

REPORT TO THE CONGRESS



BY THE COMPTROLLER GENERAL
OF THE UNITED STATES



LM100490

Health Monitoring Needed For Laboratory Employees

Environmental Protection Agency

The Environmental Protection Agency has not put into operation an agencywide program for the health monitoring of laboratory personnel even though numbers of its staff are potentially exposed on a continuing daily basis to harmful substances, fumes, dusts, and gases.

Of the 1,329 employees at laboratories GAO visited, Agency officials acknowledged 778 as potentially exposed to hazardous and toxic substances. On occasion, laboratory staff have experienced various harmful effects from exposure to dangerous substances without adequate provision for health monitoring by the Agency.

*Copy of
U222473*



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-163375

To the President of the Senate and the
Speaker of the House of Representatives

This report summarizes the need for the Environmental Protection Agency to establish a health-monitoring program for its employees.

The review was made because in earlier review work at Environmental Protection Agency laboratories we noted that a health-monitoring program, with selected additional laboratory tests, had not been established in accordance with the intent of the Occupational Safety and Health Act of 1970, an executive order, and implementing regulations.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; and the Administrator, Environmental Protection Agency.

A handwritten signature in black ink, reading "Luther B. Attala".

Comptroller General
of the United States

C o n t e n t s

		<u>Page</u>
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Requirements for monitoring EPA employee health	1
	EPA organizational arrangement	2
	Scope of review	2
2	NEED FOR HEALTH-MONITORING PROGRAMS	4
	Health-monitoring program elements	4
	Hazardous operations and substances at EPA laboratories	5
	Employees potentially exposed to hazardous and toxic substances	7
	Fragmented health-monitoring efforts	9
	Conclusions	17
	EPA actions taken and planned	18
	Recommendations	19
	Agency comments and our evaluation	19
APPENDIX		
I	Letter dated September 29, 1976, from the Environmental Protection Agency	21
II	List of EPA laboratories and locations as of June 30, 1975	23
III	Principal officials of the Environmental Protection Agency responsible for administration of activities discussed in this report	26

ABBREVIATIONS

EPA	Environmental Protection Agency
GAO	General Accounting Office
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
ppm	parts per million
RTP	Research Triangle Park

GLOSSARY

Ambient air monitoring	Collecting and analyzing outdoor air samples usually within a specific geographic area, such as near a chemical or industrial plant.
Baseline medical physical	A medical examination to establish a person's physical condition at a point in time on which future changes can be measured.
Biological tests	Medical tests, such as blood analyses, urinalyses, and liver function analyses, to measure health effects from exposures to toxic-hazardous substances.
Carcinogen	Any cancer-producing substance.
Health-monitoring program	The process of periodically giving employees medical tests and examinations to measure effects from exposures to various substances in the work environment and a related referral system when indepth treatment may be warranted.
Industrial discharge	Waste or byproducts emitted from an industrial operation.
Industrial hygienist	A person, having a college or university degree or degrees, who by virtue of special studies and training in engineering, chemistry, physics, or medicine or related sciences, has acquired competence in industrial hygiene.
LD 50 test	Establishes the amount of a substance per unit of body weight which will kill one-half of a group of experimental animals.

Occupational health physician	A medical doctor who evaluates an industrial hygienist's report on a given workplace and recommends health programs to safeguard employees from adverse health effects resulting from their work environment.
Reagents	Substances which are used in detecting, examining, or measuring other substances.
OSHA standards	Standards which require conditions or adopting or using one or more practices, means, methods, operations or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.
Toxic substances	One which demonstrates the potential to induce cancer, produce long-term disease or bodily injury, adversely affect health, produce acute discomfort, or endanger the life of man or animals through exposure via the respiratory tract, skin, eyes, mouth, or other routes.

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

HEALTH MONITORING NEEDED
FOR LABORATORY EMPLOYEES
Environmental Protection
Agency

D I G E S T

Environmental Protection Agency laboratory employees throughout the Nation are engaged in operations that include the handling, use, and exposure to highly toxic and harmful substances, including cancer-causing materials. An agencywide program for the health monitoring of laboratory personnel has not been put into operation. (See pp. 4 to 8.)

The Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.), Executive Order No. 11807, dated September 28, 1974, and implementing regulations intend that each Federal agency, including the Environmental Protection Agency, protect employees exposed to potentially harmful substances or physical agents and provide medical examinations and tests where appropriate to determine whether the health of such employees has been affected by exposure. (See pp. 1 to 2.)

The Agency operates 60 laboratories with about 3,500, or 37 percent, of its 9,500 employees involved in collecting, analyzing, and researching environmental data involving highly toxic and dangerous substances. (See p. 1.)

Many of these substances are known or suspected to be cancer causing in man or are powerful irritants and depressants with a potential for the development of tremors and convulsions or death. (See pp. 6 to 7.)

Laboratory officials identified 778, or 59 percent, of the 1,329 laboratory employees at the 11 laboratories GAO visited as potentially exposed to hazardous and toxic substances during laboratory operations. (See p. 7.)

The Agency acknowledged that at one laboratory location every item on the Department of Health, Education, and Welfare registry of substances with toxic effects--16,500 substances--was on hand for possible use. At another laboratory location, 14 National Institute for Occupational Safety and Health-identified, cancer-causing substances were available. (See p. 6.)

Six of the laboratories, having 475 of the 1,329 employees, were providing no health-monitoring programs. The remaining five laboratories visited provided only fragmented health-monitoring services. As a result, on occasion, laboratory employees who suffered ill effects from exposures were not provided the necessary health services. (See pp. 10 to 17.)

A GAO physician with public health experience studied the deaths by cancer of four employees at one of the laboratories and suggested that in one case prolonged exposures to toxic substances could not be ruled out as a possible cause. (See pp. 12 to 13.)

