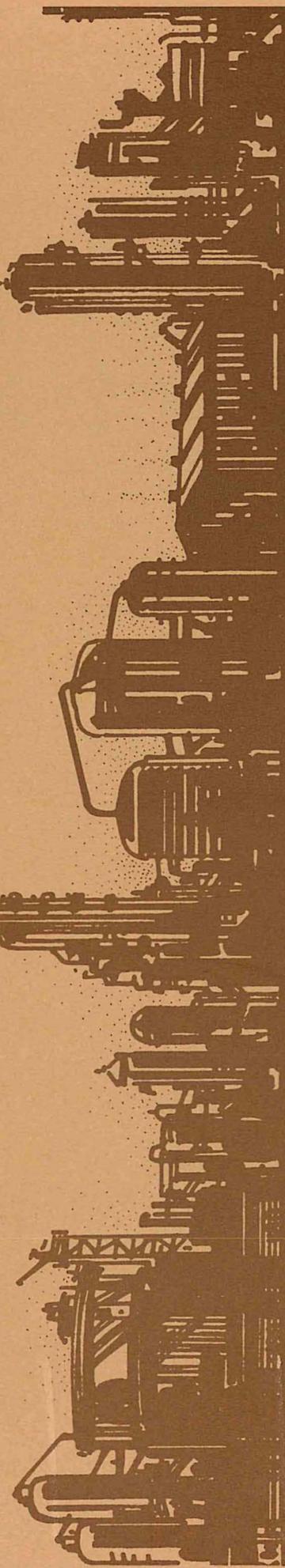


NIOSH



Fiscal Year 1983

Program Plan by Program Areas

10 Leading Work-Related Health Problems

- Occupational Lung Disease
- Musculoskeletal Injuries
- Occupational Cancer
- Fractures, Amputations, Eye Losses, and Traumatic Deaths
- Cardiovascular Disease
- Reproductive Problems
- Neurotoxic Illness
- Noise-Induced Hearing Loss
- Dermatologic Problems
- Psychological Disorders

PROGRAM OF THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

* * * * *

Program Plan by Program Areas for FY 1983

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Institute for Occupational Safety and Health

February 1983

DHHS (NIOSH) Publication No. 83-102

PREFACE

The National Institute for Occupational Safety and Health is the major federal organization responsible for scientific research on the safety and health problems caused by work. Through the scientific activities of the Institute, we hope to exercise a role of responsible leadership in the field of occupational safety and health.

Each year since 1977, NIOSH has published a "Program Plan" which specifies in detail the scientific work planned for the Institute for the Fiscal Year. The Plan is the product of a systematic process which takes into account the specific national goals for prevention¹ set by the United States Public Health Service, and also the concerns of organizations who look to NIOSH for scientific leadership in protecting the health of workers. Particular attention is paid to requests from those agencies in the Department of Labor, principally OSHA and MSHA, responsible for regulating the workplace.

In developing the plan, this year, as last, I have asked the senior scientists of NIOSH to emphasize four directions or themes which I believe will enable the Institute to provide vital, credible, and up-to-date scientific leadership. These are:

1. Strengthen mechanisms to assure excellence in research and recommendations of the Institute.
2. Focus the scientific skills and resources of the Institute on the most important diseases and injuries caused by work.
3. Facilitate an expanded participation of State and local health agencies in efforts to prevent work-related health problems.
4. Improve the access of workers to the benefits of health promotion.

During Fiscal Year 1983, significant achievements are expected in all four categories. A few examples are cited here.

Building on the rigorous peer review requirement we implemented last year, we will establish this year a Board of Scientific Counselors to advise the Director on all aspects of our program in research. With this Board in place and functioning, we can assure the public, that the quality of science at NIOSH is as good or better than that of any other governmental scientific institute.

Last year, to clearly depict our views of the problem in occupational safety and health, we developed a suggested list of "The Ten Leading Work-Related Diseases and Injuries"² based on the frequency, severity, and preventability of each entry:

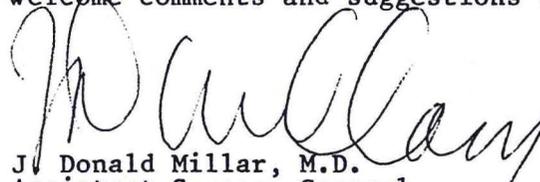
1. Occupational Lung Disease
2. Musculoskeletal Injuries
3. Occupational Cancer
4. Fractures, Amputations, Eye Losses, and Traumatic Deaths
5. Cardiovascular Disease
6. Reproductive Problems
7. Neurotoxic Illness
8. Noise-Induced Hearing Loss
9. Dermatologic Problems
10. Psychological Disorders

During Fiscal Year 1983, groups of our scientists will develop suggested national strategies for preventing three of the most important problems. The work-group addressing occupational lung diseases, has already produced an outline for such a national strategy.

During this Fiscal Year, the Institute will expand its agreements with State Health Departments for collaborative activities in surveillance. We will continue to respond to requests by these agencies for consultation and assistance in investigating and preventing work-related threats to health.

Since its inception, the National Institute for Occupational Safety and Health has aggressively supported "health protection," i.e., efforts to reduce environmental risks in the workplace. The intensity of interest in health protection will continue. In addition, we are inaugurating in Fiscal Year 1983, a program in "health promotion" to make workers aware of the preventable risks of unhealthy behaviors, as well as the environmental hazards they face at work. This logical extension makes possible a comprehensive approach to prevention which acknowledges a clear truth - health problems develop as a result of both environmental and behavioral factors, and in the workplace these factors often interact to sharply increase the risks to workers.

Those who direct the scientific activities of NIOSH are called to account for their performance in completing the programs described in this book. We hope the document offers a readily understandable description of what "what NIOSH is up to." We always welcome comments and suggestions to help us to do a better job of protecting the health of workers.



J. Donald Millar, M.D.
Assistant Surgeon General
Director, National Institute for
Occupational Safety and Health

1. Promoting Health/Preventing Disease: Objectives for the Nation. U.S. Department of Health, Education, and Welfare/Public Health Service, 1980.
2. "Leading Work-Related Diseases and Injuries - United States," Morbidity and Mortality Weekly Report. Vol. 32, No. 2, January 21, 1983.

NIOSH FISCAL YEAR 1983 PROGRAM PLAN

FOREWORD

The National Institute for Occupational Safety and Health conducts research necessary to ensure, insofar as possible, that no worker will suffer impaired health and functional capacity or diminished life expectancy as a result of a work experience. NIOSH's current responsibilities were established by the following legislative authorities (also see Appendix):

1. Occupational Safety and Health Act of 1970 (Public Law 91-596) created NIOSH in the Department of Health and Human Services (then DHEW) to conduct research in occupational safety and health and the Occupational Safety and Health Administration in the Department of Labor to establish and enforce related standards. NIOSH is authorized to develop and establish recommended occupational safety and health standards and to conduct education and training programs in order to provide for an adequate supply of qualified personnel in the field of occupational safety and health. The Presidential Document, Executive Order 12196 of February 26, 1980, extended the benefits of the Occupational Safety and Health Act to Federal employees.
2. Federal Mine Safety and Health Amendments Act of 1977 (Public Law 91-164) amended the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173), in effect merging the 1969 Act and the Federal Metal and Nonmetal Mine Safety Act of 1966 (Public Law 89-577). The 1977 Act created the Mine Safety and Health Administration in DOL and gave the Public Health Service authority to recommend health standards for the mining industry.
3. Public Health Services Act of 1966 (Public Law 89-749), Title III, Part A - Research and Investigation, includes (a) dissemination of information and practical application of research activities, (b) studies and testing of substances for carcinogenicity, teratogenicity, and mutagenicity, (c) the interchange between the United States and participating foreign countries of research scientists who are engaged in programs of biomedical research, and (d) assistance to the States to meet health emergencies or problems involving or resulting from disasters or disease.

NIOSH also has other legislative authorities:

4. Toxic Substances Control Act of 1976 (Public Law 94-469) whereby NIOSH serves on the Interagency Testing Committee which recommends substances for testing and on the Interagency Toxic Substances Data Committee and advises the Environmental Protection Agency regarding epidemiologic studies to be undertaken.
5. Clean Air Act as amended in 1977 (Public Law 95-95) whereby NIOSH serves on the Task Force on Environmental Cancer and Heart and Lung Disease to recommend research leading to the prevention of environmental diseases.
6. Health Professions Educational Assistance Act of 1976 (Public Law 94-484) through which NIOSH provides technical assistance to the Health Resources and Services Administration in DHHS for their occupational health training and education centers.

7. Outer Continental Shelf Lands Act Amendments of 1977 (Public Law 95-372) through which NIOSH, with the Secretary of Commerce, and in cooperation with the Secretary of Transportation regarding U.S. Coast Guard operations, conducts studies of underwater diving techniques and equipment suitable for protecting human safety.
8. Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Public Law 96-510)-- the Superfund Act--through which NIOSH, in conjunction with OSHA, EPA, and DOT, is directed to study and modify the National Contingency Plan to provide protection of the safety and health of employees involved in response actions, remedial or emergency.

This document outlines NIOSH's Program Plan for Fiscal Year (FY) 1983--October 1, 1982, through September 30, 1983, and will serve as a tool for ongoing internal planning and control by the Institute management. NIOSH will make modifications in individual projects as necessary to ensure prompt and appropriate response to emerging problems.

NIOSH has sustained substantial cuts in resources for FY 1983 and, within those restrictions, special effort will be made to continue to protect the highest-priority Program Areas. The amount of appropriated funds dropped from \$80 million in FY 1980 to \$68 million in FY 1981, and to \$62 million in FY 1982, with the NIOSH training program incurring the most severe reductions. The FY 1983 budget is \$56 million. The FY 1984 Budget could be as low as \$54 million.

NIOSH has ranked the Ten Leading Work-Related Health Problems based on the number of workers potentially affected, the medical severity of the problems, and the status of our current research with respect to the problems. These ten are: lung disease, including cancer; musculoskeletal injuries/disorders; cancer other than lung; traumatic deaths, amputations, fractures, and eye losses; cardiovascular disease; reproductive problems; neurotoxic illness; noise-induced hearing loss; dermatologic disorders; and psychological disorders. All current and proposed research projects are evaluated, based upon how well they address NIOSH's Ten Leading Work-Related Health Problems and the DHHS Objectives for the Nation. We have displayed the full list of 20 NIOSH Program Areas in the Keys to Coding and the five major components of the program structure-- to identify, evaluate, and control occupational safety and health problems, to disseminate research findings and recommendations, and to administer resources with a sense of public stewardship.

Emphasis will be placed on continuing efforts to identify the needs of users of NIOSH's research findings. For example, the Program Plan for FY 1983 includes specific research project proposals to meet requests from the Department of Labor's Occupational Safety and Health Administration and Mining Safety and Health Administration. Similarly, continuing efforts will be made to identify needs of other users of NIOSH's programs and products--individual workers, organized labor and management, the general population, other Federal agencies such as the Environmental Protection Agency, and State and local governments.

Dissemination of information of NIOSH's research and surveillance findings--as early as and to the broadest extent possible--also will continue to have a high priority to ensure nationwide awareness of hazards experienced by workers in the Nation's workplace-- will be a major target in NIOSH's FY 1983 information dissemination efforts.

