

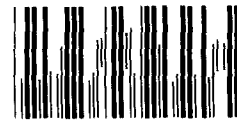
GAO

Fact Sheet for the Honorable  
Mary Rose Oakar,  
House of Representatives

June 1986

# OFFICE HEALTH HAZARDS

## Federal Activities Funded in Fiscal Years 1981-86



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UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

HUMAN RESOURCES  
DIVISION

June 13, 1986

B-223321

The Honorable Mary Rose Oakar  
House of Representatives

Dear Ms. Oakar:

In response to your request, we obtained information on selected office health hazard activities that federal agencies have funded since October 1980. In collecting this information, we agreed to focus on federally funded activities directed at real or potential office health hazard problems that could affect an estimated 33 million office workers in the United States. Problems that you were specifically interested in were those associated with indoor air pollution, asbestos exposure, video display terminals, and job stress. In general, the activities on which we collected information included research projects, technical conferences, and surveillance programs directly related to real or potential office health hazard problems.

Our information on federally funded activities was obtained from questionnaires sent to federal agencies and departments in November 1985. In several instances, we discussed the questionnaire results with agency officials to ensure that the projects on which they provided us information were directly related to office health hazard problems.

In summary, we obtained information from seven agencies (the Departments of Health and Human Services, Energy, and Labor; the Environmental Protection Agency; the Library of Congress; the National Aeronautics and Space Administration; and the Office of Technology Assessment). These agencies reported:

- For fiscal years 1981-86, total estimated obligations of \$14.2 million for office health hazard activities (ranging from about \$2.1 million to \$2.6 million per year).
- Information on 57 projects/programs involving real and potential office health hazard problems associated with indoor air pollution, asbestos, video display terminals, and job stress. Some projects addressed only a single hazard and were completed relatively quickly. Others represented relatively small portions of continuing programs aimed at a broad range of workplace hazards.

We relied, without verification, on the financial and project description data provided by the agencies that responded to our request for data.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 30 days from its issue date. At that time, we will send copies to the Director, Office of Management and Budget; the seven reporting agencies; and other interested parties and will make copies available to others on request.

Should you need additional information on the contents of this document, please call me on 275-5451.

Sincerely yours,

A handwritten signature in black ink that reads "Franklin A. Curtis". The signature is written in a cursive style with a large, sweeping initial "F".

Franklin A. Curtis  
Associate Director

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ABBREVIATIONS

GSA	General Services Administration
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OTA	Office of Technology Assessment
PCBs	polychlorinated biphenyls
VDT	video display terminal

**OFFICE HEALTH HAZARDS:**

**FEDERAL ACTIVITIES FUNDED IN**

**FISCAL YEARS 1981-86**

**BACKGROUND**

In April 1985, the Office of Technology Assessment (OTA) issued a report Preventing Illness and Injury in the Workplace, which stated:

"Office work is one of the most rapidly changing occupations as new technologies are proliferating. Since one-third of the work force are in offices, even low rates of work-related injury and illness can be of concern."

According to that report, there are about 33 million office workers in the United States. Based on our review of available literature, including the OTA report, and discussions with federal agency officials, we defined office workers and office buildings as follows.

Office workers--generally, white-collar employees who (1) sit to do their work, (2) work in buildings occupied by others doing similar work, (3) do not do production line work, and (4) do not need to wear special protective clothing or uniforms. They include managers and administrators, professional and technical personnel, and clerical workers. Individuals generally excluded from the definition of office worker include storekeepers, sales clerks, school teachers, air traffic controllers, health care professionals, and traveling salespersons.

Office buildings--generally, facilities that are (1) usually accessible by both employees and the public; (2) often multistoried, with central heating, cooling, and ventilation systems; (3) designed to accommodate people who sit at desks or office machines to do their work; and (4) not used for manufacturing or storage.