At an Agency laboratory in Denver, Colorado, GAO noted many potential health hazards which it brought to the attention of headquarters officials. At GAO's request, the Agency's industrial hygienist and a safety officer accompanied GAO on a second visit to the laboratory. The Agency later closed the laboratory after declaring the employees were in imminent danger--reasonable expectation that exposures to toxic substances, dangerous fumes, dust, or gases may cause irreversible harm so as to possibly shorten life. (See pp. 13 to 15.)

At the laboratories visited, GAO interviewed the supervisors of 680 of the 778 potentially exposed employees. Of the 680 employees, only 8 percent were receiving basic physicals. (See p. 10.)

At a Research Triangle Park, North Carolina, laboratory, four employees were exposed to dioxin, an extremely toxic chemical, when it was accidentally released in the laboratory. The employees were given physical examinations but since no baseline physicals had been given, their conditions could not be adequately assessed. Others, including three employees who suffered ill effects after being exposed to nitric and hydrochloric acid fumes, were not provided tests or health-monitoring services either before or after exposure. (See p. 11.)

The need for health-monitoring programs was generally recognized, yet GAO found only fragmented efforts underway in the Agency. Since its establishment in 1971, the Agency's safety and health program has been safety oriented--i.e. accident and fire prevention--and no detailed direction for the establishment

of a centralized health program had been issued. Instead, in 1971, field locations were directed to manage their own health programs. (See pp. 4 and 9.)

At the time of GAO's review, headquarters safety and health officials were unaware of which employees should participate in health monitoring; the types of hazardous operations conducted; the type and amounts of hazardous exposures; or whether known carcinogens were handled, used, or stored at the laboratories. (See pp. 9 to 10.)

A recent evaluation of the Agency's health and safety program by the Occupational Safety and Health Administration pointed out that the program staff was located too low in the organizational structure to be effective. GAO reached a similar conclusion. (See pp. 10 and 18.)

Agency officials expressed concern for the safety of employees when informed of the conditions discussed. Inspections and surveys were initiated of safety and health conditions at all Agency laboratories. Three laboratories have been closed, and steps are underway to implement an agencywide health-monitoring program. (See pp. 19 to 20.)

The Administrator of the Environmental Protection Agency should make sure that the inspections and later health surveys receive priority and the results thereof be used in establishing the necessary health-monitoring program at the various Agency laboratories as the surveys are completed. (See p. 19.)

In addition, the Administrator should improve the organizational alinement of the safety and health activity and have these personnel report directly to the Assistant Administrator for Planning and Management, who is the Agency's designated Safety and Health Official. Also, the Administrator should provide additional health staffing and training. (See p. 19.)

In an interim response, the Agency said it would establish a steering committee to review future courses of action and recommend steps necessary to insure safe and healthful working conditions for all Agency employees. The Agency said that

the safety and health activity would report directly to the Agency's designated Safety and Health Official. Steps have also been taken to designate a qualified occupational health officer at each of the laboratories. (See p. 19.)

GAO believes that the actions initiated by the Environmental Protection Agency represent a strong commitment to improving its occupational safety and health program. (See p. 20.)

CHAPTER 1

INTRODUCTION

The Environmental Protection Agency (EPA) operates 60 laboratories located throughout the country, involved with pollution abatement and control of water, air, solid waste, radiation, noise, and pesticides. (See app. II.) The laboratories' functions include various programs of research and analytical support to Federal, State, and local agencies and can include the collection and analysis of environmental data involving highly toxic and dangerous substances. Many of these substances can cause irreversible harm to such a degree as to shorten life or reduce physical or mental efficiency.

EPA's laboratory operations include virology, bacteriology, toxicity, and cancer research studies; pesticide formulation analyses; automobile and other emissions sampling and testing; and reference standard preparation for environmental measurements. (See pp. 5 to 6.) Of EPA's 9,500 employees, about 3,500, or 37 percent, are located at the laboratories or related locations nationwide.

REQUIREMENTS FOR MONITORING EPA EMPLOYEE HEALTH

The Occupational Safety and Health Act of 1970 (29 U.S.C. 651 et seq.) (hereafter referred to as the act) was enacted to assure safe and healthful working conditions for every working person in the Nation. The act, which is administered by the Occupational Safety and Health Administration (OSHA) in the Department of Labor, requires that the health of employees exposed to potentially harmful substances or physical agents be monitored where an OSHA occupational safety and health standard requiring medical surveillance has been established and that appropriate medical examinations and other tests be provided to determine whether the health of such employees has been adversely affected by exposure.

Although the act is directed toward private industry, it also requires each Federal agency, including EPA, to provide its employees with safe and healthful working conditions consistent with the standards, including health monitoring, and medical surveillance. The requirement for the Government to meet standards consistent with those developed for private industry was to assure that the Federal agencies are model employers.

In addition, Executive Order No. 11807, dated September 28, 1974--which superseded Executive Order No. 11612, dated July 26, 1971--requires that the head of each agency and department establish and maintain effective occupational safety and health programs. The Secretary of Labor has established comprehensive occupational health and safety standards on 16 carcinogens. These standards require the agencies to institute health-monitoring programs for exposed employees. The National Institute for Occupational Safety and Health (NIOSH) of the Department of Health, Education, and Welfare has also issued an extensive list of other toxic and hazardous substances.

Also, the Code of Federal Regulations (29 C.F.R. 1960.43 (b)) provides that the heads of agencies adopt supplemental standards necessary for agency employee working conditions where no appropriate OSHA standards have been established.

EPA ORGANIZATIONAL ARRANGEMENT

The Executive Order No. 11807, dated September 28, 1974, requires the head of each agency to designate an occupational safety and health official. The Administrator of EPA, in complying with this order, designated his Assistant Administrator for Planning and Management as the Safety and Health Official for EPA. EPA's Occupational Safety and Health Office is responsible for developing safety and health programs and assuring such services are provided to EPA employees. The office is part of the Facilities and Support Services Division and reports to the Assistant Administrator for Planning and Management through the Deputy Assistant Administrator for Administration. The safety and health staff consists of seven employees, of which only one is involved in the health function as an occupational health program manager.