The administration of the Institute is unique in that management has created a system of planning and evaluation designed to be of minimum complexity while providing sound budget and program information to the Divisions and Offices. This system incorporates the following steps which assure accountability for meeting objectives and administering resources in the Institute:

1. The NIOSH Director issues program guidance to Division and Office Directors annually;
2. The Division and Office Directors submit a program plan to the NIOSH Director in response to the guidance;
3. The Division and Office Directors use project plans that are consistent with the program plan;
4. The NIOSH Director controls resources against the project plans continuously, and;
5. The NIOSH Director conducts progress reviews against the program plan quarterly.

We will want to continue to improve our annual Program Plan in both content and presentation and in usefulness to readers both within and outside the Institute. Your suggestions for change toward improvement would be appreciated. Such suggestions, and any questions regarding this document, should be addressed to me at NIOSH, CDC, Building I, Room 3040, 1600 Clifton Road, Atlanta, GA 30333.



Melvin L. Myers
Engineer Director
Director, Office of Program
Planning and Evaluation

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NIOSH PROGRAM GOALS AND PROGRAM AREAS

IDENTIFY OCCUPATIONAL SAFETY AND HEALTH PROBLEMS	1
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Cancer, Other than Lung	38
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Cardiovascular Disease	51
Reproductive Effects	54
Neurotoxic Illness	61
Noise-Induced Hearing Loss	65
Dermatologic Disorders	67
Psychological Disorders	71
CONTROL OCCUPATIONAL SAFETY AND HEALTH PROBLEMS	74
Respirators	76
Control Systems	81
Other Personal Protective Equipment	87
Sampling/Analysis	90
Instrument/Methods Development	94

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DISSEMINATE OCCUPATIONAL SAFETY AND HEALTH	
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OUTLOOK FOR 1990

The U.S. Bureau of Labor Statistics projects that many trends observed in changes in workplace and work force characteristics during the 1970s should continue through the 1980s. Three assumptions derived from these projections help form the basis for NIOSH's program planning so that the Institute can anticipate which program areas will address occupational safety and health needs most effectively. These assumptions are:

1. The proportion of females in the work force is increasing.
2. The mean age of the work force is increasing.
3. The nature of work is shifting from production to service.

Additionally, NIOSH's program planning is designed to be consistent with the occupational safety and health "Objectives for the Nation" as published by the Department of Health and Human Services. These objectives are designed to promote safety and health and prevent injury and disease.

Characteristics of the Work Force

Because of the past decline in birth rates, the number of young people age 16 to 24 in the labor force will fall by at least 1.5 million during the 1980s. The proportion of older workers above the age of 55 in the work force will decline by over 2 percent, largely because persons born during the Great Depression and World War II when the birth rate was low are being replaced by the baby-boom generation (Table 1 and Figure 1 below). By the 1990s, more than 70 percent of the labor force is expected to be in the prime working ages of 25 to 55, up from 61 percent in 1979. A more mature, experienced labor force is in the offing.

Increased participation of women in the work force is expected to continue during the 1980s with women constituting two out of every three new additions to the work force. Women constituted 40 percent of the work force in 1975, 42 percent in 1980, and are expected to constitute over 46 percent by 1990 (Table 2 below).

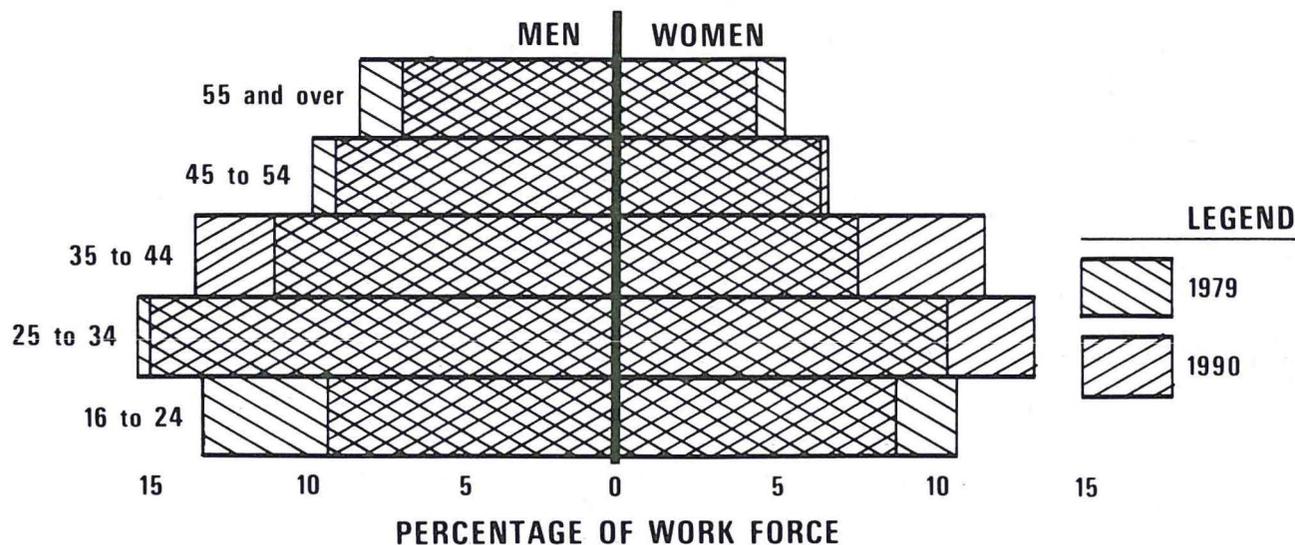
Characteristics of the Workplace

The transformation of work by technological developments, a process which began in ancient times and accelerated during the Industrial Revolution, is accelerating even more during the present computer age. The proportion of agricultural workers in the Nation has declined to under 3 percent. Forty years ago, workers involved in the production of goods accounted for approximately 50 percent of the total labor force. In 1959 manufacturing industries represented one job in four; in 1979 one in five. On the other hand, clerical work today accounts for over 18 percent of all workers.

Table 1. WORK FORCE DISTRIBUTION BY AGE (in percentages)					
Age Group	MEN		WOMEN		Combined Change 1979-1990
	1979	1990	1979	1990	
Total	57.8	53.8	42.1	46.1	
16 to 24	13.3	9.2	11.1	9.2	-24.6
25 to 34	15.3	15.0	10.8	13.5	+ 9.0
35 to 44	11.0	13.6	7.9	11.9	+34.9
45 to 54	9.7	9.0	6.6	6.7	- 3.7
55 and over	8.3	6.9	5.5	4.6	-16.7

Table 2. WORKFORCE DISTRIBUTION BY SEX (in millions)			
	1975	1979	1990
MEN	55.6	59.5	68.2
WOMEN	37.0	43.4	59.9
Total	92.6	102.9	128.1

WORK FORCE DISTRIBUTION BY AGE AND SEX



Source: Bureau of Labor Statistics

Figure 1.

Service industries now account for nearly 70 percent of the Nation's work force. These industries broadly include workers in such sectors as banking, communications, education, electric power, fire fighting, food, health, hotel, household, police, sanitation, trade, and transportation; and exclude agriculture, construction, manufacturing, and mining. Wholesale and retail trade are expected to provide the greatest number of new jobs by 1990. Services for health care, air transportation, and recreation also are projected to increase dramatically.

In manufacturing, industries expected to grow the most during the 1980s include computers; optical equipment; construction, mining, and oil field machinery; office machines; electronic components; material-handling equipment; photographic equipment, and medical and dental instruments. The mining of coal, chemicals, and fertilizers is predicted to increase substantially, and mining of nonferrous metal ores is expected to decline.

Objectives for the Nation for Occupational Safety and Health

The DHHS publication, "Promoting Health/Preventing Disease: Objectives for the Nation," contains a series of specific goals. These include reductions in workplace accidents, deaths, disabling injuries, and diseases, particularly occupational dermatitis and noise-induced hearing loss; and prevention of new cases of asbestosis, byssinosis, silicosis, coal workers' pneumoconiosis, and heavy-metal poisoning (lead, arsenic, and zinc).

These objectives are based on a set of eight principal assumptions as to what conditions are necessary to meet the Objectives for the Nation in occupational safety and health. These assumptions are:

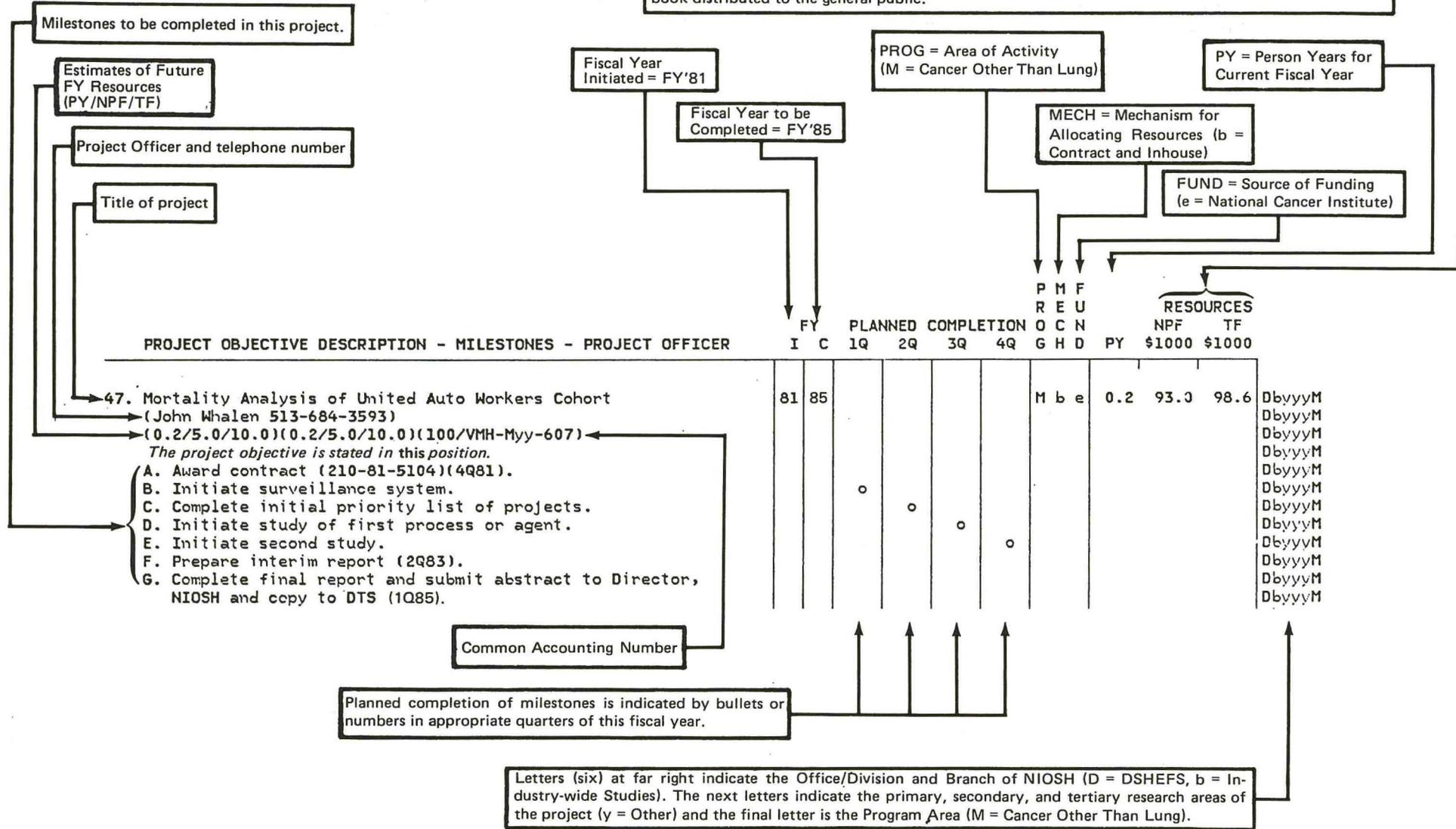
1. Control technology will have been developed in the public and private sectors to reduce many major workplace hazards.
2. A regulation program will have been developed for pre-evaluation and approval of hazard control plans for all new processes, new equipment, and new installations.
3. Greater use will be made of relevant State and local Government agencies, as well as those academic units which can address occupational safety and health problems.
4. Comprehensive school health education curricula will incorporate concepts of occupational illness and injury including the role of lifestyle and personal habits (such as smoking and alcohol consumption) and the level of hazard for the individual with occupational exposures (e.g., asbestos and smoking, vinyl chloride, and excessive drinking).
5. Growing awareness of the importance of preventing occupational disease and injuries will facilitate legislative incentive to support the recommendations.
6. Coordinated State and local implementation systems for recognition and prevention of occupational safety and health hazards will have been developed.
7. Quality control in the delivery of occupational health and safety services will be improved.
8. Workers in the public sector will be extended the same protection as those in the private sector.