A September 1984 OTA paper<sup>1</sup> on potential office hazards and controls stated that office workers are becoming increasingly concerned about such potential and perceived hazards as air pollution, excessive noise levels, improper temperature control, and exposure to radiation-emitting equipment. Some workers have complained of muscular and skeletal pain resulting

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<sup>1</sup>Potential Office Hazards and Controls (Sept. 1984). This paper was written for OTA to assist in preparation of the report, Preventing Illness and Injury in the Workplace.

from the inability to adjust office equipment for different body sizes and strengths. According to this study, some of these conditions, such as indoor air pollution, may directly cause health problems; for example, harmful bacteria in some air-conditioning systems may cause allergic reactions, fever, or infectious lung disease. Other conditions, such as chemicals being released into indoor air from certain building materials (formaldehyde or vinyl chloride) or asbestos fibers being released into indoor air when asbestos insulation deteriorates or is disturbed, are either known or suspected causes of cancer.

Some conditions in the workplace (e.g., excessive noise or improper temperature control) may lead to such health problems as anxiety, irritability, sleep disorders, and fatigue--classic symptoms of job stress. Tasks that require repetitive motions, such as those used in operating video display terminals (VDTs), have generated complaints of back, neck, shoulder, arm, and hand pain. According to the OTA report, these complaints are often associated with poor working positions and the lack of appropriate rest periods. Complaints about eye problems--such as eye strain, burning or itching eyes, blurred vision, and deterioration of clarity--have also been cited by VDT users.

#### **OBJECTIVES, SCOPE, AND METHODOLOGY**

In response to Representative Oakar's request and later discussions with her office, our principal objective was to obtain information on federal activities directly related to selected office health hazard problems. Specifically, we obtained (1) data on estimated obligations for fiscal years 1981-86 on real and potential health hazard problems associated with indoor air pollution, asbestos exposure, VDTs, and job stress and (2) brief descriptions of the projects and programs being funded.

Because no federal department or agency acts as a focal point for office health hazard activities, in September 1985 we sent presurvey questionnaires to 40 federal departments and agencies, including agencies with possible or known activities in such areas as health-related research, inspection or surveillance of workplace conditions, or building management. These questionnaires were designed to determine which agencies conducted specific activities related to office health hazards. Based on the responses we received from the 40 departments and agencies, we identified 7 that conducted office health hazard activities. In November 1985, employees of these agencies were asked to provide us with financial data and other information on each office health hazard project or program conducted by their agency during fiscal years 1981-86.

As requested, information in this fact sheet relates only to those projects and programs that were expected to contribute

to an overall accumulation of knowledge needed to better understand health hazards affecting the general office worker population. In our summary tables, we did not include information on projects limited to improving the health or health habits of office workers employed by an individual agency since these projects were not aimed at office worker populations in general. Examples of projects that we excluded were (1) lunch time seminars on smoking cessation, diet and nutrition, and job stress; (2) employee medical examinations; and (3) asbestos removal projects. However, millions of dollars are being spent on some of these projects, and we have discussed several examples of them at the end of this fact sheet. (See pp. 16 and 17.)

We relied, without verification, on financial and project description data provided by the agencies that conducted office health hazard activities.

In several instances, agencies did not provide estimated obligations for active office health hazard projects and programs. In these cases, either (1) agencies had obligated funds in a prior year (fiscal year 1980); (2) obligations associated with the projects were employee salary costs, which were not accumulated by activity and therefore not reported, or (3) agencies had no way to allocate total program costs between office health hazard activities and other activities.

In addition, we asked for--but did not receive--information on formally proposed but unfunded office health hazard activities. According to officials from the Departments of Energy and Health and Human Services, they did not report unfunded proposals because of their concern that to do so might be interpreted as an indication that they could not manage their programs with the funding provided. They also told us that unless there was some certainty of funding, such projects were unlikely to be formally proposed.