SCOPE OF REVIEW

We reviewed EPA health-monitoring policies, regulations, procedures, and practices at EPA headquarters and 11 field laboratories at 7 locations--Research Triangle Park, North Carolina; Cincinnati, Ohio; Corvallis, Oregon; Athens, Georgia; Beltsville, Maryland; Denver, Colorado; and Washington, D.C. We obtained information on laboratory operations, involving hazardous and toxic substances, the numbers of EPA personnel potentially exposed, the nature of the exposure to which individuals were subjected, the periods of time of such exposure, and on selected safety aspects of the laboratories as they related to health hazards. In consultation with laboratory directors and other laboratory

officials, it was determined which individuals within the EPA organization should be considered for inclusion in health-monitoring programs.

We also visited a major national chemical company to obtain general information on health-monitoring programs and to observe its program in operation. In addition, we obtained information on health-monitoring programs from the National Institutes of Health (NIH).

CHAPTER 2

NEED FOR HEALTH-MONITORING PROGRAMS

Although numerous EPA laboratory personnel are potentially exposed on a continuing daily basis to harmful substances, fumes, dusts, and gases in carrying out Government programs, EPA has not implemented an agencywide program for the health monitoring of laboratory personnel in accordance with the intent of the act, the executive order, and implementing regulations. The need for such programs was generally recognized, yet we found that no efforts or only fragmented efforts were underway at selected field laboratories initiated at the discretion of local officials. The program was provided virtually no guidance and direction from the headquarters level and was not emphasized in EPA's organizational structure. The result has been that laboratory personnel have experienced various harmful effects from exposure to dangerous substances without adequate EPA health monitoring to assure their continuing good health and safety.

HEALTH-MONITORING PROGRAM ELEMENTS

At our request, officials at NIH, the medical director of a major national chemical company, and EPA's industrial hygienist highlighted the major elements necessary to establish an effective health-monitoring program. At the outset, an occupational health survey of the working area by an industrial hygienist and by an occupational health physician is necessary. The major functions considered during the industrial hygiene survey would include examining the work environment and work operations and making measurements of air, heat, light, and noise to determine the extent of exposure to the employee. In addition, tests are made of employee blood and urine samples when necessary for use in determining the ability of the work environment to harm employee health and efficiency.

The occupational health physician's survey includes a medical evaluation of the work environment and results in recommendations for a health program plan to safeguard employees from the adverse health effects identified in the industrial hygienist's survey. The types of recommended health safeguards would include establishing a baseline medical physical to document past and present medical and occupational histories. Detailed recommendations would be made for periodic physical examinations and tests to include specific clinical laboratory work, such as blood chemistry tests, liver function tests, and others as warranted by the employees' particular work environment and the substances with which they work.

At the chemical company we visited, employees participated in a voluntary program consisting of an annual physical, chest X-ray, and electrocardiogram, along with additional examinations and tests, depending on the work environment and substances to which employees are exposed. Certain selective tests, such as blood tests, are made periodically throughout the year and, on occasion, as frequently as once a week when it is determined that substances handled are particularly toxic. All employees are given preemployment physicals, which serve as a baseline point in the health-monitoring program.

NIH also provides annual general physicals and collects blood samples for certain groups among its 13,000 employees subject to exposure. Employees working with carcinogens receive occupational exposure examinations. Comparative blood samples are also taken if needed. The types of health-monitoring services provided include

- preassignment physicals to serve as a baseline profile against future physical changes,
- periodic selective examinations to detect changes in the employee's medical condition, and
- various tests to determine the presence of or past exposure to harmful substances.

HAZARDOUS OPERATIONS AND SUBSTANCES AT EPA LABORATORIES

EPA laboratory employees perform various operations which expose them to toxic and hazardous substances. Descriptions of hazardous laboratory operations follow.

1. Virology and bacteriology studies. Determining the presence or absence of viruses and bacteria in selected substances or randomly collected environmental samples, such as polluted waters, sewage, and contaminated soils.
2. Cancer research studies. Controlled experimentation with various quantities of known and suspected carcinogens, involving varied patterns of exposure to different animal species and age groups used to determine the incidence, type, distribution, and possible control of cancer. Such studies may also attempt treatment or cures of existing cancers, as well as a correlation with the human environment.
3. Pesticides formulation analyses. Analyzing pesticide products randomly selected from retail sales outlets to check the accuracy of the contents listed.

4. Toxicity studies. Determining the toxicity of a given substance through controlled animal experimentation, often expressed in terms of an LD-50, the amount of a substance needed to kill 50 percent of a test group of animals.

5. Air, water, and stack sampling. Involves collecting environmental samples--ambient air monitoring, water sampling, and industrial smokestack sampling--by field laboratory personnel and subsequent analysis for potentially harmful substances.

6. Emissions testing. The analysis of emissions, such as automobile exhausts and their effects on the environment.

7. Reference standard preparation. The measuring or weighing of a nearly pure concentration of a predetermined amount of a substance for use in determining the presence, absence, or relative parity of that substance in environmental samples.

In addition, the handling, feeding, injecting, observing, and testing of laboratory animals may result in harmful exposures. Also operations, such as washing, sterilizing, and decontaminating laboratory equipment, shelves, walls, utensils, and glassware used in various operations, cause employee exposure.

At each laboratory visited, various potentially toxic or harmful substances were in use. Many of these substances are known or suspected of being cancer causing in humans or are powerful irritants and depressants with a potential for the development of tremors and convulsions or even death. EPA acknowledged that at one laboratory location every item on the U.S. Department of Health, Education, and Welfare registry of substances with toxic effects--16,500 substances--was on hand for possible use. At another laboratory location 14 NIOSH-identified, cancer-causing substances were available. The following are examples of the types of toxic substances in use at EPA laboratories.

alpha-Naphthylamine <u>1/</u>	Benzene
Asbestos <u>1/</u>	beta-Naphthylamine <u>1/</u>
2-Acetylaminofluorene <u>1/</u>	beta-Propiolactone <u>1/</u>

1/ Indicates substances identified as carcinogenic by NIOSH.

