	-4358
Descriptive project title		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
EVALUATION OF EFFECTIVENESS OF PORTABLE IND	OOR AIR CLEA	MING SYSTE	EMS
Keywords (see attached list)			
	\$.	e de la companya de l	and the second section of
· ·		٠	•
Project start	(Envisage	d) project	end
9–90		8-92	•
Estimated manpower	Estimated	cost	
1.55 FTE	Locinated	\$214,505	
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Institute, address	,	a
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Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090		
(301) 684-3777 FAX (301) 684-3729	e e	b . 1
		* 1
Name of principal investigator	Teleph	one No.
Jerome J. Solomon, Ph.D. NYU Medical Center	914-3	51–4398
Descriptive project title	<u> </u>	
GENOTOXICITY OF EPOXIDE INDUCED 3-HYDORXYA Keywords (see attached list)	LKYL URACIL	
3_Hvdnovor111 v	De	
3-Hydroxyalkyl Uracil, DNA adducts, Mutagen	esis	
Project start	(Envisaged) proj	ect end
		ect end
Project start 7-90	(Envisaged) proj	ect end
Project start	(Envisaged) proj	ect end

Institute, address	en e	· a
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090		
(301) 684-3777 FAX (301) 684-3729		. b
Name of principal investigator	Telepho	one No. 183 on 184 a, 184
Klaus Willeke, Ph.D. University of Cincinnati	513-5	58-0506
Descriptive project title		
New Bioaerosol Sampling Techniques f	or Indoor Air Enviri	onments
Keywords (see attached list)		
Bioaerosal, Aerosal Sampling, Microorganism		
Project start	(Envisaged) proje	ct end
7–90	6–93	,
Estimated manpower	Estimated cost	
2.4 FTE	\$502,1	43

Institute, address			à
Center For Indoor Air Research 1099 Winterson Road, Suite 280 Linthicum, Maryland 21090 (301) 684-3777 FAX (301) 684-3729			b
Name of principal investigator		Te l ephone	No.
Dr. Hanspeter Witschi University of California at Davis	·	916-752-	-0915
Descriptive project title NEUROENDOCRINE LUNG CANCER: MECHANISTIC ST	UDIES		
Keywords (see attached list)			
Cancer (lung), neuroendocrine cells, tumor	promotion		
Project start	(Envisaged) project	end
9–90		8-93	
Estimated manpower	Estimated	cost	
3.1 FTE		\$514,458	

Institute, address Dames & Moore 1550 Northwest Highway Park Ridge, Illinois 60068			a	-
	,		b	
	**************************************	•		
Name of principal investigator		Telephon	e No.	· · · · · · · · · · · · · · · · · · ·
Denny Totzke Reserach Chemist	**		297-6120 297-6865	
Descriptive project title			· · · · · · · · · · · · · · · · · · ·	
Humidity/Air Exchange Study in Mobile Homes	•	3° ,		
Keywords (see attached list)	····	1	· · · · · · · · · · · · · · · · · · ·	
Moisture, temperature, humidity, air infilt systems, modeling, moisture damage	ration, air	& air hea	iting	inerei.
Project start	(Envisaged) project	end:	
FY '89		ongoing		
Estimated manpower	Estimated	cost	·	······································

Institute, address	a
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631	
	b
Name of principal investigator	Telephone No.
N. Nagda	301/424-9898
Descriptive project title	
Descriptive project title Quantification of Factors Affecting 1	Indoor Air Quality
Quantification of Factors Affecting 1 Keywords (see attached list) Control (Strategies) Control	Indoor Air Quality
Quantification of Factors Affecting 1 Keywords (see attached list) Control (Strategies)	
Quantification of Factors Affecting 1 Keywords (see attached list) Control (Strategies) Control Concentrations	
Quantification of Factors Affecting 1 Keywords (see attached list) Control (Strategies) Control Concentrations	(Envisaged) project end
Quantification of Factors Affecting 1 Keywords (see attached list) Control (Strategies) Control Concentrations Project start 4/1/84	(Envisaged) project end

Institute, address		· · · · · · · · · · · · · · · · · · ·	. <u>1</u>	a Maria Salah Maria
Gas Research Institute 8600 W. Bryn Mawr Avenu Chicago, IL 60631	1e		Property of the second	er var er
				b
•				
Name of principal investiga	ator	ap e	Telephone	No. 4 - Andrew W
Stanton Coerr, Consulta	ant		919/96	57-0750
Descriptive project title		4		
Descriptive project title Regulatory Evaluation of Keywords (see attached list			and Technol	,
Regulatory Evaluation o		ality Issues	and Technol	logy Transfer
Regulatory Evaluation of Keywords (see attached list Analysis Assessment	:)	ality Issues	and Technol	logy Transfer
Regulatory Evaluation of Keywords (see attached list Analysis Assessment Evaluation	:)	ality Issues	and Technol	logy Transfer
Regulatory Evaluation of Keywords (see attached list Analysis Assessment Evaluation Review	:)	ality Issues	and Technol	Logy Transfer
Regulatory Evaluation of Keywords (see attached list Analysis Assessment Evaluation Review	:)	(Envisage	ed) project	logy Transfer

Institute, address				a	
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631					ing Salaman (1995) Salaman (1995) Salaman (1995)
				b	
	•		,		
Name of principal investigator		: 1	Telepho	one No.	e e e e e e e e e e e e e e e e e e e
T. Grumbly			617	/491-2926	
Descriptive project title Nitrogen Dioxide Exposure an	nd Susceptibilit	y to Res	piratory	Infections	• • • • • • • • • • • • • • • • • • •
Nitrogen Dioxide Exposure an	nd Susceptibilit	y to Res	piratory	Infections	3
Nitrogen Dioxide Exposure an	evaluation Measurement Respiratory		piratory	Infections	
Nitrogen Dioxide Exposure and Keywords (see attached list) Nitrogen Dioxide Exposure Analysis Assessment	Evaluation Measurement	: Effect	piratory		3
Keywords (see attached list) Nitrogen Dioxide Exposure Analysis	Evaluation Measurement	: Effect	ed) proje		
Nitrogen Dioxide Exposure and Keywords (see attached list) Nitrogen Dioxide Exposure Analysis Assessment	Evaluation Measurement	Effect (Envisag	ed) proje 92		