#### **PROJECTS AND ESTIMATED OBLIGATIONS BY FEDERAL AGENCY**

For each of the seven agencies, table 1 shows the number of office health hazard projects conducted during fiscal years 1981-86 and the total estimated obligations for them. Estimated obligations for this period totaled \$14.2 million--ranging from \$2.1 million to \$2.6 million per year. About two-thirds of the estimated obligations were for specific projects. The remainder was for broad programs, such as the National Institute for Occupational Safety and Health's (NIOSH's) health hazard evaluation program. Under this program, NIOSH evaluates workplace conditions at the request of employees and employers to determine if the chemical, biological, or physical agents used or found in the workplace are adversely affecting employees' health.



Table 1:  
Agency Activities  
on Office Health Hazards  
(fiscal years 1981-86)

(Dollars in millions)

<u>Department/ agency</u>	<u>Projects/ programs reported</u>	<u>Estimated obligations</u>	<u>Hazard areas addressed</u>			
			<u>Indoor air</u>	<u>Asbestos</u>	<u>VDTs</u>	<u>Stress</u>
Health and Human Services	25	\$ 7.90	X	X	X	X
Energy	11	3.74	X	X	X	
Labor	6	1.97	X	X	X	X
Environmental Protection Agency	3	0.32	X	X		
Library of Congress	7	0.11	X	X	X	X
National Aeronautics and Space Administration	1	0.07	X			
OTA	<u>4</u>	<u>0.06</u>	X		X	X
	<u>57<sup>a</sup></u>	<u>\$14.17<sup>b</sup></u>				

<sup>a</sup>These 57 projects represent office health hazard activities reported by the seven agencies as active sometime during fiscal years 1981-86. Twenty-two of the projects and programs were reported active in all 6 fiscal years.

<sup>b</sup>For some projects, the agencies did not report amounts obligated.

**ESTIMATED OBLIGATIONS  
BY HAZARD**

Table 2 shows, for the period fiscal years 1981-86, agency estimates of amounts obligated on office health hazard activities associated with indoor air pollution, asbestos, VDTs, and job stress. It also shows estimated obligations for broad

programs (e.g., NIOSH's health hazard evaluation program) that generally addressed each hazard.

Table 2:  
Estimated Obligations  
by Hazard  
(fiscal years 1981-86)

(Dollars in millions)

<u>Office hazard addressed</u>	<u>Projects/programs reported</u>	<u>Estimated obligations</u>
Indoor air:		
Indoor air pollution	20	\$3.1
Asbestos	8	0.3
Indoor air pollution and asbestos	<u>5</u>	<u>1.8</u>
Subtotal	33	\$ 5.2
VDTs and job stress:		
VDTs	8	1.8
VDTs and job stress	5	1.2
Job stress <sup>a</sup>	<u>2</u>	<u>0.4</u>
Subtotal	15	3.4
Program-type activities	<u>9</u>	<u>5.6</u>
Total	<u>57<sup>b</sup></u>	<u>\$14.2<sup>c</sup></u>

<sup>a</sup>An official from the National Institute of Mental Health said that agency had funded projects on job stress. However, because of organizational changes in October 1985, it could not respond to our November 1985 request for funding information relative to these projects.

<sup>b</sup>See footnote a, table 1.

<sup>c</sup>See footnote b, table 1.

### Indoor Air Pollution Activities

According to data the agencies provided to us for fiscal years 1981-86, we estimated obligations of \$5.2 million for 33 projects aimed at identifying, measuring, studying, or controlling the effects of indoor air pollution.

According to OTA's September 1984 paper, problems with the air in office buildings frequently involve such contaminants as

formaldehyde, carbon monoxide, asbestos fibers, and harmful bacteria. These contaminants, the paper stated, come from such sources as building materials, cigarette smoke, the disturbance of installed insulation, and air-conditioning systems. The paper also found that energy conservation efforts to prevent heat loss and improve temperature control by reducing the amount of outside air drawn into the buildings have significantly affected air quality. High levels of air contaminants have been found in tightly sealed buildings.

Based on agencies' responses, we categorized indoor air pollution activities as follows: indoor air pollution only, asbestos and indoor air pollution, and asbestos only.