Carbon Tetrachloride	4-Nitrobiphenyl <u>1/</u>
Chlordane	4-Nitrosodimethylamine <u>1/</u>
3,3'-Dichlorobenzidine <u>1/</u>	Methyl Chloromethyl Ether <u>1/</u>
Ethyleneimine <u>1/</u>	4,4'-Methylene-bis (2-chloroaniline) <u>1/</u>
Heptachlor	Parathion
Kepone	2,3,7,8-Tetrachlorodibenzo-p- Dioxin
Lead	Toluene
Mercury	Vinyl Chloride <u>1/</u>
Nickel Carbonyl	

EMPLOYEES POTENTIALLY EXPOSED
TO HAZARDOUS AND TOXIC SUBSTANCES

At our request, EPA laboratory officials identified 778, or 59 percent, of the 1,329 laboratory employees at the 11 laboratories we visited as potentially exposed to hazardous and toxic substances during laboratory operations. The table on page 8 shows the number of employees assigned at each location visited and the number and percentage of personnel with potential for harmful exposure.

The number of employees shown in the table as having potential for exposure to toxic substances includes employees who worked with and were around toxic substances in the laboratories. The number also includes administrative support staff who were potentially exposed because they worked near or were engaged at the laboratories on an intermittent basis.

1/ Indicates substances identified as carcinogenic by NIOSH.

<u>Location and number of laboratories</u>	<u>Laboratory employees total</u>	<u>Employees with potential for harmful exposure</u>	
		<u>Number</u>	<u>Percent</u>
Research Triangle Park, North Carolina (four)	719	392	54.5
Health Effects Research Lab Environmental Research Center, Cincinnati, Ohio (two)	228	164	71.9
Environmental Research Center, Corvallis, Oregon (one)	144	54	37.5
Region IV Surveillance and Analysis Division, Athens, Georgia (one)	107	67	62.6
Chemical Biological Investigation Branch, Beltsville, Maryland (one)	64	64	100.0
Region VIII Surveillance and Analysis Division, Denver, Colorado (one)	56	27	48.2
Pesticides Laboratory, Washington, D.C. (one)	<u>11</u>	<u>10</u>	90.9
Total	<u>1,329</u>	<u>778</u>	58.5

Laboratory officials said that, while time periods for direct exposures vary from a few minutes a day, week, or month to several hours a day, the potential for harmful exposures exists during virtually the entire workday. Because of this potential, we interviewed 75 laboratory employees, 65 of which agreed that a health-monitoring program is needed. Of the employees interviewed, 62 said they would be willing to participate in such a program.

FRAGMENTED HEALTH-MONITORING EFFORTS

EPA'S health-monitoring efforts have been fragmented because of a lack of emphasis and guidance through an agencywide program. Essentially, field laboratories were left to decide on their own the need for health programs. As a result, field laboratories responded in a disparate manner in establishing health-monitoring programs. On occasion, even laboratory employees who suffered ill effects from exposures were not provided the necessary health services.

Lack of headquarters emphasis and guidance

Executive Order 11612, dated July 26, 1971, required all Federal agencies to establish an occupational safety and health program consistent with the act. In response to that order, in November 1971, EPA instructed the headquarters safety management office to develop agencywide programs. At that time, EPA directed the field locations to manage their own field safety and health programs with no detailed direction for establishing a centralized health program. Since the establishment of EPA in 1971, its health program has been safety--accident and fire prevention--oriented.

In 1972, the agency issued a safety manual but it did not contain health-monitoring provisions. In March 1973, because of employee inquiries, EPA's Personnel Management Division initiated a survey of EPA laboratories to determine which positions involved potentially hazardous duties warranting special medical precautions. The results indicated a significant number of employees engaged in dangerous work which warranted a vigorous occupational health program in EPA. EPA officials told us, however, that no followup action was taken on the study. EPA issued a safety and health policy statement in April 1973 which cited the need for bringing the overall agency safety effort to a fully operational level, but the statement did not address health monitoring.

EPA's first effort toward health monitoring started early in 1975 when an industrial hygienist was hired to incorporate health issues into EPA's safety program. It was not until June 8, 1976, that health provisions were added to the safety and health manual in compliance with OSHA health standards.

At the time of our review, headquarters safety and health officials were still unaware of which employees should participate in health monitoring; the types of hazardous operations conducted; the type and amounts of hazardous exposures; or whether known carcinogens were handled, used or stored in

laboratories. Similarly, headquarters officials said they were unaware as to which laboratories or field locations were providing health-monitoring services.

Lack of effective organization

A January 1975 OSHA evaluation of EPA's safety and health program concluded that the safety and health staff is located too low in the EPA organizational structure to be effective and is involved primarily with safety functions. The study recommended that safety and health personnel report directly to EPA's designated Safety and Health Official rather than through the Facilities and Support Division Director as is now the case.

According to EPA's safety and health staff officials, Occupational Safety and Health staff efforts are hampered by the EPA headquarters organizational structure because information concerning safety and health conditions which need correcting is first directed to the Facilities and Support Division, which provides space for EPA laboratories.

Also, staff officials told us that safety and health officers at the laboratories were not fully aware of their health responsibilities and were not properly trained to detect harmful health conditions. In addition, health responsibilities often are assigned to individuals as collateral duties and as a result, little time is devoted to health. In other instances, laboratories have established safety and health committees; however, they also have placed their primary emphasis on safety with minimal emphasis on health.

Exposure and ill effects

No or varying health-monitoring programs and related health services were provided at the 11 laboratories we visited. Six of the laboratories, having 475 of the 1,329 employees, were providing no health-monitoring programs. The remaining five laboratories visited were providing only fragmented health-monitoring services. We interviewed supervisors responsible for 680 employees with a potential for exposure to harmful substances. Of the 680 employees, only 8 percent were receiving some tests or basic physicals. Examples of exposure to hazardous substances and the inconsistent health services provided are discussed below.