NIOSH's program continues to consider both the specific occupational safety and health Objectives for the Nation and the assumptions underlying their achievement.

- Sources:
1. "The U.S. Economy in 1990," Monthly Labor Review, August 1981, pp. 9-55.
 2. Fullerton, Howard N., "The 1995 Labor Force: A First Look," Monthly Labor Review, December 1980, pp. 11-21.
 3. Public Health Service, "Occupational Safety and Health," Promoting Health/Preventing Disease: Objectives for the Nation, U.S. Department of Health and Human Services, Fall 1980, pp. 39-43.

HOW TO USE THE NIOSH PROGRAM PLAN BOOK
 (Use with Keys to Coding on following pages)

RESOURCES needed are described in terms of funds needed to complete a project. Funding is further described as Nonpersonnel Funds (NPF) and Total Funds (TF). This funding information is officially sensitive data and, to avoid prospective contractors having an unfair advantage, is not included in the book distributed to the general public.



PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER

47. Mortality Analysis of United Auto Workers Cohort
 (John Whalen 513-684-3593)
 (0.2/5.0/10.0)(0.2/5.0/10.0)(100/VMH-Myy-607)
The project objective is stated in this position.
 A. Award contract (210-81-5104)(4Q81).
 B. Initiate surveillance system.
 C. Complete initial priority list of projects.
 D. Initiate study of first process or agent.
 E. Initiate second study.
 F. Prepare interim report (2Q83).
 G. Complete final report and submit abstract to Director, NIOSH and copy to DTS (1Q85).

FY	I	C	PLANNED COMPLETION				P R O G R E U O C N G H D	P Y	RESOURCES		D b y y y M
			1Q	2Q	3Q	4Q			NPF \$1000	TF \$1000	
81		85					M b e	0.2	93.3	98.6	D b y y y M
				o							D b y y y M
					o						D b y y y M
						o					D b y y y M
							o				D b y y y M
											D b y y y M
											D b y y y M
											D b y y y M

Common Accounting Number

Planned completion of milestones is indicated by bullets or numbers in appropriate quarters of this fiscal year.

Letters (six) at far right indicate the Office/Division and Branch of NIOSH (D = DSHEFS, b = Industry-wide Studies). The next letters indicate the primary, secondary, and tertiary research areas of the project (y = Other) and the final letter is the Program Area (M = Cancer Other Than Lung).

FY 1983
KEYS TO CODING

Program Areas (PROG) - Columns 96 and 124

Operation Mechanism (MECH) - Column 98

IDENTIFY OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

- B -- Surveillance
- V -- Health Hazard Evaluations/Technical Assistance

EVALUATE OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

- I -- Lung Disease, Including Cancer
- O -- Musculoskeletal Injuries/Disorders
- M -- Cancer Other Than Lung
- F -- Traumatic Deaths, Amputations, Fractures,
Eye Losses
- L -- Cardiovascular Disease
- A -- Reproductive Effects
- C -- Neurotoxic Illness
- P -- Noise-Induced Hearing Loss
- J -- Dermatologic Disorders
- Q -- Psychological Disorders

CONTROL OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

- D -- Respirators
- E -- Control Systems
- G -- Other Personal Protective Equipment
- N -- Sampling/Analysis
- U -- Instrument/Methods Development

DISSEMINATE OCCUPATIONAL SAFETY AND HEALTH
FINDINGS AND RECOMMENDATIONS

- H -- Information Dissemination/Document Development
- K -- Work Force Development

W - ADMINISTER INSTITUTE PROGRAMS

- a -- Contract Only
- b -- Contract and Inhouse
- c -- Inhouse Only
- d -- Interagency Agreement
- f -- Cooperative Agreement
- h -- Contract and Interagency Agreement
- i -- Contract and Cooperative Agreement
- j -- Contract and Other
- k -- Interagency and Cooperative Agreement
- m -- Research Grant
- n -- Training Grant

Source of Funding (FUND) - Column 100

- a -- Base Program
- b -- Coal Mining
- c -- Environmental Protection Agency
- d -- Metal and Nonmetal Mining
- e -- National Cancer Institute
- f -- U.S. Department of Agriculture
- g -- U.S. Department of Defense
- h -- Non-Governmental
- y -- Other

FY 1983

Research Areas

Primary, Col. 121; Secondary, Col. 122; Tertiary, Col. 123

N = NIOSH Planning Group in the Department of Labor

P = 1990 Prevention Objectives for the Nation

EXPOSURE-SPECIFIC STUDIES

- a - Radiation
- d - Biohazards
- e - Pesticides
- f - Heat, Cold, Noise,
Vibrations, and Pressure
- g - Fibers
- h - Solvents
- i - Energy
- j - Cotton Dust
- k - Asbestos
- m - Coal Dust
- n - Silica
- p - Lead
- q - Arsenic
- r - Zinc
- s - Falls from Elevations
- t - Caught In, Under, or Between
- u - Hazardous Wastes
- y - Other
- x - Alcohol
- z - Smoking

Office/Divisions and Branches -- Columns 119 and 120

- A - Division of Biomedical and Behavioral Science
 - a - Applied Psychology and Ergonomics
 - c - Experimental Toxicology
 - d - Technical Support
 - e - Physical Agents Effects
- B - Division of Physical Sciences and Engineering
 - a - Engineering Control Technology
 - b - Measurements Research Support
 - c - Methods Research
 - d - Monitoring and Control Research
- C - Division of Respiratory Disease Studies
 - a - Epidemiological Investigations
 - b - Environmental Investigations
 - c - Clinical Investigations
 - d - Laboratory Investigations
 - e - Examination Processing
- D - Division of Surveillance, Hazard Evaluations and Field Studies
 - a - Hazard Evaluations and Technical Assistance
 - b - Industrywide Studies
 - c - Surveillance
 - d - Support Services
- E - Division of Safety Research
 - a - Safety Surveillance
 - b - Accident and Injury Epidemiology
 - c - Standards and Consultation
 - d - Testing and Certification
- F - Office of Extramural Coordination and Special Projects
 - a - Grants Administration and Review
 - b - Regional Operations
- G - Division of Standards Development and Technology Transfer
 - a - Program Management
 - b - Document Development
 - c - Priorities and Research Analysis
 - d - Technical Information
- H - Division of Training and Manpower Development
 - a - Direct Training
 - b - Curriculum Development
 - c - Educational Resource Development
- J - Office of Administrative and Management Services
 - a - Administrative Services
 - b - Financial Management
 - c - Management Systems
 - d - Procurement and Grants Management
- K - Office of the Director
- L - Office of Program Planning and Evaluation
 - a - Planning and Program Development
 - b - Evaluation and Control
 - c - Policy Analysis

NIOSH
 Summary of Resources by Program Goals
 Fiscal Year 1983
 (funds are in thousands of dollars)

	<u>Person Years</u>	<u>Non-Personnel Funds</u>	<u>Total Funds*</u>
Identify Occupational Safety and Health Problems	213.4	3,600.4	10,538.0
Evaluate Occupational Safety and Health Problems	204.0	9,240.5**	15,840.0
Control Occupational Safety and Health Problems	126.7	3,279.3	7,597.2
Disseminate Occupational Safety and Health Findings and Recommendations	113.7	8,129.5	11,794.0
Administer Institute Programs	<u>253.9</u>	<u>9,400.8</u>	<u>17,737.5</u>
TOTALS	911.7	\$33,650.5	\$63,506.7

*The total funds for planning purposes include funds appropriated by the Congress, funds transferred from other agencies for research, reimbursements for services, and overallocation of funds in anticipation of cancellation of projects during the year.

** Includes research grants.

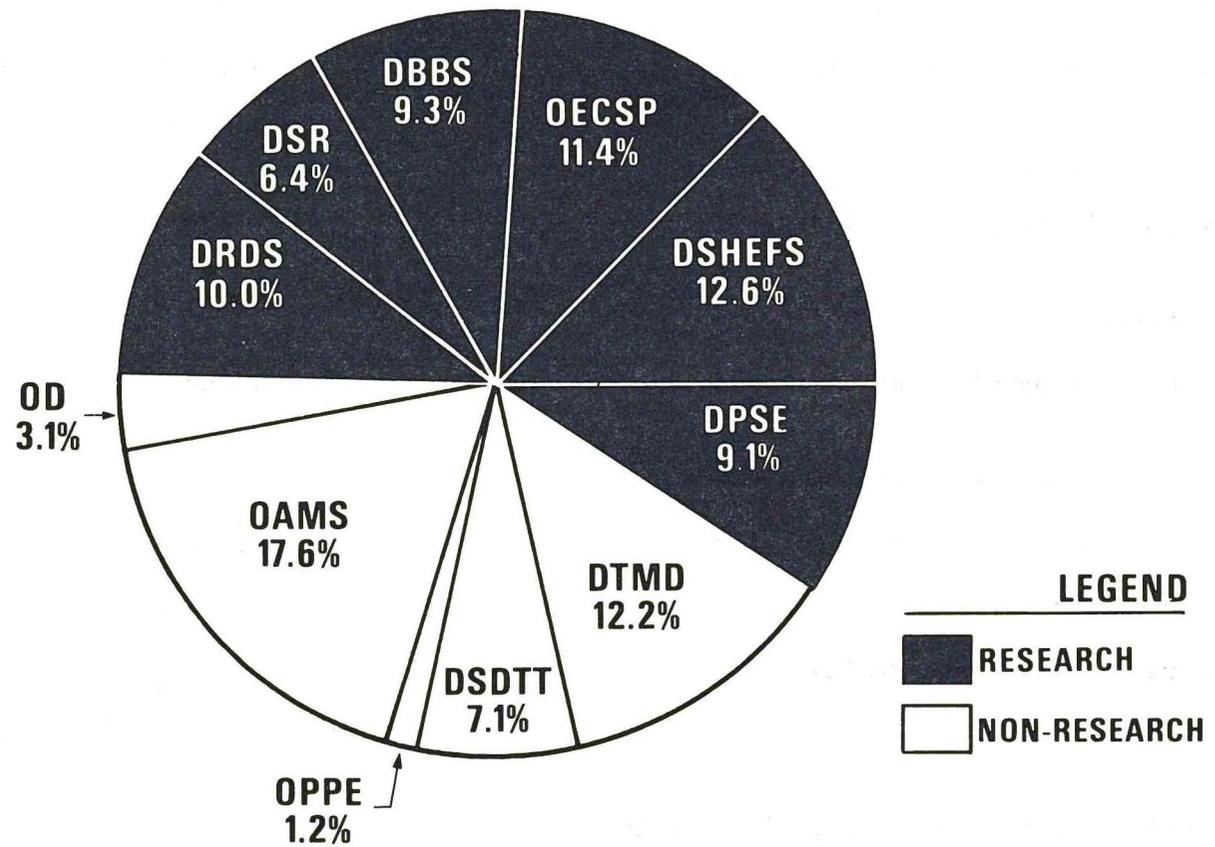
NIOSH
 Summary of Resources by Divisions
 Fiscal Year 1983
 (funds are in thousands of dollars)