#### Indoor Air Pollution Only

Of the \$5.2 million in estimated obligations for indoor air pollution activities, \$3.1 million was for 20 projects that each addressed a single type of air pollution problem. The projects involved such activities as measuring carbon monoxide exposure in public buildings, evaluating methods for collecting formaldehyde samples in the workplace, and developing methods to measure the efficiency of ventilation systems. Projects reported under this category included:

- Three NIOSH projects totaling about \$120,000 to develop a sampling and analytical methodology for chemicals, such as formaldehyde, found in indoor air.
- Two NIOSH projects totaling about \$40,000 to (1) determine how heating, ventilation, and air-conditioning systems affect airborne bacteria levels in office buildings and (2) develop procedures for tracing air flow in buildings and determine the rates at which inside air is replaced with fresh air.
- A NIOSH project for \$65,000 to evaluate the effectiveness of procedures for reducing levels of airborne bacteria in office environments.
- A NIOSH project for \$28,000 to develop a sampling and analytical method for determining the amount of a suspected carcinogen (trinitrofluorenone) in copy machine toner.
- Six Department of Energy projects totaling \$1.5 million to develop and test methods of measuring the efficiency of ventilation systems and to trace air flow in buildings.
- A Department of Energy project totaling \$729,000 to measure emissions of potentially harmful compounds from

building materials used as adhesives and to measure the effects of aging, temperature, and ventilation on the levels of these emissions.

- A Department of Energy project totaling \$132,000 to develop, test, and evaluate air-sampling devices for air pollutants, including carbon monoxide, water vapor, and formaldehyde.
- A Department of Energy project for \$79,000 to provide support (exchange of technology) to the Air Infiltration Center in Great Britain.
- Two Environmental Protection Agency projects totaling \$305,000 to measure air quality and exposure to air pollutants in public buildings.
- A National Aeronautics and Space Administration project totaling \$74,000 to study the use of house plants for removing air pollutants from energy efficient buildings.
- A Library of Congress project (no obligation data provided) to prepare a report entitled Air Quality and Health Impacts of Energy Conservation.

#### Asbestos

Of the total estimated obligations of \$5.2 million on indoor air pollution activities, about \$300,000 was for eight projects aimed specifically at asbestos-related problems. The projects are described below.

- Four NIOSH projects for about \$248,000, two to develop methods for analyzing asbestos fibers, and two to identify and evaluate existing methods of controlling exposure during asbestos removal projects.
- An Environmental Protection Agency project for \$15,000 to provide training for field teams and laboratory personnel participating in a national survey of asbestos in buildings.
- Two Library of Congress projects (no obligation data provided) to prepare two reports--one providing A Summary of Federal Regulations on Asbestos, and the other discussing program and policy issues on asbestos in schools and federal buildings.
- An Occupational Safety and Health Administration (OSHA) project (no obligation data provided) to conduct a workshop entitled "Dealing With Asbestos in the Federal Workplace."

(Also, see p. 16 for information on the General Services Administration's asbestos removal program.)

Activities on Indoor  
Air Pollution and Asbestos

Of the estimated obligations of \$5.2 million for indoor air pollution activities, \$1.8 million was for five projects and programs that addressed asbestos along with other air pollution problems. The following projects were funded under this category.

- Three NIOSH programs totaling about \$1.2 million for analytical chemistry services and health hazard evaluations directed at asbestos and other indoor air pollution problems.
- A NIOSH project for \$23,000 to revise and update the agency's manual used to analyze office environments for asbestos, formaldehyde, and airborne bacteria.
- A Department of Energy project for \$581,000 to examine the air quality in 40 commercial buildings, including offices and school buildings.

VDT and Job Stress Activities

According to responses from five federal agencies, for fiscal years 1981-86, an estimated \$3.4 million was obligated for 15 projects and programs to study real and potential health effects of operating VDTs and to identify causes and effects of job stress. Some of the projects and programs addressed only VDTs, some addressed only job stress, and some addressed both problems.