Research Triangle Park,
North Carolina

Four laboratories at EPA's Research Triangle Park (RTP) had a joint health-monitoring program for its laboratory personnel from October 1972 to October 1974. Health services for personnel potentially exposed was provided by contract. According to participants in the program, the services provided were not effective because (1) baseline physicals needed for comparison purposes and periodic inspections to identify potentially exposed personnel were not done, (2) information on test results was seldom or never transmitted to program participants, and (3) medical examinations were too infrequent to be meaningful. The contract ended in October 1974. Since the contract expired, each laboratory director has been responsible for providing health-monitoring services for respective employees.

The following demonstrated the inconsistencies in health-monitoring services provided at RTP laboratories.

- In the spring of 1975, three employees were exposed to nitric and hydrochloric acid fumes because an exhaust hood at one of the laboratories was not functioning properly. We were told that one of the employees suffered head and chest congestion, sore throat, and laryngitis for about a week and missed 2 days of work because of the exposure. The two other employees were also affected and suffered sore throats. EPA provided no tests or health-monitoring services for these employees either before or after the exposure.
- In April 1975, at another laboratory, four laboratory employees were exposed to dioxin (2,3,7,8-Tetrachlorodibenzo-p-Dioxin), an extremely toxic chemical, when it was accidentally released in the laboratory. Although there were no immediate symptoms, the employees were given physical examinations, but since no baseline physicals had been given, their conditions could not be adequately assessed.
- In December 1975 three employees--a research chemist, a typist, and a secretary--experienced nausea, headache, and a burning sensation of the nose, throat, and eyes when toxic fumes from nitrogen dioxide and hydrochloric acid passed through the building's ventilation system from the laboratory to the floor below, where the employees were working. The employees were given no medical tests or examinations as a result of the exposure.

--In December 1975 experiments were begun to evaluate the carcinogenic potential of N-Nitrosodiethylamine (identified by NIOSH as a suspected carcinogen). In the experiments, hamsters were injected with the substance. An employee working with the substance felt the experiments were conducted in a manner which was unsafe for those involved and in January 1976 expressed concern to the laboratory director. The director ordered the experiments stopped. In March 1976, after further discussion with the employee, the director personally investigated the incident. Following the investigation, the director placed the employees under medical surveillance.

At the time of our visit, laboratory directors and branch chiefs responsible for 330 of the 392 employees identified as potentially exposed to toxic and hazardous substances at RTP told us that only 34 employees were included in health-monitoring programs. The tests provided were as follow.

<u>Type</u>	<u>Number of employees</u>
Hearing	4
Eye	2
Toxic substance exposure monitoring (note a)	<u>28</u>
Total	<u>34</u>

a/ Included blood and urinalysis tests.

At the time of our review work, officials at RTP were considering proposals to initiate a health-monitoring program.

Pesticides Laboratory,
Washington, D.C.

Employees at EPA's Washington, D.C., Pesticides Laboratory were provided no health-monitoring services. At this laboratory employees expressed concern over the toxic substances to which they were exposed and it was suggested there might be a connection between such exposures and the deaths of four laboratory employees who died of cancer.

A GAO physician with public health experience studied the cases of these four employees to determine whether there was a relationship between their deaths and exposure to the laboratory substances used. The physician concluded that to clearly develop such a relationship was difficult, but suggested that in at least one case a possible relationship between exposures to the toxic substances used at the laboratory and the

employee's death could not be ruled out. In this case, the individual was apparently exposed to considerable quantities of benzene over a period of 10 to 12 years and died of acute myelocytic leukemia. Since benzene has been associated with the development of acute leukemia, the physician believed there may have been a relationship between the exposures to the benzene and the development of leukemia in the employee.

Later, the EPA industrial hygienist visited this laboratory and agreed with our conclusions in his December 1975 report that personnel routinely handle dangerous pesticide samples and the potential for exposure to these pesticides was great. He recommended that operations in the laboratory be discontinued until conditions could be improved and that all employees be included in an occupational health program of medical monitoring according to their exposures to the specific pesticides, solvents, and harmful reagents used. The laboratory was officially closed by EPA on June 11, 1976.

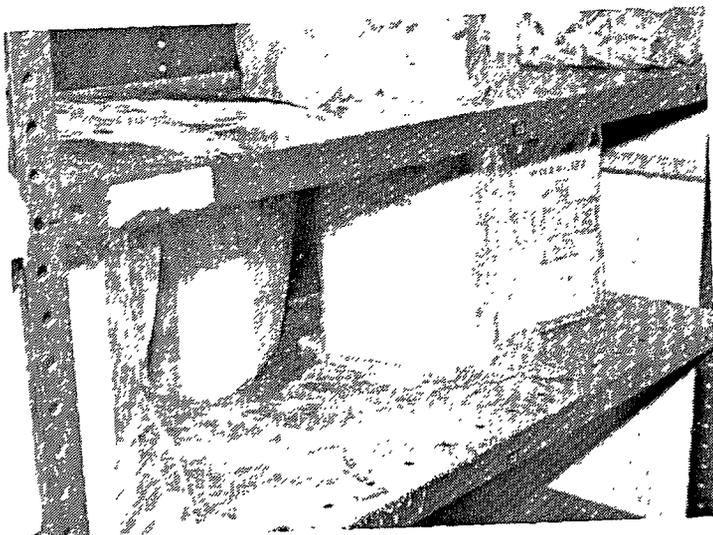
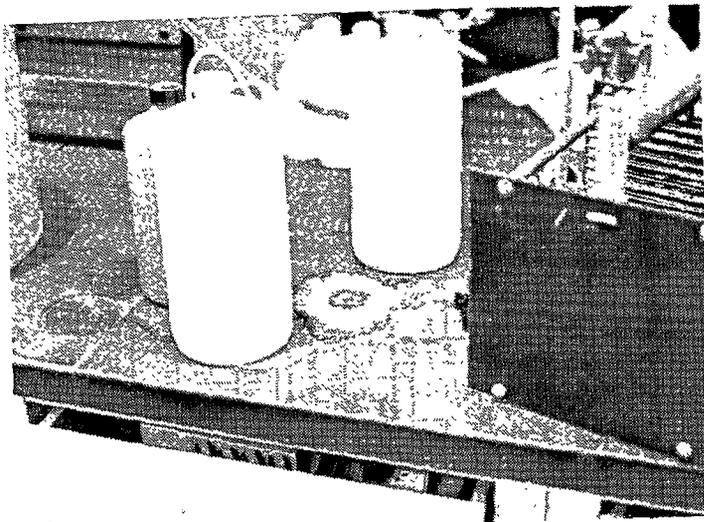
Region VIII Surveillance and
Analysis Division Laboratory,
Denver, Colorado