<u>Research Divisions</u>	<u>Person Years</u>	<u>Non-Personnel Funds</u>	<u>Total Funds*</u>
Division of Biomedical and Behavioral Science	108.0	2,251.0	5,729.9
Division of Physical Sciences and Engineering	92.0	2,403.2	5,623.2
Division of Respiratory Disease Studies	135.5	1,839.6	6,193.8
Division of Surveillance, Hazard Evaluations, and Field Studies	175.5	3,785.3	9,433.9
Division of Safety Research	71.5	1,575.5	3,940.9
Office of Extramural Coordination and Special Projects	46.8	5,485.0	7,053.0
 <u>Non-Research Divisions</u>			
Division of Standards Development and Technology Transfer	82.9	1,640.2	4,419.1
Division of Training and Manpower Development	34.2	6,524.0	7,551.0
Office of Administrative and Management Services	100.9	7,598.3	10,864.3
Office of the Director	44.6	421.0	1,933.0
Office of Program Planning and Evaluation	<u>19.8</u>	<u>127.4</u>	<u>764.6</u>
TOTALS	911.7	\$33,650.5	\$63,506.7

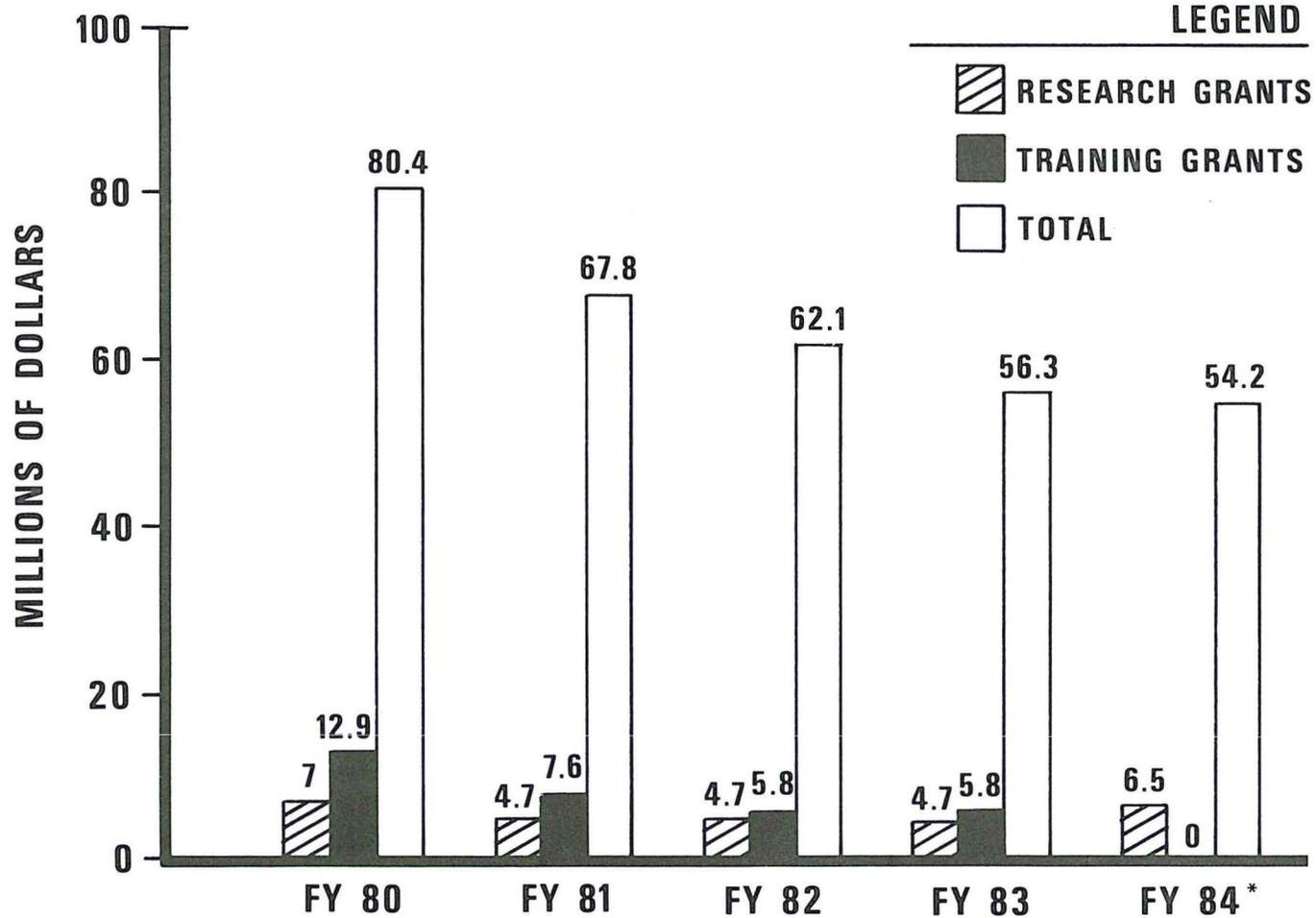
*The total funds for planning purposes include funds appropriated by the Congress, funds transferred from other agencies for research, reimbursements for services, and overallocation of funds in anticipation of cancellation of projects during the year.

SUMMARY OF RESOURCES BY OFFICE/DIVISIONS FOR FY 1983

TOTAL FUNDS: \$63.6 MILLION



NIOSH APPROPRIATIONS



*President's Budget

N I O S H P R O G R A M G O A L S A N D P R O G R A M A R E A S
F I S C A L Y E A R 1 9 8 3

IDENTIFY OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

NIOSH's goal, to identify occupational safety and health (OSH) problems, is the foundation of the NIOSH policy to prevent occupationally induced illness, injuries, and deaths. Under this goal NIOSH defines the state of OSH through the disciplines of medicine, industrial hygiene, epidemiology, and safety, and through statistics. NIOSH investigators derive priorities for research and public health action and measure progress in preventing impairments. Facts are generated from national OSH data bases and from requests by workers and employers for health hazard evaluations (HHEs). Scientific hypotheses are generated from these facts. The following long-range objectives for the Nation are considered under this goal:

1. By 1985, an ongoing occupational health hazard/illness/injury coding system and a survey and surveillance capability should be developed, including identification of workplace hazards and related health effects such as cancer, coronary heart disease, and reproductive effects. This system also should include adequate measurements of the severity of work-related disabling injuries.
2. By 1985, at least one question about employees' lifetime work history and known exposures to hazardous substances should be added to all appropriate existing health data reporting systems (e.g., cancer registries, hospital discharge abstracts, death certificates, and specifically to the proposed 1984 disease-prevention supplement to be added to the National Health Interview Survey.)
3. By 1990, the number of HHEs of all types being performed annually should increase to 1,500. (In 1979, NIOSH performed 150 HHEs.)

Efforts to achieve the Institute's goal have led to the development of a list of the Ten Leading Work-Related Health Problems, and both near-range and long-range planning efforts will focus on developing projects related to controlling them: Lung disease, including cancer; musculoskeletal injuries/disorders; cancer other than lung; traumatic deaths, amputations, fractures, and eye losses; cardiovascular disease; reproductive problems; neurotoxic illness; noise-induced hearing loss; dermatologic disorders; and psychological disorders. These problem areas were chosen by NIOSH to receive special attention based on their severity and relevance to the occupational environment.

Surveillance

NIOSH has responsibility for developing national surveillance systems that identify workplace hazards and work-related injuries, disease, disability, or death.

To identify hazards in general industry, a second National Occupational Hazard Survey now known as the National Occupational Exposure Survey (NOES) was initiated in November 1980. For 2 years, specially trained surveyors will visit a probability sample of about 5,000 U.S. workplaces, and will record the potential exposures to selected chemical and physical agents. By FY 1983, 4,000 worksites employing 1,200,000 workers were surveyed. The field phase of the survey will be completed by March 1983. A similar mining environmental surveillance program (NOESM) will commence in FY 1983. The sample selected for this study is composed of approximately 1,050 mining locations. The United States mining industry work force of 500,000 individuals is distributed among the producers of 83 commodities. In FY 1983, field sampling will be initiated, with 64 mines scheduled for study. During the first 18 months, NIOSH will include studies at 347 mining locations producing 19 different commodities. The actual work force at these locations (61,500) represents a total work force in these commodity areas of 90,500 individuals. The results from NOES and NOESM will provide decision makers with an updated profile of potential workplace hazards seen in a cross section of U.S. industries, mines, mills, and occupations.

Earlier, in 1979, the NIOSH Current Awareness System (CA) was developed to monitor, enter, store, and retrieve hazardous chemical data, including acute and chronic effects, toxicity testing by Federal and private sectors, pending interests and activities of agencies and private sectors, Federal regulations, and consensus standards.

To obtain information about work-related injury and illness effects, national data sets from other agencies are being adapted by NIOSH for use in occupational health and injury surveillance. These sources include the Bureau of Labor Statistics' (BLS) data bases, the National Center for Health Statistics' (NCHS) Health Interview Survey, the Social Security Administration's (SSA) Continuous Disability History Sample, State workers' compensation programs, and State vital statistics record systems. For example: (1) Four surveillance cooperative agreements (Maine, New York, Rhode Island, and Utah) were funded in 1980. A second round of these agreements was announced later in FY 1982 and six to eight States will be supported in FY 1983. This effort to decentralize occupational health surveillance by assisting States to develop their capabilities is in response to a NIOSH survey of the States' needs. (2) NCHS, the Bureau of Census, and NIOSH are cooperating in the development and adaptation of vital statistics records for occupational health studies. (3) Eight States pilot-tested a Bureau of Census-designed occupation/industry coding-training module that will be offered to all States during FY 1983. (4) A list of 51 Sentinel Health Events (Occupational) has been developed by NIOSH for the purpose of increasing Federal and State capabilities in the identification of significant occupational health problems. (5) Worker compensation data are being programed for easy

analysis of injury statistics. (6) Hospital records of injured workers who obtained emergency treatment are being obtained and analyzed in conjunction with the Consumer Products Safety Commission's National Electronic Injury Surveillance System (NEISS). (7) Injury incidence rates based on 1980 census figures are being computed to help pinpoint high-risk occupations.