A VDT consists of a keyboard resembling a typewriter and a display screen. VDTs either contain their own microprocessor or are linked to a central computer, where data processing functions are performed. An August 1985 staff report by the Subcommittee on Health and Safety, House Committee on Education and Labor, noted that over 10 million VDTs are in use in American workplaces and that the number is growing rapidly.

According to the April 1985 OTA report, VDT users have complained about eye strain and back, neck, shoulder, arm, and hand pain. In other reports on VDTs, users have questioned if the radiation being emitted from VDTs has caused cataracts, miscarriages, and abnormal pregnancies. A 1980 NIOSH study found that clerical workers who used VDTs considered their jobs more emotionally stressful than those who did not.

Although government and privately funded studies have not confirmed that VDTs emit harmful levels of radiation, NIOSH officials recommended continuing research into the effects of long-term exposure to low frequencies of radiation. NIOSH officials, business associations, and worker organization representatives agree that eye strain and back, neck, and shoulder pain have been experienced by VDT users. Representatives from these groups agree that such problems can be alleviated by improving VDT design and by better structuring VDT tasks.

In May 1984, NIOSH published "ergonomic"<sup>2</sup> guidelines for VDT design and use. The guidelines, which are not legally binding on employers, recommended (1) that flexibility be built into work-station design, to include adjustable tables and chairs, detachable keyboards, and lighting systems that may be adjusted to increase or decrease room light and control VDT screen glare; (2) that VDT operators be given vision testing before beginning work on VDTs and periodically thereafter; and (3) that VDT operators be allowed breaks after every 2 hours of continuous VDT work to ease visual fatigue and muscular tension.

According to a NIOSH report, job stress can result from fatiguing workloads, boring tasks, lack of job control, uncomfortable or hazardous work environments, poor interpersonal relationships, and job insecurity. Symptoms of job stress include anxiety, irritability, sleep disorders, and fatigue. NIOSH's report also states that job stress is deemed a significant factor in cardiovascular disease and psychological disorders.

Details on federal activities on VDTs and job stress follow.

#### Activities on VDTs

Federal agencies estimated obligations of \$1.8 million for eight projects to study health hazards related to operating VDTs. Information on the projects and programs that addressed VDTs only is contained below.

--A NIOSH project for \$551,000 to explore ways to reduce job stress by better VDT work-station design.

--A NIOSH project for \$389,000 to compare the incidence rates of spontaneous abortion and birth defects of babies born to VDT operators with those of women office workers who do not operate VDTs.

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<sup>2</sup>Ergonomics is the study of how humans and machines interact. A goal of ergonomics is to design the workplace to match the worker's capabilities.

- A portion of the NIOSH health hazard evaluation program (\$105,000) that was directed at responding to complaints about VDTs.
- A Department of Energy project for \$695,000 to study the effects on eye mechanisms of the interaction of VDTs and normal room lighting.
- An OSHA project for \$15,000 to prepare a booklet to familiarize workers and employers with potential safety and health hazards associated with VDTs.
- Two efforts by the Library of Congress (no obligation data provided), one to prepare a report discussing the controversy about the health and safety issues of VDTs, and the other to assist the House Subcommittee on Health and Safety in preparing its staff report on VDTs in the workplace.
- A Food and Drug Administration project (obligations were incurred before October 1980) to prepare a report entitled An Evaluation of Radiation Emission from Video Display Terminals.

#### Activities on VDTs and Stress

Federal agencies estimated obligations of \$1.2 million for five projects and programs that addressed VDTs and stress. Details on these activities follow.