Institute, address	· a
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicagok IL 60631	
•	b
Name of principal investigator	Telephone No.
J. Reuther	614/424-4916
Descriptive project title Evaluation of NO ₂ Protocol and Burn	er Emissions
Evaluation of NO ₂ Protocol and Burn	er Emissions
	er Emissions Gas Cookers Nitrogen Oxides
Evaluation of NO ₂ Protocol and Burn Keywords (see attached list) Measurement methods Evaluation Analysis	Gas Cookers
Evaluation of NO ₂ Protocol and Burn Keywords (see attached list) Measurement methods Evaluation Analysis Interlaboratory Comparison Project start	Gas Cookers Nitrogen Oxides (Envisaged) project end

Institute, address				a.
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631		• • • • • • • • • • • • • • • • • • • •		
				b
		·	,	
Name of principal investigator			Telephone	e No.
N. Leslie		·	708/647	-9000
Conventional Francis Recearch	Houses			
Conventional Energy Research Keywords (see attached list)	nouse			
Keywords (see attached list)	Field Measurem Multizonal Combustion Sou			
Keywords (see attached list) NO. Dwellings-Residences Analysis	Field Measurem	rces	ed) project	t end
Keywords (see attached list) NO. Dwellings-Residences Analysis Assessment	Field Measurem	rces		end

•				a
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631	e	۷.		
				b
•				
Name of principal investiga	tor	3 4	re l'ephon	e No.
J. D. Spengler			617/732-	-1255
Assessment of Public Tot Contributed in Part by I	al Exposure to Selected	cted Emissi	ons Spec	cies
Contributed in Part by I	indoor Sources	cted Emissi	ons Spec	
Assessment of Public Tot Contributed in Part by I Keywords (see attached list) Gas Cookers Emissions NO Residence Effects	indoor Sources			cies
Keywords (see attached list) Gas Cookers Emissions NO Residence	Analysis Assessment Evaluation Environmental			
Contributed in Part by I Keywords (see attached list) Gas Cookers Emissions NO Residence Effects	Analysis Assessment Evaluation Environmental	Monitoring		

Institute, address Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631			
			b
Name of principal investigator C. W. Spicer		Telephone 614/424-	
Descriptive project title Investigation of Nitrogen Dioxide Remova	al from Indo	or Air	er en general en sy en 1946. O deus en en <mark>ga</mark> nt en
o . 1 0			
Project start 8/1/86	(Envisage 3/1/91	ed) projec	t end

Institute, address	1.	ı	a
Gas Research Institute 8600 W. Bryn Mawr Avenue Chicago, IL 60631		: 1 : 1	
			b
Name of principal investigator	Te	lephone	No.
D. Walkinshaw	61	3/748-2	2714
Descriptive project title			
Partial Funding for 5th International Con	nference on Indo	or Air	Quality
Keywords (see attached list)			
Review			
Project start	(Envisaged)	roject	end
9/30/89	9/30/90	•	
Estimated manpower	Estimated cos	t	

Form of the COST 613 Inventory of Indoor Air Research. CONCERTED ACTION "INDOOR AIR QUALITY AND ITS IMPACT ON MAN" (COST 613) PROJECT INVENTORY

Institute, address Environmental Health Service Los Amigos Research & Education Institute, 51 Medical Science Bldg. 7601 Imperial Highway Downey, California 90242	Inc. b	
Name of principal investigator	Telephone No.	
Jack D. Hackney, M.D.	(213) 940-7561	
Descriptive project title		
Field studies of respiratory health status in asthmatic volunteers	and irritant exposures	
Field studies of respiratory health status in asthmatic volunteers	and irritant exposures , asthma, health lung function,	
Field studies of respiratory health status in asthmatic volunteers Keywords (see attached list) exposure, seasonal variations, outdoor air:	and irritant exposures , asthma, health lung function,	•
Field studies of respiratory health status in asthmatic volunteers Keywords (see attached list) exposure, seasonal variations, outdoor air risk assessment, risk groups, field measure	and irritant exposures , asthma, health lung function, ements,	
Field studies of respiratory health status in asthmatic volunteers Keywords (see attached list) exposure, seasonal variations, outdoor air risk assessment, risk groups, field measure Project start	and irritant exposures , asthma, health lung function, ements, (Envisaged) project end	
Field studies of respiratory health status in asthmatic volunteers Keywords (see attached list) exposure, seasonal variations, outdoor air risk assessment, risk groups, field measure Project start	and irritant exposures , asthma, health lung function, ements, (Envisaged) project end	

Institute, address	a
Environmental Health Service Los Amigos Research & Education Institute, Inc 51 Medical Science Building 7601 Imperial Highway Downey, California 90242	ic. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
•	
Name of principal investigator	Telephone No.
Jack D. Hackney, M.D.	(213) 940-7561
Effects of NO ₂ in volunteers with chronic obstract a combined field monitoring and chamber exposure	and the second s
Keywords (see attached list) exposure, outdoor air, NO ₂ , health, lung functi groups, controlled exposure, field measurements	
Project start	(Envisaged) project end
1989	1990 () () () () () () () () () (
Estimated manpower	Estimated cost
' I	•

Institute, address			a
Rand Corporation 1700 Main Street Santa Monica, CA 90401 U.S.A.			
0.3.A.			b
Name of principal investigator		Telephon	e No.
Naihua Duan	•	(213) x.	393-0411 7896
Descriptive project title		 	
pescriptive project title		. •	
Study on statistics and environmental fact	ors in heal	. •	
	osures, env	ironmental	
Study on statistics and environmental fact Keywords (see attached list) exposure, variations of concentrations/exp	osures, env	ironmental	
Study on statistics and environmental fact Keywords (see attached list) exposure, variations of concentrations/exp	osures, env , validatio	ironmental	t end

Institute, address		. a
California Indoor Air Quality Program California Dept. of Health Services 2151 Berkeley Way Berkeley, CA 94704		
Dericacy, on 54.01		b
r		•
Name of principal investigator	Telephone	No.
Leon Alevantis, Ventilation Engineer	(415) 540-	2132
Descriptive project title		And the second s
Studies of Ventilation Efficiency	. •	Service Programme
Keywords (see attached list)		
Offices, chamber studies, ACS, air movement,	forced ventilation, to	racer gas (SF ₆)
	7	
Project start	(Envisaged) project	end
June, 1989	Ongoing	en e
Estimated manpower	Estimated cost	
FTE 0.3	\$20 K	,