The 3-year objectives for this program area are to (1) continue funding surveillance cooperative agreements with eight to twelve States, including mining and safety surveillance; (2) complete and maintain an estimate of occupationally related mortality and morbidity, which will be utilized to continually update NIOSH's priority-setting data base and the list of Ten Leading Work-Related Health Problems; (3) complete the development of an occupational health hazard/illness/injury coding system; (4) complete the development and fully implement utilization of national and State data systems to identify causes of occupational injury and fatalities; (5) complete data analyses and trade-name clarification for the NOES so that the survey information can be used totally in place of the first survey, NOHS, which was conducted during 1972-1974; (6) have completed the data-collection phase of NOESM; and (7) have in place the disease-reporting requirements for pneumoconiosis, heavy-metal poisoning, and dermatitis as required in the DHHS Prevention Objectives for the Nation.

Division of Respiratory Disease Studies

The Division's environmental surveillance efforts are directed toward fulfillment of the mining surveillance mandate given the Institute in the Federal Mine Safety and Health Act of 1977. The Act specifically directs the Secretary to determine, for each toxic material or harmful physical agent that is used or found in a mine, the potential toxicity of the material for the concentrations in which it is used or found. Responsibility for this aspect of the surveillance program was given to DRDS, which is conducting the NOESM program.

The NOESM will (1) inventory substances brought into the mines and used in extraction and processing of ores, (2) sample materials that naturally occur in the mines, (3) collect information about occupational health surveillance programs available to miners, and (4) collect other information that describes the mines covered by the survey. After obtaining this information, NIOSH will determine the toxicity of the substances and physical agents so found, and project the exposures within the entire mining industry.

Accomplishments to date include the development of the sampling protocol, an appropriate questionnaire, a training program for surveyors, and partial completion of the survey projection programs. The sample of survey sites and the projection flow chart have been developed by a NIOSH contractor. NIOSH staff will supply a computer code for the projection of national statistics. Future work includes submission of the survey package to the Office of Management and Budget for Federal Reports Act clearance, determination of the proper implementation method for the survey (i.e., in-house personnel, contracted work, or interagency agreement), updating the surveyor training plans and the survey sample, and the actual performance of the survey. The actual survey work is scheduled to be initiated when the general-industry survey field work has been accomplished by DSHEFS. Institute resources are not sufficient to accomplish two field-intensive studies at the same time. During FY 1983, DRDS will:

1. Initiate NOESM field surveys, subsequent to OMB approval and conclusion of NOES II field work. Assuming requested resources are forthcoming, half of the survey will be completed in FY 1983.
2. Consolidate environmental data previously developed by various investigators. In FY 1983, DRDS will concentrate on (a) updating previously collected data, (b) adding more NIOSH data, (c) adding data for more State agencies, and (d) implementing the NIOSH system for protecting confidential data.
3. Conduct targeted environmental investigations of potential health hazards, as suggested by MSHA, the Bureau of Mines, or reports in the literature.
4. Identify high-risk cohorts suitable for health surveillance.
5. Stimulate increased reporting of coal workers' pneumoconiosis by physicians.

Division of Surveillance, Hazard Evaluations, and Field Studies

Within the framework of NIOSH's goals, it is the responsibility of DSHEFS to develop an occupational hazard and health surveillance program that can be used in establishing priorities for research and as a basis for program evaluation. To identify potential workplace hazards, a NIOSH data base, the NOES, is being developed. For occupationally related health effects surveillance, existing national health and demographic data bases have been adapted to meet NIOSH's needs. A summary of these FY 1982 activities and a description of their continuation in FY 1983 are given in the following:

Hazard Surveillance--Large-scale periodic national probability sample surveys of about 5,000 of the 5 million workplaces provide the foundation for NIOSH's general-industry hazard surveillance program. The first survey, the NOHS, was conducted in 1972-1974. Information from this survey has been used to help set NIOSH research priorities, to locate groups of workers potentially exposed to agents of particular interest, and to provide a readily accessible computerized list of the chemical ingredients in over 65,000 trade-name products found in the workplace. The second national survey, the National Occupational Exposure Survey (NOES), was initiated on November 3, 1980, and the field phase will be completed in March 1983.

NOHS and NOES constitute the centerpiece of the general-industry hazard research program which also includes:

1. The identification and classification of chemical ingredients found in approximately 90,000 trade-name products used in U.S. workplaces.
2. The use of computer-generated State-level and county-level maps of the United States to describe the worksite distribution of high-interest chemicals.
3. The linking of the NOHS Trade Name Ingredient File to the list of trade name products provided to unions by plant management to increase employee awareness of potential job hazards.

Disease Surveillance--Our disease surveillance responsibility is to develop a nationwide system for the identification of work-related disease, disability, and death. Three recent NIOSH Surveillance Research Reports describe how Federal and State data systems have been adapted for use in conducting these responsibilities. DSHEFS also is using this information to identify disease and injury rubrics that correspond to the Ten Leading Work-Related Health Problems that provide NIOSH's planning framework for FY 1983. Other FY 1983 projects are listed below:

Surveillance Cooperative Agreements Between NIOSH and States--Consistent with the Institute's directive, steps will be taken to expand the number of participating State agencies from four to six or eight, and broaden the scope of surveillance activities to support NIOSH's surveillance needs in the mining and safety surveillance programs. We also will attempt to accommodate the PHS 1990 Objectives regarding surveillance activities in the areas of heavy metals and pneumoconiosis through this project and other of our disease-reporting projects.

Mortality Surveillance of Occupation and Industry--This project supports our efforts in assisting States to collect and code decedent employment history data. The principal FY 1983 objectives include (1) providing training to State health department personnel for industry and occupation (I/O) coding, and (2) providing a deferral of coding costs for selected States.

Computer-Generated Maps--This activity was developed to enhance the use of our health effects and hazards data. Consistent with the Institute's directive, a study will be undertaken to assess the feasibility of entering NOES-generated data into a computerized health-effect and hazard-mapping system. Moreover, this project advances two major objectives: (1) To demonstrate the feasibility of using computer-generated maps to generate hypotheses, establish baseline measures, and monitor change, and (2) to evaluate the utility of these maps for OSH surveillance.

Fetal Mortality Study--This project will support analyses based on the 1980 National Fetal Mortality Survey conducted by NCHS. Analyses in FY 1983 will compare and contrast the distribution of parental employment characteristics with respect to (1) fetal outcomes, including low birth weight and congenital malformation; (2) prenatal health practices, such as maternal drug and tobacco usage; and (3) other parental characteristics, such as educational and ethnic backgrounds.

Surveillance of Parental Employment and Spontaneous Abortion--This project supports a contract to examine the relationship between spontaneous abortion and the parental employment characteristics. Activities scheduled for FY 1983 are limited to review and publication of the contractor's report.

Disability Surveillance of Occupation and Industry--Activities in FY 1983 will be undertaken to (1) acquire and edit SSA disability data for 1977, (2) improve dissemination, (3) develop improved analytical techniques, and (4) establish liaison with DBBS to support their project proposal concerning stress and stress-related occupational disabilities.

Registration of Disease and Exposure Cohorts--Additional activities will be initiated to determine the mortality experience of the Kepone cohort, and to update an analysis on the angiosarcoma of the liver register.

Sentinel Health Event (Occupational) (SHE(O))--This activity is intended to develop and implement Rutstein's Sentinel Health Event concept in occupational health. The principal objectives of this project in FY 1983 are (1) to explore the utility of the SHE(O) concept in a surveillance setting via its application through the SCANS States, and (2) to assess the utility of the SHE(O) concept in medical school curricula as a means of promoting occupational health education.

Estimation of Occupationally Related Mortality and Morbidity--This activity is designed to develop and implement methods to estimate occupationally related mortality and morbidity. The preliminary activities which preceded this project proposal contributed to the original Ten Leading Work-Related Health Problems. The project will provide data to be used in NIOSH's priority setting and updating of these "top ten" problems.

Division of Safety Research

DSR's efforts in the surveillance program area are organized primarily in the Safety Surveillance Branch, but also include research projects aimed at assessment of exposure to risk in various work settings.

Surveillance in general in DSR is intended to assess the number, rates, and impacts of occupational injuries and fatalities in the Nation. This is done through access to established injury-reporting systems and through development of specific data sources for special project needs. The information obtained is used for identifying injury patterns, high-risk occupations, industries, and operations; for setting research priorities and defining precise areas for further research; for supporting recommendations for changing safety standards; and for monitoring changes to evaluate specific preventive efforts. The data sources used for these efforts include:

1. Workers' compensation data from 33 States for 1977 through 1980 provide basic frequency and severity measures and injury characteristics on 6.8 million cases. Computer access to these data makes possible morbidity studies and identification of problems. Surveillance reports based on these files were produced in FY 1982.

2. DSR collaborates with BLS and OSHA in conducting Work Injury Surveys, which are special-topic mail surveys of injured workers. Data from these surveys represent an important step in providing detailed case series for indepth analysis of problems and formulation of specific hypotheses.

3. In collaboration with the Consumer Product Safety Commission, DSR receives daily reports of work-related injuries that are treated at hospital emergency rooms. A sample of such hospitals participated in CPSC's NEISS which permits national estimates of emergency-room-treated job injuries. Since this system provides daily reports, it is being used to detect sudden changes in accident trends, and as a source for followup investigations.

4. In addition, other data sources are being considered for future projects: Death certificate files from State agencies, OSHA fatality investigation abstracts, occupational injury incidence rates using workers' compensation and census employment data, and special surveys of workers exposed to selected hazards (e.g., chemicals requiring protective clothing). Insurance industry data also will be explored for their surveillance potential.

In 1983, surveillance efforts in DSR will identify high risk injury problems in two of the areas identified as high priority by the Institute: musculoskeletal injuries and traumatic injuries such as fractures, amputations, eye losses, and fatal injuries. This will be accomplished primarily through analysis of workers compensation data and hospital emergency room reports of job injuries.

Division of Standards Development and Technology Transfer

The NIOSH Current Awareness System, together with the Research Analysis project within this Division, will continue to track emerging health issues and new technologies and analyze them for relevance to OSH. Mechanisms are being developed for the Priorities Development project to receive data from the surveillance components of DSHEFS and DSR. Combining hazard and illness data in the Priorities Development project will contribute toward the identification of those agents or factors likely to be the most important etiologic agents or determinants in occupational injury and illness.