- A NIOSH project for \$713,000 to study job stress in VDT work, define prominent stress factors, and recommend strategies for control.
- A NIOSH project for \$387,000 to define stress factors in the workplace, with emphasis on clerical and secretarial workers. With the advent of new office technology, including greater use of VDTs, these populations showed signs of increased risk.
- NIOSH health hazard evaluation efforts for \$75,000 that were directed at VDTs and job stress.
- An OSHA program for \$31,000 to provide lecture and consultation services to the private sector and to federal and state agencies in the areas of job stress, VDTs, and office design.
- An OTA project for \$30,000 to prepare a report entitled Automation of American Offices. This report discusses the changes in employment patterns, the skills needed, and the quality of worklife brought about by the rapid

increase in the use of computers and new communications systems in offices.

### Activities on Office-Related Job Stress

NIOSH estimated obligations of \$388,000 for two projects that focused on job stress. One project studied the fatigue effects of extended workdays and workloads. The other project was designed to establish a scientific base for defining and evaluating working conditions that contributed to psychological disorders. As mentioned on page 8, although a National Institute of Mental Health official told us it had funded projects on office stress, October 1985 organizational changes within the Institute precluded it from responding to our November 1985 request for funding information relative to these projects.

### Programs Directed at Office Health Hazards

Federal agencies gave us data showing estimated obligations of \$5.6 million for nine program-type activities. Some portion of these programs addressed each of the hazards that were of interest to us. In general, these programs covered a wide range of activities, of which the portion related to office health hazards was only a small percentage of the total program. Information on these programs follows.

#### NIOSH's Health Hazard Evaluation Program

During fiscal years 1981-86, NIOSH estimated obligations of about \$3.6 million for the office health hazards portion of its health hazard evaluation program. Under this program, which is mandated by the Occupational Safety and Health Act, employees and employers can request an inspection and workplace evaluation. NIOSH reported total estimated obligations of \$59.7 million for this program for the 6-year period 1981-86, of which about \$3.6 million was used to address office health hazard issues.

#### OSHA's New Directions Program

OSHA's "New Directions" national training and education program also includes some office health hazard activities. Under this program, OSHA awards grants to nonprofit organizations to help them develop programs to educate employees and employers about workplace hazards and their abatement. OSHA estimated that of the total program amount of \$53.7 million, about 3 percent (\$1.7 million) was used to address office health hazards involving air pollution, asbestos, VDTs, and job stress.



### OSHA Training Institute

OSHA operates a training institute in Des Plaines, Illinois, to provide courses, primarily for federal and state workplace inspectors and safety and health personnel. Private-sector employers and employees also participate in courses conducted by the institute staff. OSHA reported that during fiscal years 1981-85, about 29,300 people were enrolled in institute courses. Courses offered include Principles of Ergonomics; Introduction to Industrial Hygiene for Safety Personnel; Principles of Industrial Ventilation; Industrial Toxicology; and Recognition, Evaluation, and Control of Microwave and Radiofrequency Radiation. OSHA estimated that of total program obligations of \$15.7 million for fiscal years 1981-86, about \$250,000 applied to office-related indoor air pollution, asbestos, VDTs, and job stress.

### OSHA Consultation Program

OSHA sponsors a program, mandated by the Congress in fiscal year 1975, that provides consultation to private-sector employers who request help in recognizing and correcting safety and health hazards in their workplaces. The consultations are carried out by 50 participating state labor departments; however, OSHA provides about 90 percent of the program's total funding. The consultations, which are separate from the OSHA inspection program, include an appraisal of all mechanical and environmental hazards and physical work practices and a written report of findings, recommendations, and agreements. Assistance is also provided to employers in developing new safety and health programs. An OSHA official said about 30,000 consultations are performed each year. Under this program OSHA reported that office-related hazards--indoor air, asbestos, VDTs, and job stress--were addressed, but an OSHA official said that records are not kept that would enable them to estimate the amount of obligations applicable to such hazards. OSHA reported total obligations for the program of \$135.6 million for fiscal years 1981-86; however, none of this amount is included in our estimates.

### Other Program Activities

Other program-type activities that we obtained information on included the following.

--Two OTA reports, one entitled Preventing Illness and Injury in the Workplace and the other entitled Reproductive Health Hazards in the Workplace.