Institute, address			a		
California Indoor Air Quality Program California State Dept. of Health Services 2151 Berkeley Way				-	
Berkeley, CA 94704	i		b		
					·
Name of principal investigator	· · ·	Telephon	e No.		
Steven B. Hayward, Manager	* · •	(415) 54	40-3427		
Descriptive project title					
Descriptive project title Indoor Air Quality Interagency Working Grou	p				
Indoor Air Quality Interagency Working Grou Keywords (see attached list)					
Indoor Air Quality Interagency Working Grou		nation exc	hange		
Indoor Air Quality Interagency Working Grou Keywords (see attached list)	ants, infor	nation exc ed) projec			
Indoor Air Quality Interagency Working Grouk Keywords (see attached list) State Agencies, coordination, indoor pollut	ants, infor	ed) projec			
Indoor Air Quality Interagency Working Ground Keywords (see attached list) State Agencies, coordination, indoor pollute Project start	ants, information (Envisag	ed) projec			

Institute, address			a
California Indoor Air Quality Program California State Dept. of Health Services 2151 Berkeley Way Berkeley, CA 94704	S		
			b
Name of principal investigator		Telephone	e No.
John R. Girman, Deputy Manager		(415) 54	40-3130
Bake-out of Office Buildings to Reduce Em	issions of Vola	tile Orga	anic Compounds
Bake-out of Office Buildings to Reduce Em Keywords (see attached list)	issions of Vola	tile Orga	anic Compounds
Bake-out of Office Buildings to Reduce Em Keywords (see attached list) Control techniques, bake-out, building com VOC, offices, new buildings, SBS, temperate mitigation	missioming, build	ling mate	erials, formaldehyd
Keywords (see attached list) Control techniques, bake-out, building community VOC, offices, new buildings, SBS, temperate	missioming, build	ling mate	erials, formaldehyd measurements,
Keywords (see attached list) Control techniques, bake out, building community VOC, offices, new buildings, SBS, temperate mitigation	nssioning, buildure, ventilation	ling mate	erials, formaldehyde measurements,
Keywords (see attached list) Control techniques, bakerout, building community VOC, offices, new buildings, SBS, temperatumitigation Project start	nissioning, buildure, ventilation (Envisaged)	ling mate n, field project	erials, formaldehyd measurements,

Institute, address	en e	,	a	
California Indoor Air Quality Program California State Dept. of Health Services 2151 Berkeley Way Berkeley, CA 94704	n Albania B	,		
berkerey, on 34704	•		b	
Name of principal investigator	X - 1/2	Telephon	e No.	
John R. Girman, Deputy Manager		(415) 54	0-3130	****
Descriptive project title Emissions and Modeling Exposures of TCE in	From Correction	n Fluid		•
Descriptive project title Emissions and Modeling Exposures of TCE i	From Correction	n Fluid		
Emissions and Modeling Exposures of TCE i	rom Correction	n Fluid		ices,
Emissions and Modeling Exposures of TCE in the Keywords (see attached list) Exposure, emissions, ventilation, corrections of the chamber study reformulation. Prop 65, in the chamber study reformulation.	ion fluid, tri	n Fluid	lene, offi	ices,
Emissions and Modeling Exposures of TCE in Keywords (see attached list) Exposure, emissions, ventilation, correct chamber study, reformulation, Prop 65, management in the study in the st	ion fluid, tri	chloroethydel	lene, offi	ices,
Emissions and Modeling Exposures of TCE in the Keywords (see attached list) Exposure, emissions, ventilation, correct chamber study, reformulation, Prop 65, in the Project start	ion fluid, triass-balance mo	chloroethydel ed) project	lene, offi	ices,

			a
California Indoor Air Quality Program California State Dept. of Health Service 2151 Berkeley Way Berkeley, CA 94704	es		
		:	b
Name of principal investigator		Telephone	No.
John R. Girman, Deputy Manager		(415) 54	0-3130
Descriptive project title	,		
VOC Emissions from Art-Supplies	Karamatan Basa	ra a e e e	State of The
Keywords (see attached list)			1
Keywords (see attached list) Concentrations, exposure, sources of VOC chamber study, mass-balance model		ties, art p	ens, schools,
Concentrations, exposure, sources of VOC	hobby activi		
Concentrations, exposure, sources of VOC chamber study, mass-balance model	hobby activi	1) project	

Institute, address			a
California Indoor Air Quality Program California State Dept. of Health Services 2151 Berkeley Way Berkeley, CA 94704	; · · · · · · · · · · · · · · · · · · ·		
berkeley, CA 94704			b
Name of principal investigator	. ,	Telephone	No.
John R. Girman, Deputy Manager		(415) 54	0-3130
Yavayords (see attached list)			
Keywords (see attached list) VOC, buildings, emissions, sampling, anal	lysis, standard	ization,	
measurements, measurement methods, field GC-MS, sorbent	measurements,	developme	nt, sources, GC,
GC-MS, sorbent		developme	nt, sources, GC,
measurements, measurement methods, field GC-MS, sorbent Project start Ongoing	(Envisaged	developme	nt, sources, GC,
GC-MS, sorbent Project start		developme	nt, sources, GC,

			a
California Indoor Air Quality Program California State Department of Health 2151 Berkeley Way Berkeley, CA 94704			b
		·	
Name of principal investigator	A = 3	Telephone	No.
John R. Girman Deputy Manager		(415) 540	-3130
Descriptive project title			
Causes of Accidental Carbon Monoxide Po-	isonings in Cali	ornia	i v tra
			
Keywords (see attached list)			
•	icles, case study		
© sources, combustion, residences, vehi		, death c	ertificates,
CO sources, combustion, residences, vehicoroner's reports, CO alarm	(Envisaged	, death c	ertificates,
CO sources, combustion, residences, vehicoroner's reports, CO alarm Project start	(Envisaged	, death co) project 0, 1991	ertificates,

Institute, address			a	
California Indoor Air Quality Program California State Department of Health Ser 2151 Berkeley Way Berkeley, CA 94704	rvices			
			b	
			,	* . •
Name of principal investigator	1	elephone	No.	
Kai-Shen Liu, Epidemiologist Steven B. Hayward, Program Manager	er (*		40-3161 40-3427	· ;*
Descriptive project title				,
Estimating Distributions of Radon Exposu	ure in Californi	a w		:
Keywords (see attached list)			to a gard	
Exposure, radon general population, model passive samples, residences, population m			tive surv	ey,
Project start	(Envisaged)	project	end	
April, 1990	March, 19	91		
April, 1990 Estimated manpower	March, 19			