At the time of our visit to EPA's Region VIII Laboratory in Denver, Colorado, no health-monitoring program was in effect. The pesticides analysis unit at that location performed various operations involved with numerous carcinogenic and toxic substances. We noted many health hazards at the site, including poor housekeeping; excessive pesticides, solvents, and reagents on and under work benches; improper storage areas; and a lack of respiratory protective devices and personal protective clothing, all of which could have resulted in employee exposure to potential health hazards. (See photographs on p. 14.)



STORAGE AREA
CONTAMINATED
BY POWDER AND
LIQUID RESIDUE

ENCRUSTATION OF
CHEMICALS ON
WORKBENCHES



STORAGE AND WORK AREA
CONTAMINATED BY POWDER
AND LIQUID RESIDUE

We told EPA headquarters officials of the conditions observed. At our request, EPA's industrial hygienist and the safety officer from EPA's National Research Center at Corvallis, Oregon, accompanied us on a visit to the laboratory. An occupational health survey was conducted which confirmed our findings that many health hazards existed at the laboratory. The industrial hygienist's report included the following observations on laboratory conditions.

"Personnel working in the Pesticide Laboratory are handling pesticide samples routinely in the fulfillment of their missions. These samples may represent any pesticide (synthetic-organic, natural organic, and inorganic insecticides; fungicides; herbicides; adjuvants; and rodenticides). They may be organophosphates, carbamates, or chlorinated hydrocarbons. The amounts handled may vary from the microgram to the kilogram quantities with many of them highly toxic. The containers in which the pesticides are received are not always adequate for containment nor are they always properly labeled as to content. The potential for exposure to these pesticides is great.

"Large quantities of solvents and reagents are used in this laboratory on the open bench without adequate local exhaust ventilation. Most solvents affect the central nervous system to some extent acting as depressants, and causing other effects depending upon the solvent involved and the degree of exposure."

The industrial hygienist also said that, because of the conditions observed, employees at this laboratory were in imminent danger because (1) toxic substances, dangerous fumes, dust, or gases were present and (2) exposure to them would cause irreversible harm to such a degree as to shorten life or cause a reduction in physical or mental efficiency. He recommended that action be taken to correct the poor conditions that existed and that all the employees be included in an occupational health-monitoring program consisting of baseline physicals and monitoring according to the employee's exposure to pesticides, solvents, or other harmful reagents. The EPA Regional Administrator immediately closed the laboratory until the industrial hygienist's recommendations could be implemented. The chemists involved were provided physical examinations designed for the potential exposures to which each was subjected.

Region IV Surveillance and
Analysis Division Laboratory,
Athens, Georgia

Employees at the Athens laboratory, which at the time of our visit were provided no health-monitoring services, perform analyses to identify the types and amounts of pollutants contained in environmental and industrial discharge samples received from Federal, State, and local agencies. In addition, the laboratory has its own teams of employees to take air, water, and industrial discharge samples. Officials said that these employees, unlike laboratory workers, often do not know the types or concentrations of substances being handled in their work. Only after laboratory analyses of the samples do the employees know when they have been dangerously exposed to harmful substances.

For example, Federal regulations (29 C.F.R. 1910.1017) currently require that employees not be exposed to vinyl chloride concentrations greater than one part vinyl chloride per one million parts of air (ppm) averaged over any 8-hour period or to concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes. The regulations also require that respirators be worn by employees exposed to concentrations of vinyl chloride that exceed the permissible control level and that the health of such exposed employees be monitored.

In May 1974, however, two employees of the Athens laboratory collected air samples for a 9-day period outside an industrial plant which produced vinyl chloride. Vinyl chloride has since been reported as the possible cause of a rare form of liver cancer.

One of the two employees said that he and his companion were exposed to vinyl chloride in the air for a minimum of 8 hours per day during the 9-day sampling period. He also said the samples were taken downwind from the plant to obtain those with the highest concentration of vinyl chloride. Laboratory analysis of the air samples showed they contained from less than 1 ppm to more than 30 ppm of vinyl chloride. Of 188 samples collected, 36 percent contained greater than 1 ppm of vinyl chloride; 13 percent contained greater than 5 ppm; and 3 percent contained greater than 10 ppm. The two employees that took the air samples did not wear any type of respirators nor was their health monitored as a result of these exposures.

In July 1975 another employee of the Athens laboratory had chemical burns on his hands after collecting a river

water sample near a chemical plant. The sample contained the pesticides chlordane, heptachlor, and endrin, two of which are suspected carcinogens. The employee received no monitoring physicals either before or after the exposures.

At the time of our review, the laboratory's safety officer was considering contracting with the U.S. Public Health Service to provide monitoring physicals for laboratory personnel.

Health Effects Research Laboratory,
Environmental Research Center,
Cincinnati, Ohio

At the Health Effects Research Laboratory in Cincinnati, employees were performing work such as cancer research studies which involved both known and suspected carcinogens. Other operations exposed personnel to automotive and diesel emissions, mercury, nickel carbonyl, aerosols, and radioactive substances, yet health monitoring was provided to only 7 of 132 employees.

The seven employees worked with animals while performing cancer research studies. They were given physical examinations in 1975, including immunizations against tetanus, polio, and rabies; tuberculosis tests; and blood chemistry and urinalysis tests. In addition, about 15 employees performing virology studies conducted monthly monitoring tests of their own health conditions from December 1973 to May 1975. An EPA official told us these tests were discontinued in May because there was only one positive test during the period.