DSDTT also will implement a new priority system developed in FY 1982 for OSH document and research needs. In addition to recommending priorities for document development, this system will make and justify recommendations for Institute research in field studies, biologic and behavioral studies, and physical sciences and engineering. Through current awareness and research analysis, emerging issues and new technologies will continue to be tracked.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY I C	PLANNED COMPLETION				O C N G H D	P M F R E U O C N G H D	RESOURCES		
		1Q	2Q	3Q	4Q			NPF	TF	
								PY	\$1000	
*****SURVEILLANCE*****										B B B
DIVISION OF BIOMEDICAL AND BEHAVIORAL SCIENCE										A A B
1. Heat Stress Survey in Mines (F. Duker-Dobos, 684-8469) (100/VOA-Bfi-298) Train DRDS and MSHA personnel for heat stress assessment in miners.	83	83					B c a			AAfyyB AAfyyB AAfyyB AAfyyB AAfyyB AAfyyB
2. Imminent Danger from Heat Stress in Mines (F. Duker-Dobos, 684-8469) (VOA/Qfm/305) (1.0/16.0/50.0) (100/VOA-Bfm-305) Develop a simple procedure for detecting imminent danger due to excessive heat stress in underground mines.	80	84					B b a			AAfmnB AAfmnB AAfmnB AAfmnB AAfmnB AAfmnB
3. Safety and Health of Commercial Divers(F. Duker-Dobos 684-8469) (VOB-Qfy-296) (100/VOA-Bfy-296) Identify problems and conduct health and safety research for divers and decompression workers.	80	83					B j a			AAfyyB AAfyyB AAfyyB AAfyyB AAfyyB AAfyyB
4. Industrial Hygiene Consultative Services-DBBS (J. Ferguson, 684-8273) (100/VOT-Byy-375) Provide industrial hygiene consultative services to DBBS and other NIOSH units.	83	C					B c a			AdyydB AdyydB AdyydB AdyydB AdyydB AdyydB
5. State Assistance and Emerging Technologies (W. Murray 684-8482) (100/VOG-Baf-370) To provide consultation, develop assessments of emerging radiation problems and establish cooperation with states.	83	83					B c a			AeafyB AeafyB AeafyB AeafyB AeafyB

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	I	C	PLANNED COMPLETION				O	C	N	G	H	D	PY	RESOURCES	
				1Q	2Q	3Q	4Q								NPF	TF
															\$1000	\$1000
22. Utilization of Full File for Survey/Sampling Decisions - NCI (Dave Pedersen - 513-684-2706) (VMO-Byy-665)(1.0/32.0/210.0)(100/VMO-Byy-665) Project Objective: To maintain a file of basic demographic information of U.S. workplaces.	78		C													DcyyPB DcyyPB DcyyPB DcyyPB DcyyPB DcyyPB E B E B
DIVISION OF SAFETY RESEARCH																
23. General Surveillance and Analysis (Coleman 923-4576)(VEa-BNy-806)(1.3/50.0/91.8)(100/VLB-Byy-806) The purpose of this project is to carry out general injury surveillance activities, identify problems and priorities, and plan future projects.	77		C													EayyyB EayyyB EayyyB EayyyB EayyyB EayyyB EayyyB
24. NEISS Occupationally Related Data Sharing (Gustin 923-4576)(VEa-FNy-814)(0.9/325.0/354.0)(100/VLB-BNy-814) To supply surveillance data for estimating total US occupational injuries, and to supply cases for follow-up studies.	81		C													EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB
25. BLS Work Injury Report Surveys (Perry 923-4576)(VEa-FsN-813)(0.6/30.0/49.3)(100/VLB-BNy-813) The surveys will generate exposure data, detailed causal factors, and analytic reports including publications.	77		C													EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB EaNyyB
DIVISION OF STANDARDS DEVELOPMENT AND TECHNOLOGY TRANSFER																
26. Priorities Development - West, D., DSDTT - (301)443-3680 (VII-Byy-087)(4.1/54.0/184.3)(VII-Byy-092) To recommend and provide the rationale for priorities for Institute research, document development, and recommendations for standards.	70		C													G B G B GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB
27. Research Analysis - West, D., DSDTT - (301)443-3680 (VII-Byy-087)(2.9/27.8/119.5)(VII-Byy-093) To provide continuing investigation and evaluation of OS&H problems arising from current issues, and to recommend Institute policy or action.	70		C													GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F		RESOURCES			
	I	C	1Q	2Q	3Q	4Q	O	C	NPF	TF		
							G	H	D	PY	\$1000	\$1000
28. Current Awareness - West, D., DSDTT - (301)443-3680 (VII-Byy-087)(1.9/4.0/63.5)(100/VII-Byy-094) Monitor, enter, store, and retrieve scientific, technical, current activity, and policy information on chemicals of potential hazard in the workplace.	70	C					B	c	a			GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB GcyyyB

Health Hazard Evaluations/Technical Assistance

The purpose of this activity in NIOSH is to conduct the Health Hazard Evaluation program mandated by the Occupational Safety and Health and the Federal Mine Safety and Health Acts. This program responds to requests for assistance from employers, employees, and their authorized representatives, other Federal agencies, and State and local agencies to determine the toxic effects of chemical, biological, or physical agents that are used or found in the workplace. To accomplish this assistance, medical, epidemiologic, and industrial hygiene investigations are conducted at the workplaces of concern. These investigations evaluate the substances, processes, work practices, etc., found in the workplace and come to conclusions about related health effects based on the most recent published criteria (i.e., OSHA and MSHA standards, NIOSH recommendations for standards, and Threshold Limit Values (TLV) published by the American Conference of Governmental Industrial Hygienists), and on the medical or epidemiologic findings of the evaluation. Recommendations for improved work practices, control techniques, industrial hygiene procedures, and medical monitoring are then made to the employer to reduce the risk of adverse health effects on the employees.

During FY 1982, NIOSH received 488 requests for assistance; 282 final reports were issued, and 206 requests were closed out by letter (after a site visit). For FY 1983, it is expected that the number of requests and completions will remain constant. Increased dissemination of these results is planned. In addition, requests will be stimulated in several areas of specific importance and interest to NIOSH. (This effort will be coordinated with Institute priorities.) Building on efforts from previous years, DSHEFS, DRDS, OECSP, DBBS, and DPSE will place emphasis on increasing the efficiency of the HHE program through streamlining procedures, better segmenting of incoming requests, more effective management, and improved coordination of efforts with State health departments.

The 3-year objectives for this program area are to (1) maintain the number of HHEs being performed annually at about 500 to 550; (2) have a major portion of the HHEs being conducted in the area of NIOSH's priorities, including the list of Ten Leading Work-Related Health Problems; (3) improve the dissemination of the HHE results by publishing at least 12 CDC Morbidity and Mortality Weekly Report (MMWR) articles and 20 technical journal articles annually; and (4) have increased assistance to State and local governments for the conduct of the HHE programs, with emphasis on pneumoconiosis, heavy-metal poisoning, and dermatitis, as required in the DHHS Prevention Objectives for the Nation.

Division of Surveillance, Hazard Evaluations, and Field Studies

DSHEFS' HHE Program has as its goal to (1) increase our responsiveness to requests, (2) decrease the average time to complete an evaluation, (3) increase the number of HHEs resulting in followup research efforts by NIOSH, (4) expand the number of subsequent dissemination efforts resulting from HHEs, and (5) improve the coordination of our efforts with State health department programs and with other NIOSH O/Ds.

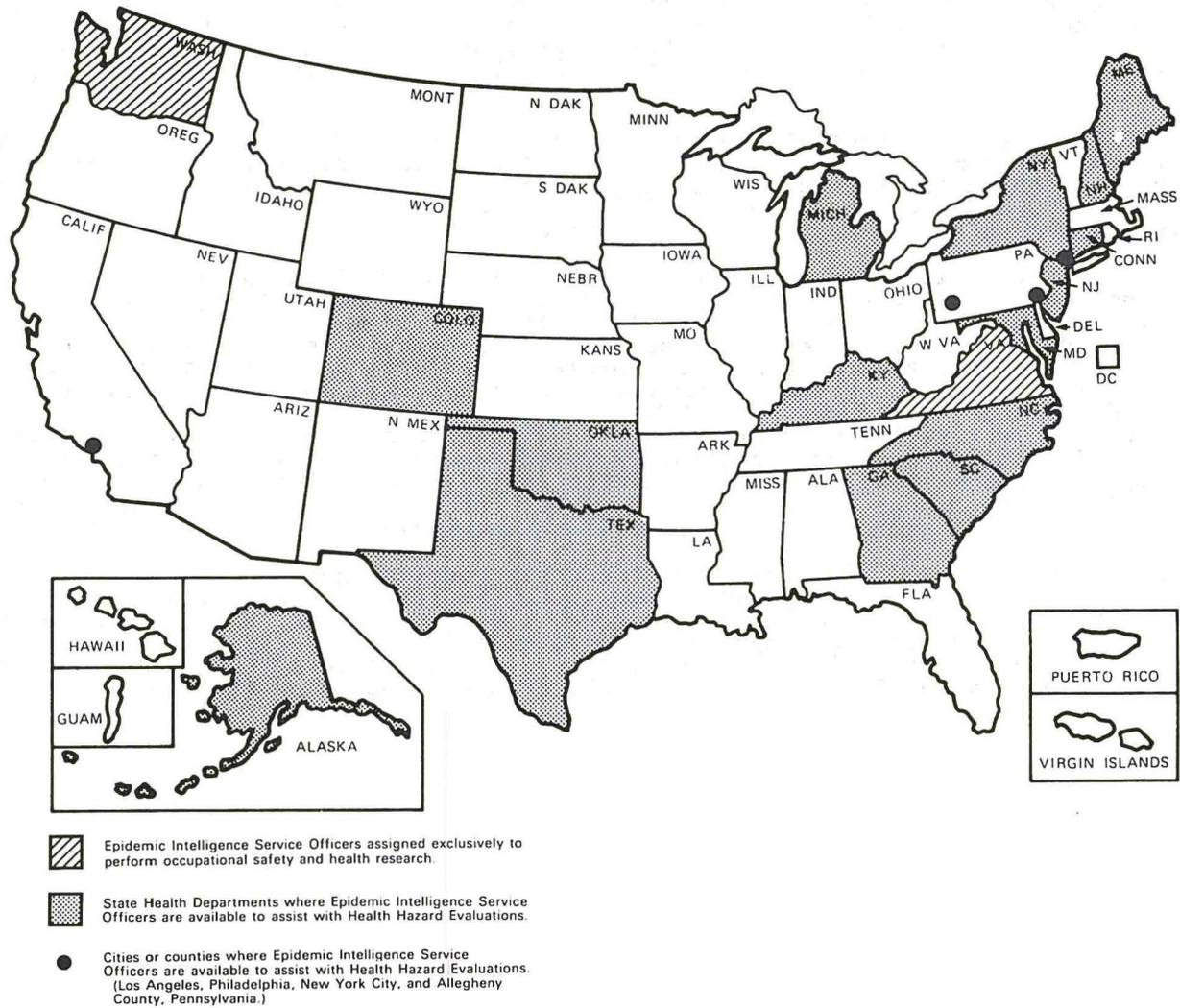
During FY 1982, 450 general-industry HHE requests were received; 250 final reports were issued, and an additional 200 requests were closed out by letter (after a site visit). Dissemination efforts increased, including two quarterly summaries of HHE reports, six articles in the MMWR, three trade-journal articles on specific types of HHEs, expansion of the initial HETA notification list (HETA 1's and 2's) to include State health department personnel, and an increased number of technical-journal articles on HHEs.