Institute, address		a
Calfornia Indoor Air Quality Program California State Department of Health Servi 2151 Berkeley Way	ces	
Berkeley, CA 94704		b
Name of principal investigator	Telepho	one No.
Steven B. Hayward, Manager Indoor Air Quality Program	(415)	540-3427
Descriptive project title Radon Concentrations in Residences in Ventu County	ra County and North	western Los Angeles
Keywords (see attached list) Concentrations, annual exposure, radon, res samplers, representative survey	idences, general po	pulation, passive
Project start	(Envisaged) proje	ct end
May, 1989	October, 1990	
Estimated manpower	Estimated cost	
FTE 1.25	\$100 K	

1		a
California Indoor Air Quality Program California State Department of Health 2151 Berkeley Way Berkeley, CA 94704	Services	
,		b
Name of principal investigator		Telephone No.
Janet Macher		(415) 540-2137
	×	
Keywords (see attached list)		
Keywords (see attached list) Bacteria, suspended particulates, hosp biological air monitoring, field trial	itals, clinics, s	jails, tuberculosis, ventilatio
Bacteria, suspended particulates, hosp	S	jails, tuberculosis, ventilation
Bacteria, suspended particulates, hosp biological air monitoring, field trial	S	
Bacteria, suspended particulates, hosp biological air monitoring, field trial Project start	s (Envisaged)	project end

Institute, address California Indoor Air Quality Program California State Department of Health Service 2151 Berkeley Way Berkeley, CA 94704	es		a b
Name of principal investigator Janet Macher	i	lephone 415) 54	
Descriptive project title Studies of Indoor Microbiological Contaminat	ion		
Keywords (see attached list) Bacteria, fungi, allergy, hypersensitivity humidity, investigations, field studies	pneumonitis, co	omplaint	ts, infection,
Project start ongoing	(Envisaged)	project	end
Estimated manpower FTE 0.4	Estimated co \$30 K per		

Institute, address		٠,	a
Maryland Department of the Environment Toxics, Environmental Science and Health 2500 Broening Highway Baltimore, Maryland 21224	i taliga ethili i tyli Kiloli Seal Delli III.		b
. 1		w	
Name of principal investigator	Managara wang mara	Telephone	No.
Katherine P. Farrell, M.D., M.P.H., Chair		(301) 6	31–3775
Maryland Indoor Air Quality Task Force Report "Indoor Air Quality A common sense approach"	rt (gjjirg		et tall agust a sin eile eile. San eile tall eile eile eile eile eile eile eile e
			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Keywords (see attached list) Comfort, V.O.C. (volatile organic compounds) bioaerosols, UFFI (urea formaldhyde foam installing materials, molds, pollutants, office S.B.S. (sick building syndrome).	ulation), ve	ntilation,	standards.
Comfort, V.O.C. (volatile organic compounds) bioaerosols, UFFI (urea formaldhyde foam instuilding materials, molds, pollutants, office S.B.S. (sick building syndrome).	ulation), ve	ntilation, schools,	standards, irritation,
Comfort, V.O.C. (volatile organic compounds) bioaerosols, UFFI (urea formaldhyde foam inst building materials, molds, pollutants, office S.B.S. (sick building syndrome). Project start	ulation), ve e buildings,	schools,	standards, irritation,
bioaerosols, UFFI (urea formaldhyde foam inst building materials, molds, pollutants, office S.B.S. (sick building syndrome). Project start	(Envisaged	ntilation, schools,) project 1990 cost	standards, irritation,

Institute, address			
Minnesota Department of Health Division of Enrironmental Health 925 S.E. Delaware Street P.O. Box 59040 Minneapolis, MN 55459-0040			b
Name of principal investigator	· · · · · · · · · · · · · · · · · · ·	Telephon 612/627	
Laura Oatman		012/02/	
Descriptive project title	tan e	en e	and the state of t
Indoor Air Quality Assessment Protocol		n ingari	and the state of
Keywords (see attached list)		:	
control strategies, residences, risk,		ment, pollu	ants
Project start	(Envisa	ged) projec	t end
Project start July 1989	i	ged) projec 0, 1991	t end
	June 3		

Institute, address		a
Minnesota Department of Health Section of Chronic Disease and Environme 717 Delaware Street, S.E. Minneapolis, Minnesota 55414	ntal Epidemiolog	Y
		b
en grande de la companya del companya del companya de la companya del la companya de la companya	4.4. 84	e e an e e e e e e e e e e e e e e e e e
Name of principal investigator	Te	lephone No.
Marian C. Marbury, Sc.D.		(612) 623-5216
Descriptive project title		
Epidemiology of Respiratory Illness and I Keywords (see attached list)	Indoor Pollution	
Keywords (see attached list) respiratory, infection, NOx, ETS, wood st epidemiological study, passive samplers		s, children, asthma,
Keywords (see attached list) respiratory, infection, NOx, ETS, wood st epidemiological study, passive samplers	coves, residence	s, children, asthma,
Keywords (see attached list) respiratory, infection, NOx, ETS, wood st epidemiological study, passive samplers Project start	coves, residence	s, children, asthma, Oroject end

Institute, address Environmental Health Service Division of Occupational and Environmental New Jersey Department of Health CN-360 Health-Agriculture Building, Room 706 Trenton, New Jersey 08625-0360	Health		a
		- Tr	
Name of principal investigator	• •	Telephone	e No. en la
Steven M. Miller, Project Manager Environmental Health Service		(609)	633-2043
Assessment of New Jersey's Commercial Labor	ratory Indoor	Aır Analy	sis Capabilities
Keywords (see attached list) Allergens, analysis, asbestos, assessment, ETS (environmental tobacco smoke), environmental, measurement methods, residences, san VOC.	mental monitor	ing, form	aldehyde,
Project start	(Envisaged) project	t end
FY 89	FY 91		1 y
Estimated manpower	Estimated	cost	
FTE 0.75	\$50 K		e de la companya de La companya de la co

Institute, address	a a stronomento de la compansión de la
New Jersey State Department of Health Cancer Epidemiology Program and Enviro CN 360 Trenton, New Jersey 08625-0360	
	TO BE TO SEE THE PARTY OF THE P
Name of principal investigator	Telephone No.
Janet B. Schoenberg	(609) 588–3500
Descriptive project title	A SAME TO A SAME
Descriptive project title Case control study of radon and lung of	ancer in New Jersey women.
Descriptive project title Case control study of radon and lung of Keywords (see attached list)	ancer in New Jersey women.
Descriptive project title Case control study of radon and lung of Keywords (see attached list) Radon, residences, occupants, lung can	ancer in New Jersey women.
Descriptive project title Case control study of radon and lung of Keywords (see attached list) Radon, residences, occupants, lung can study, measurement	ancer in New Jersey women. cer, exposures, guidelines, epidemiology
Descriptive project title Case control study of radon and lung of Keywords (see attached list) Radon, residences, occupants, lung can	ancer in New Jersey women.