In February 1972 a laboratory aide assisting in moving laboratory chemicals reported a rash on the hands and fingers. A physical examination was provided the employee, and a physician diagnosed the condition as contact dermatitis and recommended avoiding future exposure to chemicals.

Similarly, another laboratory employee, who received no health-monitoring services, developed chemical conjunctivitis, an eye sensitivity caused by continuous exposure to chemical vapors. Later, in February 1976, the employee's personal physician diagnosed the condition as permanent and recommended avoiding further contact with chemical fumes.

CONCLUSIONS

EPA laboratory employees throughout the Nation are engaged in operations that include the handling, use, and exposure to highly toxic and harmful substances, including

carcinogenic materials. They are not receiving effective medical surveillance through a health-monitoring program. To protect the health of EPA employees and to carry out the intent of the act, the executive order, and implementing regulations, EPA should establish a health-monitoring program.

Within EPA, the necessary emphasis on the health-monitoring function has not been provided in that (1) the function has been located too low in the organizational structure to be effective, (2) direction to the field laboratories on the specific elements needed in establishing such a program has not been provided, and (3) training and staffing needs in the health areas have not been met.

EPA ACTIONS TAKEN AND PLANNED

Although EPA laboratory employees generally had not received effective health monitoring, EPA officials were concerned about the conditions discussed.

A February 2, 1976, memorandum from EPA's Assistant Administrator for Planning and Management, to EPA Office Directors, Assistant Administrators, and Regional Administrators, states the following:

"As the designated Agency Safety and Health Official, I wish to advise you that my Occupational Safety and Health Staff is developing a national program of industrial hygiene and occupational health surveys of EPA workplaces to implement the requirements for occupational health and environmental controls contained in the Occupational Safety and Health Standards issued by the Secretary of Labor in Title 29 of the Code of Federal Regulations Part 1910."

According to the memorandum the services of industrial hygienists and occupational health physicians are to be contracted initially to perform surveys of EPA's most critical workplaces. EPA has also appointed individuals to identify and assist in developing health programs for specific hazards, such as radiation, and carcinogen use.

In a second memorandum dated July 16, 1976, EPA announced the inspection by the safety and health staff of all EPA laboratory operations emphasizing laboratory procedures for labeling, using, handling, and storing chemicals, especially toxic compounds. The inspections are being made and the results of these inspections are to be used to establish priorities for industrial hygiene and occupational health surveys to be conducted during fiscal year 1977.

When all the health surveys are completed, the findings and detailed recommendations are to be used to establish an agencywide employee health-monitoring program. Because all the health surveys could take a long time, for the protection of certain EPA employees at the various facilities it would not be wise to delay implementing a health-monitoring program until health surveys of all laboratories have been completed.

RECOMMENDATIONS

We recommend that the Administrator, EPA, insure that the inspections and subsequent health surveys receive priority and the results thereof be used in establishing the necessary health-monitoring programs at the various EPA laboratories as the surveys are completed. In addition, the Administrator should improve the organizational alinement of the safety and health activity and have these personnel report directly to the Assistant Administrator for Planning and Management, who is the Agency's designated Safety and Health Official. Also, the Administrator should provide additional health staffing and training.

AGENCY COMMENTS AND OUR EVALUATION

In commenting on our report in an interim response (see app. I), EPA stated that the GAO conclusions are essentially correct in that no formal health-monitoring program exists on an agencywide basis. When the conditions described were brought to its attention, EPA expressed concern for the safety of its employees and began a program of corrective measures. Three EPA laboratories were closed, and a review of all laboratories was begun to implement a formal agencywide health-monitoring program.

EPA stated that

- an Occupational Safety and Health Steering Committee was to be established at the highest level in the Agency to review current and future courses of action in the safety and health area,
- the safety and health activity would report directly to the Assistant Administrator for Planning and Management, who is the Agency's designated Safety and Health Official, and
- a qualified Occupational Health Officer would be designated at each of the EPA laboratories.

In conclusion, EPA said that it was firmly committed to a strong and effective health and safety program.

We believe that the actions initiated by EPA represent a strong commitment to improving its occupational safety and health program.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

September 29, 1976

OFFICE OF
PLANNING AND MANAGEMENT

Mr. Henry Eschwege
Director, Community & Economic
Development Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Eschwege:

We have reviewed the draft General Accounting Office report entitled "Health Monitoring Needed for Laboratory Employees."

When GAO first brought to our attention problems regarding EPA's laboratory health program, we became concerned and began a program of corrective measures. The Safety and Health Staff began an intensive review of safety practices at all EPA laboratories. That survey identified deficiencies which, in many instances, are directly related to procedures for handling certain substances, and laboratory housekeeping. Laboratory Directors were notified of specific deficiencies and have been directed to take immediate corrective action. In the course of these reviews, we closed our Annapolis, Maryland laboratory pending correction of a number of deficiencies.

The GAO conclusions are essentially correct in that no formal health monitoring program exists on an Agency-wide basis, although some of our laboratories do conduct health monitoring. We have initiated a detailed review of all EPA laboratories to implement formal medical monitoring of all EPA laboratory personnel. This review will be the basis for specific base-line physicals and medical monitoring programs. The Assistant Administrators and Regional Administrators were advised that the Occupational Safety and Health Staff were developing such a program on February 2, 1976, and to date, industrial hygiene surveys have been completed and health monitoring programs have been implemented in laboratories in the Washington, D.C. area.

We are taking a number of other steps to improve our Occupational Safety and Health Program. We are establishing an Occupational Safety and Health Steering Committee at the highest level within the Agency, which will review current and future courses of action, policies, and procedures and to recommend any

-2-

additional steps which are necessary to insure safe and healthful working conditions for all EPA employees. In addition, we are taking immediate steps to designate in every laboratory a qualified Occupational Health Officer to insure compliance with approved laboratory procedures and protocol and to facilitate establishment of an effective medical monitoring program.

We are reviewing the organizational placement of the health and safety function within EPA and will shortly inform you of our conclusions.