For FY 1983, DSHEFS expects to receive 450-500 new HHE requests. These requests should continue to derive proportionately from the same sources as in FY 1982: approximately 50 percent from employees or unions, 25 percent from employers (mainly small businesses), and 25 percent from other government agencies. Between 180 and 200 final reports will be issued, and another 100 requests will be completed by letter (often after an initial site visit). In addition:

1. Continued efforts will be made to improve the efficiency of the program by better segmenting (triaging) of incoming requests to concentrate efforts on more important requests (i.e., new agents or processes, multiple exposures, undocumented health effects).
2. An increased effort will be made to coordinate HHE priorities with NIOSH priorities (e.g., the Ten Leading Work-Related Health Problems), to coordinate evaluations with similar research efforts in other NIOSH programs, and to uncover problems that are appropriate for research efforts by other NIOSH programs or for dissemination efforts by DSDTT.
3. The effort to improve the dissemination of HHE results also will continue, to include publication of MMWR articles and technical papers, trade journal articles directed at specific employers or employee groups (e.g., lead in radiator shops), and publications on the methods of evaluating specific occupational health problems (e.g., for State health department programs). An important basis for this dissemination program will be the implementation of an indexing system for past HHE reports.
4. A concentrated effort will be made to strengthen the linkages between the HHE program and State health departments. Mechanisms will be developed to (a) improve communication regarding program activities of mutual interest, (b) help improve capabilities to conduct HHEs, (c) jointly conduct investigations when appropriate, (d) improve the dissemination of results of investigations, and (e) increase our use of State-based Epidemic Intelligence Service Officers (CDC). The assignments of Epidemic Intelligence Service (EIS) Officers are shown on the map below (Figure 2).

Figure 2.

STATE-BASED EPIDEMIC INTELLIGENCE SERVICE OFFICERS IN OCCUPATIONAL SAFETY AND HEALTH ACTIVITIES



Division of Respiratory Disease Studies

Under the Federal Mine Safety and Health Act of 1977, NIOSH has the responsibility to conduct HHEs in mines upon request from miners and mine operators. This program responds to health concerns of the approximately 500,000 miners in coal and metal and non-metal mines. In addition to assessing health hazards at actual mine sites, the personnel in the HHE program assess hazards in preparation plants, mills, maintenance facilities, laboratories, and waste treatment plants associated with the mine site. The program also provides technical assistance to other Federal agencies and State and local agencies with interests in mining operations.

The HHE program identifies potential health hazards at a particular mine site. Once a study is completed the results are distributed so that other mines with similar potential hazards are made aware of the particular problems. Internally, the HHE program acts as a passive surveillance program which provides information to active mine surveillance, to research programs for future areas of emphasis, and to indepth studies within relevant areas of research.

In FY 1981, the fourth year of operation, the program handled 38 new requests most of which required a walk-through survey and in many cases an indepth study. For FY 1982, 40 such requests were projected; by the end of the third quarter, 38 requests had been received, 32 final reports had been issued, and six requests were closed out by letter (after a site visit). Similar levels of activity are anticipated by FY 1983.

In addition to surveys, the DRDS HHE program also provides technical information to individuals who write or call regarding particular interests in mining-related exposures or health problems, and conducts hazard evaluations related to respiratory disease in general industry on requests received via DSHEFS.

Division of Biomedical and Behavioral Science

DBBS performs HHEs on factors identified with physical agents, job stress, and ergonomics problems associated with work environments or conditions. Expertise within DBBS is strongly associated with these factors in terms of intramural and extramural research consultation and field experience. In FY 1982, 13 HHEs related to physical agents and six HHEs bearing on ergonomic factors were conducted. In addition to the direct performance of HHEs, DBBS provides expert consultation and laboratory support services in biological monitoring, clinical laboratory health assessment, and toxicity evaluations of workplace chemicals.

Division of Safety Research

NIOSH, through DSR, also has undertaken limited initial fatality investigations and respirator field investigations, which, as appropriate, are undertaken in conjunction with HHEs. These efforts are described elsewhere.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	I	C	PLANNED COMPLETION				O	C	N	G	H	D	PY	RESOURCES	
				1Q	2Q	3Q	4Q								NPF	TF
															\$1000	\$1000
7. Effects of Vibration on Helicopter Pilots (V. Behrens 684-8281) (0.8/9.0/35.0) (0.8/14.0/40.0) (100/VOG-Vfy-357) Determine if army helicopter pilots have musculoskeletal disorders of the back related to whole body vibration and posture.	83		85									V	c	a		AefyyV AefyyV AefyyV AefyyV AefyyV AefyyV AefyyV
8. Health Hazard Evaluations of Physical Agents (W. Murray, 684-8482) (100/VOG-Vaf-354) To respond to those Health Hazard Evaluation requests which involve potential hazards from physical agents.	83		C									V	c	a		AeafdV AeafdV AeafdV AeafdV AeafdV AeafdV AeafdV
DIVISION OF PHYSICAL SCIENCES AND ENGINEERING																
9. HHE Analytical Support (A. Grote 684-4215) (VQK-Vyh-425) (7.8/194.4/428.4)(100/VQK/Vnu/425) Provide quick analytical results and fast turnaround time for method development/modification efforts for HETA projects and regional activities.	82		C									V	b	a		BbhuyV BbhuyV BbhuyV BbhuyV BbhuyV BbhuyV BbhuyV
10. Revision of NIOSH Manual of Analytical Methods (P. Eller, 684-4323) (100/VQU-Nhu-445)(4.0/5.0/157.0) Update the 7 Volume 2nd Edition of the NIOSH Manual of Analytical Methods.	83		C									V	c	a		BchpyV BchpyV BchpyV BchpyV BchpyV BchpyV BchpyV
DIVISION OF RESPIRATORY DISEASE STUDIES																
11. Mining Health Hazards Evaluation and Technical Assistance (Hankinson J 304-291-4755)(VKH-Vdn-153)(17.0/80.0/658.0) (100/VKH-Vng-153) Project Objective: To conduct mining-related health hazard evaluations and technical assistances, as mandated by the Federal Mine Safety and health Act of 1977.	80		C									V	b	a		CcngdV CcngdV CcngdV CcngdV CcngdV CcngdV CcngdV

EVALUATE OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

The evaluation of OSH problems is the core of the Institute's scientific research. Under this goal, NIOSH tests scientific hypotheses through the disciplines of epidemiology, toxicology, kinesiology, and the physical and behavioral sciences. The objective of evaluation is to discover cause-and-effect relationships between workplace exposures and illness and injury. As associations of OSH problems are made with causes, intervention strategies can be implemented. The following long-range objectives for the Nation are considered under this goal:

1. By 1985, a program should be developed to (a) follow up individual findings from HHEs, from reports from unions and management, and from other existing surveillance sources of clinical and epidemiologic data, and (b) use the findings to determine the etiology, natural history, and mechanisms of suspected occupational disease and injury.
2. The number of industrywide studies being performed annually should remain constant at between 30 and 40.

The priorities for the Institute's evaluation program will focus on NIOSH's Ten Leading Work-Related Health Problems.

Lung Disease, Including Cancer

It has long been recognized that emphysema, which is the leading cause of respiratory deaths in the United States, has an increased incidence in populations exposed to dusty or chemical-laden environments. Lung cancer, which is the second leading cause of respiratory deaths, has been connected with occupational exposures to carcinogenic material. The morbidity and mortality of these diseases, plus occupational exposures which lead to the development of lung disorders such as asthma, bronchitis, allergic alveolitis, interstitial fibrosis, pneumoconiosis, and other airways diseases, show the importance of research in respiratory disease if NIOSH is to carry out its mission of protecting the health of the American worker.

The major areas for research in lung disorders within the Institute are (1) nonfibrous minerals, (2) fibrous minerals, (3) organic dusts, chemicals, and biological products, and (4) methods development for measuring pulmonary mechanics and lung function in humans and animals.

The respiratory disease program within the Institute is multidisciplinary, and interrelates with other Institute areas such as surveillance, mutagenicity, respirator use, energy, and HHEs. The environmental, laboratory, and epidemiologic research of the Institute are all coordinated within this program, with primary responsibility for nonmalignant respiratory disease residing within DRDS and lung cancer research residing within DSHEFS and DBBS..

By or before the end of FY 1986, NIOSH actions relating to research in lung disorders should have several resultant effects. First, we should be in a position to make a statement as to whether the $2\text{mg}/\text{m}^3$ dust level in underground coal mines is effective. If found to be not effective, then we may forward to MSHA our recommendations as to what the dust level should be. Secondly, results from various studies should be sufficient to advise MSHA about the health effects of the use of diesel engines in an underground environment. Such recommendations will relate to coal and to metal and nonmetal operations.

Although much already is known relating to the health effects of asbestos exposure, one major problem which should be addressed successfully by FY 1986 involves the significance of nonmalignant pleural abnormalities such as plaques and pleural thickening. We should then be in a position to advise industry, OSHA and MSHA, and the public at large about the significance of plaques, and whether they are merely markers of exposure or if they identify individuals who are more likely to develop disabling or fatal conditions due to asbestos exposure. Results from several studies involving other fibrous minerals such as fibrous clays, vermiculite, and crushed stone will be available to combine with control technology information and animal research data for health recommendations and safe work practices. Significant work is now ongoing relating to the magnitude of possible bias in NIOSH studies resulting from the "survivor" or "health worker" effect. Prior to the end of FY 1986, the magnitude of the problem (if it can be demonstrated to exist) will be documented. In various industries many workers seem highly susceptible to environmental exposures, and thus develop acute respiratory problems. Whether the individuals with the acute problems are more prone to develop chronic disorders remains (at present) an unknown. However, results should be available then to provide us with significant information on this particular problem.

Last, but not least, NIOSH has taken the lead in developing procedures for handling potential health effect problems in emerging energy industries. One prime example of this is the industry engaged in the extraction of oil from oil shale. By the end of FY 1986 a complete program should be in place, in this particular industry, to form a worker registry and obtain health data. This will then serve as a model for the development of similar tasks in other industries.

Division of Respiratory Disease Studies

The Division program for the study of lung disorders includes laboratory-based research upon physiological mechanisms and the effect of various challenge agents upon lung mechanics and pulmonary function. Research is conducted that relates to coal and non-coal mining, fibrous minerals such as asbestos, and a variety of organic dusts, industrial chemicals, and biological products that are found in the workplace environment. Multiple morbidity and mortality studies are under way, and environmental data collected, to assist in the development of dose-response information which can then be translated into information of direct benefit to the worker.

Laboratory-based research will continue, in FY 1983, to address the physiological significance of worker exposure to aerosols, such as diesel exhaust, and to organic and inorganic respirable dusts. These studies will address the mechanisms of disease production and dose-response relationships.

During FY 1982, and to extend into FY 1984, morbidity and mortality studies were conducted concerning the mortality of TVA employees in coal-fired steam-generation plants, crushed-stone workers, Portland cement workers, diesel engine mechanics, workers exposed to welding fumes, and two or three cohorts of coal workers from out-morbidity studies. Also in FY 1982 several significant findings resulted from a mortality study of gastric cancer in miners. The National Coal Study (morbidity) will continue in FY 1983 to provide an assessment of the $2\text{mg}/\text{m}^3$ dust standards. The third round of examinations conducted through this study has been completed, and analysis is now under way. The second round of examinations of approximately 900 miners exposed to diesel emissions underground and of controls has been completed and that analysis also is proceeding.

Division of Surveillance, Hazard Evaluations, and Field Studies

As part of DSHEFS' retrospective cohort mortality, proportionate mortality, and case control studies, nonmalignant and malignant respiratory diseases are evaluated among worker populations exposed to a variety of industrial chemicals and fibrous materials. In FY 1982, the final results from several epidemiologic studies examined respiratory disease. Studies of particular interest include uranium miners exposed to radon daughters and goldminers exposed to amphibole fibers and silica. Beginning in FY 1983, the uranium miners cohort will be examined in more detail to evaluate the effect of low doses of radiation. In addition, a collaborative project with NCI will begin to look at the predictive value of sputum cytology as a screening technique.