Institute, address	9	a .
Occupational Safety and Health Division Texas Department of Health 1100 West 49th Street		
Austin, Texas 78756		b .
Name of principal investigator Quade R. Stahl, Environmental Quality Speci Indoor Air Branch		phone No. 2)458-7254
Descriptive project title		
Indoor Air Program (mainly a surveillance a	ctivity)	
Keywords (see attached list)		
Pollutants, concentrations, sampling, envir household products, home textiles, aldehyde chlorinated HC, CO2, VOC, ETS Fibers, forma MMMF	s, allergan, bio	logical, chemical,
Project start	(Envisaged) pro	oject end
	Ongoing	
Estimated manpower	Estimated cost	
N/A	n/a	

Institute, address		•	7. a
Wisconsin Department of Health & P. O. Box 309 1 West Wilson Street	Social Se	ervices	
Madison, WI 53701			b
Name of principal investigator		Telephone	No.
William H. Otto, Supervisor Health Hazard Evaluation Unit		608	-266-9337
Inhalation Exposure from Volatile Drinking Water	e Organic	Compounds	Found in
Keywords (see attached list)			
Risk, residences, water passive s	sampling,	inhalatio	- 1/00-
Alba, lesidences, water passives			n, vocs
Project start		ed) project	
Project start		ed) project 1990	

Institute, address		a
Department of Chemistry 276 FB		
Brigham Young University Provo. UT 84602		
11010, 01 04002		b
Name of principal investigator	Telepho	one No.
Delbert J. Eatough, Professor of Chemist	ry (801)	378-6040
Descriptive project title		
Descriptive project title Exposure - Dose Relationships for Environ	nmental Tobacco Smoke	
• • •	osols, chemical, ETS, ed exposure, interlabo ds, passive samplers,	NO _X , organic, PM, oratory sampling,
Keywords (see attached list) dose, emissions, exposure, variations, aero SVOC, ventilation, chamber study, controlle comparison, measurement, measurement method	osols, chemical, ETS, ed exposure, interlabo ds, passive samplers,	NO _X , organic, PM, oratory sampling,
Exposure - Dose Relationships for Environment Keywords (see attached list) dose, emissions, exposure, variations, aero SVOC, ventilation, chamber study, controlle comparison, measurement, measurement method biological monitoring	osols, chemical, ETS, ed exposure, interlabo ds, passive samplers,	NO _X , organic, PM, oratory sampling, ect end
Exposure - Dose Relationships for Environment Keywords (see attached list) dose, emissions, exposure, variations, aero SVOC, ventilation, chamber study, controlle comparison, measurement, measurement method biological monitoring	osols, chemical, ETS, ed exposure, interlabo ds, passive samplers, (Envisaged) proje	NO _X , organic, PM, oratory sampling, ect end

Institute, address			a
Department of Chemistry Brigham Young University 276 FB Provo, UT 84602		i de la granda de	
P10V0, 01 04002			b
Name of principal investigator	đ	Telephon	e No.
Delbert J. Eatough		(801)	378-6040
Descriptive project title		4	
Air Quality in Commercial Aircraft	·	•	
Keywords (see attached list) concentration, dose, emissions, exposure, s aerosols, aldehydes, chemical, CO ₂ , ETS, NO pollutants, comfort, complaint study, gener forced ventilation, moisture, temperature, measurements, measurement methods	χ, organic, al populati	ozone, P on. air m	M, ovement.
Project start	(Envisage	d) projec	t end
December 1988		June 1	990
December 1988 Estimated manpower	Estimated		990

Institute, address	•	. '	a
Dept. of Environmental Science & Physiology Harvard School of Public Health 665 Huntington Ave., I-1303 Boston, MA 02115	y		
		,	b
			; ;
Name of principal investigators		Telephone	No.
John Spengler, Petros Koutrakis, Yukio Yana Haluk Ozkaynak, Barry Ryan and Margo Schwal	agisawa, b		Spengler) 432-1255
Descriptive project title	:		
Several exposure and health studies related microenvironments (homes, offices, vehicles		ty of cont	aminants and
Keywords (see attached list)			
Acids, NO2, SO2, CO, CO2, Particles, HCHO,	Fibers, Rad	on Biolos	
nerus, 102, 502, 60, 602, rarezeres, none,		, D-010E	icais, Asthma,
Respiratory, Children, Adults, SBS		, D_0_0	icais, Asthma,
<u> </u>		d) project	
Respiratory, Children, Adults, SBS	(Envisage		

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Harvard School of Public Health	1	•	
665 Huntington Avenue Department of Environmental Science and Phy	siology		
Boston, MA 02115			b
			_
			:
<u>rangan kanangan dan merupakan beranggan beranggan beranggan beranggan beranggan beranggan beranggan beranggan</u>		<u></u>	
Name of principal investigator	1	e l ephone	No.
Petros Koutrakis Ph.D.		(617) 4	32-1268
Descriptive project title			
Investigation of Physical and Chemical Proc	esses Affect	ing Indo	or Human Exposur
to Acids and Other Related Pollutants.			
	gen oxides, i	nitrous a	acid, ozone,
<pre>Keywords (see attached list) emissions, adsorption, indoor/outdoor ratio aerosols, acidic pollutants, ammonia, nitro sulfur dioxide, chamber study, models, samp</pre>	gen oxides, i ling, <u>p</u> assivo	nitrous a e sample	acid, ozone,
<pre>Keywords (see attached list) emissions, adsorption, indoor/outdoor ratio aerosols, acidic pollutants, ammonia, nitro</pre>	gen oxides, i ling, passive (Envisaged)	nitrous a e sample	end
Keywords (see attached list) emissions, adsorption, indoor/outdoor ratio aerosols, acidic pollutants, ammonia, nitro sulfur dioxide, chamber study, models, samp	gen oxides, i ling, passive (Envisaged)	project	end
Keywords (see attached list) emissions, adsorption, indoor/outdoor ratio aerosols, acidic pollutants, ammonia, nitro sulfur dioxide, chamber study, models, samp Project start March 15, 1990	gen oxides, ing, passive (Envisaged) March	project 15, 1991	end