--An OTA symposium on the impact of office automation on the quality of life.

--Two Library of Congress programs that provide information referral and bibliographical services on many subjects, including office health hazards.

**SELECTED PROGRAMS AND PROJECTS**  
**INDIRECTLY RELATED TO OFFICE**  
**HEALTH HAZARD ACTIVITIES**

Several federal agencies told us about their activities that were directed at eliminating or alleviating health hazard problems affecting their employees--for example, projects to remove asbestos from buildings occupied by their employees. Another agency told us about a project to study the effects of indoor lighting on humans. Because these types of studies did not meet our criteria (relate to either office workers in general or indoor air pollution, asbestos, VDTs, or job stress), we did not include information on their costs in our tables.

We also excluded projects that studied some of the same real or potential hazards, but in a nonoffice environment. Because these projects were not directly related to health hazards in the office workplace, we did not include them in our overall statistics on federal office health hazard activities. A brief description of some of these activities follows.

**General Services Administration**

The General Services Administration (GSA) reported programs to eliminate asbestos and polychlorinated biphenyls (PCBs) from GSA-controlled workplaces.

GSA's asbestos program is directed at surveying public buildings to identify and either remove or enclose asbestos determined to be hazardous. Asbestos--which was used extensively in building construction because of its fireproofing, insulating, and other properties--has been found in indoor air, usually after it has deteriorated or been disturbed. Exposure to air-borne asbestos has been associated with lung disease and cancer.

GSA's PCB removal program is directed primarily at transformers and other electrical equipment whose coolant contains PCBs. According to NIOSH publications, transformers that leak PCBs pose a potential health risk through skin contact, ingestion, and inhalation of vapors. One NIOSH publication states that there is evidence of association between increased incidences of cancer and exposure to PCBs. However, it also stated, "definite causal relationships between exposure and carcinogenic effects in humans remain unclear due to the inadequately defined populations studied and the influences of mixed exposure."

According to a GSA official, obligations for the office-related part of the PCB program for fiscal years 1985 and 1986

will total \$52.6 million, and obligations for the office-related part of the asbestos program for fiscal years 1983-86 will total about \$12.8 million. By fiscal year 1991, when the asbestos program is expected to be completed, GSA estimates it will have spent a total of about \$342.5 million to remove and monitor asbestos-containing materials in federal buildings. The PCB program is expected to be completed by the end of fiscal year 1987 at a total cost for the 3 fiscal years (1985-87) of about \$93.1 million. Because these programs primarily benefited federal workers rather than office workers in general, we did not include these figures in our statistics.

#### Department of Energy

The Department of Energy reported a research project that studied the possible health effects of different lighting technologies on humans. This study measured the effects of incandescent, fluorescent, high-pressure sodium, low-pressure sodium, and metal halide lighting systems on heart rate, exercise tolerance, respiratory rate, skin response, skin temperature, and pupil dilation. The Department indicated that the project was directed at the office environment and that about \$1.2 million had been obligated for it in fiscal years 1981-86.

#### Consumer Product Safety Commission

The Consumer Product Safety Commission reported activities on asbestos and indoor air quality that related specifically to individuals' residences. One effort investigated the adverse effect that gases from fuel fired appliances, like kerosene heaters and coal- and wood-burning stoves, have on indoor air quality. The Commission reported that this effort was carried out in coordination with the Interagency Committee on Indoor Air Quality, a committee formed in 1983 consisting of representatives from 16 federal agencies, to coordinate federal efforts in studying indoor air problems. This effort was carried out at a cost of about \$4.8 million. We did not include this project because the types of appliances that emit the gases being studied are not normally found in offices.

Another activity reported by the Commission was an effort carried out in fiscal years 1985 and 1986 to test whether there was airborne asbestos in 40 homes that had already been identified as containing asbestos products. The Commission estimated that about \$120,000 was obligated for this project in fiscal years 1985-86.

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