I wanted, in this letter, to bring you up to date on the status of actions we have taken to strengthen our health programs. I will shortly be sending you EPA's comments on the accuracy of the report.

Let me reiterate our concern for the safety of EPA employees. Through EPA surveys and other information, we took action to close down three laboratories, even though some Agency priorities would suffer. We have initiated a comprehensive series of actions which will fully meet the recommendations of GAO. We are firmly committed to a strong and effective health and safety program.

Sincerely yours,



Alvin L. Alm
Assistant Administrator
for Planning and Management

ENVIRONMENTAL PROTECTION AGENCY LABORATORIESAND LOCATIONS AS OF JUNE 30, 1975OFFICE OF RESEARCH & DEVELOPMENT LABORATORIES

1. Environmental Monitoring and Support Laboratory,
Research Triangle Park, North Carolina
2. Environmental Monitoring and Support Laboratory,
Cincinnati, Ohio
3. Environmental Monitoring and Support Laboratory,
Las Vegas, Nevada
4. Industrial Environmental Research Laboratory, Research
Triangle Park, North Carolina
5. Industrial Environmental Research Laboratory, Cincinnati,
Ohio
6. Municipal Environmental Research Laboratory, Cincinnati,
Ohio
7. Environmental Sciences Research Laboratory, Research
Triangle Park, North Carolina
8. Environmental Research Laboratory, Athens, Georgia
9. Environmental Research Laboratory, Ada, Oklahoma
10. Health Effects Research Laboratory, Research Triangle
Park, North Carolina
11. Health Effects Research Laboratory, Cincinnati, Ohio
12. Environmental Research Laboratory, Corvallis, Oregon
13. Environmental Research Laboratory, Duluth, Minnesota
14. Environmental Research Laboratory, Narragansett,
Rhode Island
15. Environmental Research Laboratory, Gulf Breeze, Florida

OFFICE OF RESEARCH AND DEVELOPMENT
FIELD STATIONS AND PILOT PLANTS

16. Edison, New Jersey
17. College, Alaska
18. Grosse Ile, Michigan
19. Bears Bluff, South Carolina
20. Newtown, Ohio
21. Corvallis, Oregon
22. Wenatchee, Washington
23. Ely, Minnesota
24. Newport, Oregon
25. Monticello, Minnesota
26. Rivesville, West Virginia
27. Warrentown, Virginia
28. Lebanon, Ohio
29. Washington, D.C.

OFFICE OF AIR AND WASTE MANAGEMENT LABORATORIES

30. Ann Arbor, Michigan
31. Cincinnati, Ohio
32. Montgomery, Alabama
33. Las Vegas, Nevada
34. RTP, North Carolina

OFFICE OF ENFORCEMENT LABORATORIES

35. National Environmental Investigative Center, Denver,
Colorado
36. Sandusky, Ohio

OFFICE OF WATER AND HAZARDOUS MATERIALS

37. Beltsville, Maryland
38. Corvallis, Oregon
39. Bay St. Louis, Mississippi
40. Washington, D.C.

REGIONAL LABORATORIES AND LOCATIONS

Region I

41. Needham Heights, Massachusetts

Regional Laboratories and Locations (continued)Region II

- 42. New York, New York
- 43. Edison, New Jersey
- 44. Rochester, New York

Region III

- 45. Annapolis, Maryland
- 46. Wheeling, West Virginia

Region IV

- 47. Athens, Georgia

Region V

- 48. Chicago, Illinois
- 49. Cleveland, Ohio
- 50. Evansville, Indiana
- 51. Minneapolis, Minnesota

Region VI

- 52. Ada, Oklahoma
- 53. Houston, Texas
- 54. Bay St. Louis, Mississippi

Region VII

- 55. Kansas City, Kansas

Region VIII

- 56. Denver, Colorado

Region IX

- 57. Alameda, California
- 58. San Francisco, California

Region X

- 59. Seattle, Washington
- 60. Manchester, Washington

In addition to the preceding laboratories, the Environmental Protection Agency has regional pesticides inspectors located in 32 locations.

PRINCIPAL OFFICIALS OF THE ENVIRONMENTAL PROTECTION AGENCY
RESPONSIBLE FOR ACTIVITIES
DISCUSSED IN THIS REPORT

	<u>Tenure of Office</u>	
	<u>From</u>	<u>To</u>
ADMINISTRATOR:		
Russell E. Train	Sept. 1973	Present
John R. Quarles, Jr. (acting)	Aug. 1973	Sept. 1973
Robert W. Fri (acting)	Apr. 1973	Aug. 1973
William D. Ruckelshaus	Dec. 1970	Apr. 1973
ASSISTANT ADMINISTRATOR FOR PLANNING AND MANAGEMENT:		
Alvin L. Alm	July 1973	Present
Thomas E. Carroll	Dec. 1970	July 1973

Copies of GAO reports are available to the general public at a cost of \$1.00 a copy. There is no charge for reports furnished to Members of Congress and congressional committee staff members. Officials of Federal, State, and local governments may receive up to 10 copies free of charge. Members of the press; college libraries, faculty members, and students; and non-profit organizations may receive up to 2 copies free of charge. Requests for larger quantities should be accompanied by payment.

Requesters entitled to reports without charge should address their requests to:

U.S. General Accounting Office
Distribution Section, Room 4522
441 G Street, NW.
Washington, D.C. 20548

Requesters who are required to pay for reports should send their requests with checks or money orders to:

U.S. General Accounting Office
Distribution Section
P.O. Box 1020
Washington, D.C. 20013

Checks or money orders should be made payable to the U.S. General Accounting Office. Stamps or Superintendent of Documents coupons will not be accepted. Please do not send cash.

To expedite filling your order, use the report number in the lower left corner and the date in the lower right corner of the front cover.

GAO reports are now available on microfiche. If such copies will meet your needs, be sure to specify that you want microfiche copies.

AN EQUAL OPPORTUNITY EMPLOYER

**UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548**

**OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300**

**POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE**



THIRD CLASS