Institute, address		·	a - www.to
Dept of Env. Sciences Rutgers University			e desperante de la companya de la c La companya de la co
P.O. Box 231 New Brunswick, NJ 08903		÷,	e de la companya de La companya de la co
new promovines, no cores		,	b .
			: : **********************************
Name of principal investigator			No.
Richard Fenske		(201) 932	-7715
Descriptive project title	·	to the contract of	The state of the s
Pesticide Exposure to Children in the Ho Indoor Pesticide Applications	me following		San
Keywords (see attached list)	· · · · · · · · · · · · · · · · · · ·		
exposure, surfaces, dose, biocides, inse environmental monitoring, sampling	cticides, dwellin	gs, child	ren, ventilation,
Project start	(Envisaged) project	end
Nov 1989	Oct 1992		* 93.7
Estimated manpower	Estimated	cost	
I.O FTE	\$300,000		general de la companya de la compan

Institute, address			a	
Dept of Env. Sciences Rutgers University P.O. Box 231 New Brunswick, NJ 08903				
			b	
Name of principal investigator		Telephone	No.	
Richard Fenske		(201) 93	2-7715	
Descriptive project title		: '		:
Minimizing Dermal and Respiratory Expos	sures to Pesticid	es		
in Greenhouses	, · · ·	***	,	•
Keywords (see attached list) exposure, surfaces, biocides, insectici forced ventilation, environmental monit	des, greenhouses	, employees als, sampli	ing	
Keywords (see attached list) exposure, surfaces, biocides, insectici	oring, field tri	, employees als, sampli	ing	
Keywords (see attached list) exposure, surfaces, biocides, insectici forced ventilation, environmental monit	oring, field tri	als, sampli	ing	
Keywords (see attached list) exposure, surfaces, biocides, insectici forced ventilation, environmental monit Project start	(Envisage	als, sampli	ing	

Institute, address			a	,
Environmental and Occupational Health Scier (EOHSI) UMONJ & Rutgers University 675 Hoes Lane	ces Instit	ute		
Piscataway, NJ 08854			b	
Name of principal investigator		Telephone	e No.	
Paul J. Lioy, Professor and Director Exposure Measurement and Assessment Divisio	n	(201) 4	163-4547	
Descriptive project title				
Research on Total Exposure			en e	
Keywords (see attached list)	· · · · · · · · · · · · · · · · · · ·			
exposure, indoor/outdoor ratios, combustion aerosols, food contamination, ozone, chromicactivities, respiratory effects	, automobi um, lead, 1	les, PAH, V residences,	OC, sports	
Project start	(Envisage	ed) project	end	
FY 86		ongoing	e e e e e e e e e e e e e e e e e e e	4
Estimated manpower FTE 10	Estimated > \$800,00	i cost 00 (various	sources)	

CONCERTED ACTION "INDOOR AIR QUALITY AND ITS IMPACT ON MAN" (COST 613) PROJECT INVENTORY

Institute, address			, a
University of Arizona Division of Respiratory Sciences University of Arizona College of Medicine 1501 N. Campbell Avenue		, m	
Tucson, Arizona 85724			b
	+\$		
Name of principal investigator Michael D. Lebowitz James J. Quackenboss		Telephon 602-626 602-626	5-6379
Descriptive project title Particulate Matte	r. Ozone. Ir	idoor Polli	utants and
Descriptive project title Particulate Matter Respiratory Responses - To Study the acute (6-8 hr/daily), and Chronic effects of indo	health (hour	·lv/dailv).	, sub-chronic
Pachinatory Pachaneas - To Study the acute	health (hour property of the control	Sources), / Matter), / on, hyperifects), R	Aerosols, HCHO Pollutants, reactivity, hyperisk, Susceptable
Respiratory Responses - To Study the acute (6-8 hr/daily), and Chronic effects of indomic	ombustion (S Particulate ral Populati piratory (ef , Humidity, ive Samplers	Sources), / Matter), / on, hyperifects), R	Aerosols, HCHO Pollutants, reactivity, hyper- isk, Susceptable ogy, Environmental g, (SEE BELOW)
Respiratory Responses - To Study the acute (6-8 hr/daily), and Chronic effects of indocential (6-8 hr/daily)	ombustion (S Particulate ral Populati piratory (ef , Humidity, ive Samplers	Sources), / Sources), / Matter), / on, hyperifects), R Epidemiolo , Sampling ed) projec	Aerosols, HCHO Pollutants, reactivity, hyper- isk, Susceptable ogy, Environmental g, (SEE BELOW)
Respiratory Responses - To Study the acute (6-8 hr/daily), and Chronic effects of indocential (6-8 hr/daily)	ombustion (SParticulate ral Populati piratory (et , Humidity, ive Samplers	Sources), / Sources), / Matter), / on, hyperifects), R Epidemiolo (), Sampling (d) projecting	Aerosols, HCHO Pollutants, reactivity, hyper- isk, Susceptable ogy, Environmental g, (SEE BELOW)

Keywords: Standardization, Subjective evaluation, Validation, Questionnaires, Diaries

Institute, address			a	3 . j. 3 . 19 tr
University of Arizona Division of Respiratory Sciences University of Arizona College of Medicine 1501 N. Campbell Avenue				
Tucson, Arizona 85724			b	er a ^{n e}
Name of principal investigator		Telephone	No.	
Michael D. Lebowitz James J. Quackenboss		602-626- 602-626-		
December of the state of the st				
Descriptive project title Nitrogen Dioxide, Responses in Asthmanics to study Indoor/Outo Term (1-4hr.) NO and daily PM; and Respirate able individuals?	door and Tota	1 Fynneum	ac ta	Shont
Term (1-4hr.) No and daily PM: and Respirat	or and Tota tory Function or/Outdoor Ra okers, Outdoo d, Airway, As	1 Exposur /Symptoms tios, Sea r Air, ET thma, Ana Passive	es to in Su sonal/S S, Pol	Spatial
Term (1-4hr.) NO and daily PM; and Respirate able individuals? Keywords (see attached list) Exposure, Indoor Variations, PM Combustion (Sources), Gas Coo Nitrogen Dioxide, Residences, Traffic Related Environmental Monitoring, Epidemiological St	or and Tota tory Function or/Outdoor Ra okers, Outdoo d, Airway, As	1 Exposur /Symptoms tios, Sea r Air, ET thma, Ana Passive ((effects)	sonal/s sonal/s S, Pol lysis, Sampler	Spatial
Term (1-4hr.) NO, and daily PM; and Respirate able individuals? Keywords (see attached list) Exposure, Indoor Variations, PM Combustion (Sources), Gas Coor Nitrogen Dioxide, Residences, Traffic Related Environmental Monitoring, Epidemiological St Children, Lung Function, Susceptible Groups,	or/Outdoor Rackers, Outdool, Airway, Astudy, Models, Respirator	1 Exposur /Symptoms tios, Sea r Air, ET thma, Ana Passive ((effects)	sonal/s sonal/s S, Pol lysis, Sampler	Spatial
Term (1-4hr.) NO, and daily PM; and Respirate able individuals? Keywords (see attached list) Exposure, Indoor Variations, PM Combustion (Sources), Gas Coor Nitrogen Dioxide, Residences, Traffic Related Environmental Monitoring, Epidemiological St Children, Lung Function, Susceptible Groups, Project start	or/Outdoor Rackers, Outdooi, Airway, Astudy, Models, Respirator	l Exposur/Symptoms tios, Sear Air, ET thma, Ana Passive (effects) project	sonal/s sonal/s S, Pol lysis, Sampler	Spatial

Institute, address			. a	a that is a first	
University of Arizona Division of Respiratory Sciences University of Arizona College of Medicine 1501 N. Campbell Avenue	y santa				
Tucson, Arizona 85724			;. b		
Name of principal investigator		Telephone	e No.	ran en	
Mary Kay O'Rourke		602-626	-6379	e de la companya de l	
		sease)	Sugar Sugar		
Keywords (see attached list) Exposure, Indoor/Outdoor Ratios, Seasonal Fungi, House Dust, Mold, Residences, Aller Meteorological factors, Epidemiological St	Variations, (gy, Atopic Hy	Outdoor ai	r, Aller	rgans, [rritation	
Exposure, Indoor/Outdoor Ratios, Seasonal Fungi, House Dust, Mold, Residences, Aller	Variations, (gy, Atopic Hy udy, Measurem	Outdoor ai	r, Aller ivity, l functio	rgans, Irritation on	. 9

Institute, address		a
University of Illinois at Ch School of Public Health Environmental & Occupational P.O. Box 6998 Mail Code 92 Chicago, IL 60680	Health Sciences	b
No. de la companya d		
Name of principal investigator Richard A. Wadden, PhD	Telephone	e No.
Peter A. Scheff, PhD John E. Franke, PhD	(312) FAX (312)	996-8855 996-1374
Descriptive project title		
Emission Factors for Vapor Degreasers		
Keywords (see attached list) mass emission factos, degreasing, enginee exhaust, atomic absorption, infrared spec	ering controls, trichlo	roethylene, local s, model
Project start 3/88	(Envisaged) project	end
Estimated manpower 1.0 FTE	Estimated cost	

Institute, address	
University of Illinois at Chic School of Public Health Environmental & Occupational F P.O. Box 6998 Mail Code 922	Health Sciences
Chicago, IL 60680	b
Name of principal investigator	Telephone No.
John E. Franke, PhD Richard A. Wadden Peter A. Scheff	(312) 996-8855 FAX (312) 996-1374
Descriptive project title Some Observations of Eddy Diffusivities i	n Industrial Settings
Keywords (see attached list) emissions, concentrations, air change rat trichloroethylene, chromium, nickel, indu	te, point source, degreasing, electroplatestrial building, air movement, wind spee
eniorisms concentrations air change rat	ce, point source, degreasing, electroplatestrial building, air movement, wind speed (Envisaged) project end ongoing

Institute, address	THE PARTY OF SATISFIE	j
School of Public Healt	tional Health Sciences	
Chicago, IL 60680	b	
Name of principal investigator	Telephone No.	
John E. Franke Richard A. Wadden Peter A. Scheff	(312) 996-8855 FAX (312) 996-1374	* *
Descriptive project title Activity Based Emission Factors	s for Indoor Sources	
Keywords (see attached list)	ssion factors, mass balance, completely mix	
emission rates, activity-based emis concept, two-point diffusion, diffuelectroplating	usion-advection, welding, grinding, degreas	ed ing,
concept, two-point diffusion, diffu	usion-advection, welding, grinding, degreas	ing,
concept, two-point diffusion, diffuelectroplating Project start	(Envisaged) project end	ing,

Institute, address	a	10
University of Illinois at Chicago School of Public Health Environmental & Occupational Health Sciences		
P.O. Box 6998 Mail Code 922 Chicago, IL 60680		
Name of principal investigator	Telephone No.	
Peter A. Scheff Richard A. Wadden	(312) 996- FAX (312) 996-	
	•	
Descriptive project title Trace Element Analysis in an Electropla Varyanda (see attached list)	ting and Metal Finishing Sho	qo
•	ray Emissions), low-concent:	ration data,
Trace Element Analysis in an Electropla Keywords (see attached list) emissions, TLV, PIXE (Proton Induced X- atomic absorption, metals, metal finish	ray Emissions), low-concent:	ration data,
Trace Element Analysis in an Electropla Keywords (see attached list) emissions, TLV, PIXE (Proton Induced X- atomic absorption, metals, metal finish multi-elemental results	ray Emissions), low-concent ing plant, nondestructive e	ration data,
Trace Element Analysis in an Electropla Keywords (see attached list) emissions, TLV, PIXE (Proton Induced X- atomic absorption, metals, metal finish multi-elemental results Project start	ray Emissions), low-concentring plant, nondestructive end	ration data,

Institute, address	a
University of Illinois at School of Public Health Environmental & Occupation P.O. Box 6998 Mail Code Chicago, IL 60680	nal Health Sciences
Name of principal investigator	Telephone No.
Peter A. Scheff, PhD Robert L. Friedman	(312) 996-8855 FAX (312) 996-1374
Emissions of Freon from Two Open Top Va Keywords (see attached list)	apor Degreasers
emissions, vapor degreasers, solvents	, trichloroethylene, 1,1,1-trichloroethane s manufacturing, gas chromatography, infra
	(F-1)
Project start	(Envisaged) project end
Project start 1/89	ongoing

Institute, address	. a
University of Illinois at Chi School of Public Health Environmental & Occupational P.O. Box 6998 Mail Code 922	Health Sciences
Chicago, IL 60680	b
Name of principal investigator	Telephone No.
Richard A. Wadden, PhD Peter A. Scheff, PhD Barbara A. Bates	(312) 996-8855 FAX (312) 996-1374
Descriptive project title Indoor Air Pollution	
Keywords (see attached list) concentration, guidelines, standards, furnithousehold products, combustion sources, emitaerosols, asbestos, CO ₂ , NO _x , radon, solven new buildings, offices, residences, cancer, physiological reactions, SBS, respiratory experiences.	ts, buildings, dwellings, mobile homes, complaints, infection, occupants,
Project start	(Envisaged) project end
7/88	6/90
Estimated manpower 0.1 FTE	Estimated cost

Institute, address			a
School of Public	Occupational Health Mail Code 922		b
Name of principal investigator		Telephone	No.
Richard A. Wadden, PhD David I. Baird		(312) (312) (312)	996-8855 996-1374
Descriptive project title	lazing During Candy	Production	,
Ethanol Emissions from G Keywords (see attached list) emission rate, concentrat	ion, ethyl alcohol,	solvents, factor	ry line,
Ethanol Emissions from G Keywords (see attached list)	ion, ethyl alcohol,	solvents, factor	ry line,
Ethanol Emissions from G Keywords (see attached list) emission rate, concentrat	ion, ethyl alcohol, om air, gas analyzer	solvents, factor	

•	-
University of Illinois at Che School of Public Health Environmental & Occupational P.O. Box 6998 Mail Code 922 Chicago, IL 60680	Health Sciences
and the second of the second o	And the second s
Name of principal investigator	Telephone No.
Lorraine M. Conroy, ScD	(312) 996-8855 FAX (312) 996-1374
Capture Efficiency of Local Exhaust Hoo	in the contraction of the contra
العالم المراجع الم	e de la companya de
Keywords (see attached list) control techniques, tracer gas, indu measurement of velocity and capture	strial settings, forced ventilation,
Keywords (see attached list) control techniques, tracer gas, indu measurement of velocity and capture Project start 8/1/89	strial settings, forced ventilation,

Institute, address	a
University of Illinois at C School of Public Health Environmental & Occupationa P.O. Box 6998 Mail Code 9	1 Health Sciences
Chicago, IL 60680	b
Name of principal investigator	Telephone No.
Lorraine M. Conroy, ScD	(312) 996-8855 FAX (312) 996-1374
Descriptive project title	
Effects of Buoyant Sources on Captur	re Efficiency of Slot Hoods
Keywords (see attached list)	
control techniques, tracer gas, industrated measurement of velocity and capture eff	rial settings, forced ventilation, ficiency, models, validation
Project start	(Envisaged) project end
7/3/89	6/30/90
Estimated manpower	Estimated cost
0.3 FTE	8,000

Institute, address	
University of Illinois at Chic School of Public Health Environmental & Occupational H P.O. Box 6998 Mail Code 922 Chicago, IL 60680	lealth Sciences
Name of principal investigator	Telephone No.
Lorraine M. Conroy, ScD	(312) 996-8855 FAX (312) 996-1374
Field Study of Local Exhaust Ventilation	And the second s
Managed (and about 18.4)	
Keywords (see attached list) solvents, industrial settings, air movemes monitoring, field measurements, models, see monitoring, models, see monitoring, models, see monitoring, models, see monitoring, monitoring, models, see monitoring, models	nt, forced ventilation, environmental ampling, validation, dry cleaning
colvents industrial settings, air moveme	nt, forced ventilation, environmental ampling, validation, dry cleaning (Envisaged) project end 9/29/92

Institute, address	·	÷ .	a
University of New Mexico School of M Cancer Center New Mexico Tumor Registry	ledicine		
900 Camino de Salud, NE Albuquerque, NM 87131			b
Name of principal investigator		Talanhan	44
Jonathan M. Samet, M.D.		(505) 27	en de la companya de La companya de la co
NO ₂ and Respiratory Infections in In-	fants		tariana kutolis J
Keywords (see attached list)			
Gas cookers, residences, infection, r	espiratory, NO	x, epidemiol	ogy
Project start	(Envisag	ed) project	end
07/01/87	Í	30/92	en e
Estimated manpower	Estimate	d cost	The second secon
· · · · · · · · · · · · · · · · · · ·	1		

Graduate School of Public Health Pittsburgh, PA 15261, USA and Carnegie Mellon University	nga ang mga mga mga mga mga mga mga mga mga mg			
Department of Civil Engineering Pittsburgh, PA 15213, USA			b *** ***	
Name of principal investigator Julian B. Andelman, University of Pittsburgh Cliff I. Davidson, Carnegie Mellon University Mitchell J. Small, Carnegie Mellon University	4	Telephor 12/624- 112/268- 112/268-	3113 2951	.,
Descriptive project title Inhalation Exposure in the Home to Volatile Or	rganic Consti	tuents	of Drinking Wa	ter
Descriptive project title	entrations/ex	(posure)	, sources,	· · · ·
Descriptive project title Inhalation Exposure in the Home to Volatile Or Keywords (see attached list) concentrations, exposure, variations (of concedrinking water, water, SVOC, VOC, dwellings, concentrations, exposure, variations (of concedrinking water, water, SVOC, VOC, dwellings, concentrations)	entrations/ex	(posure)	, sources, measurements,	· · · · ·

Institute, address		રા .
Department of Epidemiology and Public Heal Yale University School of Medicine 60 College Street, P.O. Box 3333 New Haven, CT 06510	th	b
Name of principal investigator		none No. 785-2867
Jan A. J. Stolwijk		203) 785-7296
Keywords (see attached list) cost/benefit, energy conservation, reaction office buildings, employee productivity, Sinuman controlled exposure	ns, exposure build BS, ventilation, t	ing equipment, emperature,
Project start	(Envisaged) proj	ect end
1/89	1/91	
Estimated manpower	Estimated cost	
FTE 1.0	\$50K	

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Environmental Protection Agency

Cincinnati OH 45268-1072

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