Other studies of respiratory disease, either ongoing or to be initiated in FY 1983, include workers exposed to beryllium, formaldehyde, sulfuric acid mist, and non-asbestos-exposed welders.

Division of Biomedical and Behavioral Sciences

The Division program will continue its study of etiology, dose-response, and interactive factors in occupationally induced asthma. Following the development of a monkey model of human occupational asthma in FY 1982, primary emphases will be investigations of the potential of industrial metals and agricultural products, including cotton and grain, to induce asthma in workers. Experiments to assess the relative sensitivities and specificities of pulmonary pathology and pulmonary physiology will be continued in animals exposed to diesel exhaust, coal dust, and organic amines.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY I C	PLANNED COMPLETION				R E U O C N G H D	P M F R E U O C N G H D	RESOURCES		
		1Q	2Q	3Q	4Q			NPF	TF	
								PY	\$1000	\$1000
11. Evaluation of Dust Sampling Protocols (Hearl F 304-291-4421)(2.0/42.0/110.0)(100/VKP-Img-165) Project Objective: To evaluate the effectiveness and biases associated with the measurement of dust exposures. The best sampling/analysis system will be reported out.	83	85					I c a			CbmgdI CbmgdI CbmgdI CbmgdI CbmgdI CbmgdI
12. Occupational Exposure to Organic and Biological Aerosols (Hearl F 304-291-4421)(VKP-Idy-160)(2.5/61.0/146.0) (100/VKP-Idy-166) Project Objective: To evaluate occupational exposure and environmental parameters associated with hypersensitivity pneumonitis and allergic asthma response in workers.	82	85					I c a			CbdyyI CbdyyI CbdyyI CbdyyI CbdyyI CbdyyI CbdyyI
13. Occupational Health Studies of Emerging Energy Industries (Wallace W 304-291-4136)(VKP-Iiy-202)(2.5/25.0/110.0) (100/VKP-Iiy-157) Project Objective: Identify and characterize potential workplace hazards in emerging energy technologies in order to prevent adverse health effects. This project is a combination of a number of DRDS projects from FY82.	82	C					I b b			CbimyI CbimyI CbimyI CbimyI CbimyI CbimyI CbimyI
14. Occupational Health Studies Oil Shale Processes (Wheeler R 304-291-4421)(1.5/39.0/90.0)(100/VKP-Iiy-159) Project Objective: To define occupational health effects of oil shale processes prior to the commercial deployment of this synfuel industry. This is a combination of two previous projects (NIOSH and EPA funded), and in addition monitors two out-of-house efforts to develop worker information.	83	85					I d a			CbiyyI CbiyyI CbiyyI CbiyyI CbiyyI CbiyyI CbiyyI CbiyyI
15. Morbidity/IH Study of Mild Steel Workers (Patil A 304-291-4223)(VKP-Ipy-157)(4.5/97.0/250.0) (100/VKH-Ipy-213) Project Objective: To determine whether welding exposure causes respiratory impairment and whether this is related to the deposition of iron oxide and whether existing TLVs are appropriate.	82	84					I c a			CcppyI CcppyI CcppyI CcppyI CcppyI CcppyI CcppyI CcppyI

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY PLANNED COMPLETION				P M F			RESOURCES			
	I	C	1Q	2Q	3Q	4Q	O	C	N	NPF	TF
			G	H	D	PY	\$1000	\$1000			
21. Immunotoxicity of Occupational Dusts (Olenchock S 304-291-4256)(6.4/126.5/357.2)(100/VKC-Idy-113) Project Objective: To isolate and identify those dust components which interact with and alter the immune system; to define immune mechanisms; to perform clinical immunology. This is a combination of previously-existing Section projects.	83	85					I	c	a		CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI
22. Comparative Research in Analytical Pathology (Green F 304-291-4581)(VKC-Lyd-116)(6.0/80.0/284.0) (100/VKC-Img-117) Project Objective: To investigate the pathology and pathogenesis of occupational lung diseases, and to administer the national coal workers autopsy program and disaster plan.	83	C					I	b	b		CdmgI CdmgI CdmgI CdmgI CdmgI CdmgI CdmgI CdmgI CdmgI CdmgI
23. Physiology and Pharmacology of Occupational Respiratory Disease (Weber K 304-291-4561)(VKC-Idy-127)(9.2/80.0/392.8) (100/VKC-Idm-115) Project Objective: To use the principles of physiology and pharmacology to evaluate occupational respiratory disease and hazards, so as to understand their causes and to detect their response to preventive measures.	82	C					I	c	b		CddmI CddmI CddmI CddmI CddmI CddmI CddmI CddmI CddmI CddmI
24. Cotton Dusts and Extracts: Pulmonary Responses (Miles P 304-291-4561)(VKC-Ijj-134)(1.0/50.0/84.0) (39/VKC-Ijg-134) Project Objective: To determine the effects of cotton dusts and extracts on various aspects of lung function, in order to attempt to define the cause(s) of byssinosis.	82	84					I	d	f		CdjggI CdjggI CdjggI CdjggI CdjggI CdjggI CdjggI CdjggI CdjggI CdjggI
25. NRC Postdoctoral Fellowships (Weber K 304-291-4561)(VKC-Idy-132)(0.5/160.0/177.0) (100/VKC-Idy-132) Project Objective: To provide increased knowledge and understanding of the mechanisms of occupational lung disease to participating Fellows.	81	C					I	f	a		CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI CddyI

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F			RESOURCES				
	I	C	1Q	2Q	3Q	4Q	RE	U	PY	NPF	TF			
							O	C		N	\$1000	\$1000		
31. Uranium Miners - Low Dose Study - NCI (Robert Roscoe 513-684-2761) (2.0/40.0/100.0)(2.0/40.0/100.0)(100/VMH-Iai-592) (100/VMH-Iai-567) Project Objective: To determine whether the excess risk of lung cancer within the PHS cohort of uranium miners extends to those receiving low doses of radon daughters.	83	85					I	b	e			Dbai	a	I
							I	b	a			Dbai	a	I
												Dbai	a	I
												Dbai	a	I
												Dbai	a	I
												Dbai	a	I
												Dbai	a	I
												Dbai	a	I
												Dbai	a	I

Musculoskeletal Injuries/Disorders

A major goal of NIOSH is to control and ultimately prevent musculoskeletal injuries and disorders that are work-related. The need for this program is indicated by the following: (1) Musculoskeletal conditions rank first among disease groups in the frequency of their effects; nearly one-half of the Nation's work force are affected (NCHS, 1974, 1977); (2) musculoskeletal conditions represent a significant accessory factor in one third of reported occupational injuries (NCHS, 1969; NSC, 1976); (3) cost of musculoskeletal disorders based on lost earnings and worker compensation payments exceed that of any single health disorder; back injuries alone cost American industry an estimated \$14 billion a year (SSA, 1977; Arthritis Foundation, 1975); (4) musculoskeletal injuries, such as hernias, inflamed joints, and sprains/strains, account for one third of annual compensation claims, the latter category being the most prevalent, with the back accounting for almost 50 percent of the disorders, followed by disorders of the ankle, knee, and shoulder (BLS, SDS 1979; NCHS, 1969); and (5) the frequency and impact of musculoskeletal conditions of the work force are expected to increase over the next several decades as the average age of the work force increases (U.S. Bureau of Census, 1976).

By 1986, NIOSH research will have elucidated job-risk factors leading to certain disorders of the upper extremities (carpal tunnel syndrome), furnished how-to manuals as aids in recognizing such conditions, and demonstrated control techniques for reducing these problems as well as lifting hazards in select high-risk occupations.

Since musculoskeletal disorders are the leading cause of disability among people of working age, NIOSH's goal is compatible with the DHHS Prevention Objectives for the Nation of reducing the numbers of workdays lost to ill health and injury. Overall, the NIOSH program is oriented toward (1) the identification and recognition of occupational disorders and injuries arising from excessive biomechanical demands posed by current work methods, (2) the evaluation of work tasks/equipment/operations that contribute to such health and safety risks, (3) the development and testing of effective intervention strategies for reducing these types of hazards, including design changes in work methods and tools, and (4) the development of effective dissemination procedures for reaching practitioner/user groups.

Division of Biomedical and Behavioral Sciences

DBBS activities are of two types: One is to define fatigue/overexertion/musculoskeletal injury and disorders due to workplace demands and to determine the factors contributing to such problems. The second is to apply such knowledge to work situations where there are real or suspected problems, instituting appropriate preventative measures in the form of demonstration case studies.

During FY 1982, with regard to lifting hazards and their control, task load and personal factors in dynamic lifting capability were identified, as were roles of height, weight, and reach of lift on measures of fatigue. Limiting factors in one-handed lifting tasks for females also were analyzed. Data from such studies served to supplement information in the 1981 NIOSH Work Practices Guide for Manual Lifting. Recommendations from the Guide for relieving lifting hazards in a governmental records-processing facility were specified as part of a demonstration. Examination of fatigue allowances for lifting jobs in grocery warehouses began in FY 1982 and will continue into FY 1983 with recommendations based upon the Guide to be tested. In FY 1983 lifting jobs at a plumbing-fixture manufacturer will be evaluated to establish the feasibility of certain proposed techniques for reducing the apparent risk of overexertion injuries.

With respect to disorders of the upper extremity, jobs were selected for analyzing traumatogenic risk factors (repetitive motion, force, posture) in wrist disorders such as carpal tunnel syndrome. This effort will continue into FY 1983. A manual intended to provide health/safety practitioners with information for making judgments of job tasks posing musculoskeletal hazards of the upper extremities also was outlined and will be detailed in FY 1983. Demonstration case studies involving job task analysis and suggested tool redesign to offset stressful wrist/hand/finger postures observed in poultry trimming and garment stitching work continued through FY 1982 and will end in FY 1983.

Proposed new efforts for FY 1983 include a DBBS/DSR project for martialing the Institute's expertise in drafting a coordinated NIOSH ergonomic program plan aimed at preventing work-related musculoskeletal disorders. As part of this program development, efforts will be made to assess potentially new projects focused on issues of static postures and muscle fatigue, psychosocial correlates of lower back pain, and lower extremity disorders. A new project for FY 1983 will assess adverse effects of the extended workday for work tasks that range from highly cognitive to highly physical in their demand. The study is expected to provide a set of guidelines for fatigue allowances, given different task loads and lengths of work shift.

Division of Surveillance, Hazard Evaluations, and Field Studies

The DSHEFS surveillance program has adapted three national data sets--the NCHS Interview Survey, the SSA Disability Award File and Mortality Statistics, and State workmen's compensation award files--for use in the assessment of work-related injury, disease, disability, and death. Of specific interest is an analysis of the 1969-1972 SSA Disability Award File for several occupational rubrics for which there is reason to suspect a relationship between trauma and disabilities of the musculoskeletal, nervous, or respiratory systems. A surveillance report on chronic trauma has been completed. NOES also will provide data on ergonomic factors that may result in chronic trauma.

DSHEFS will continue to evaluate episodes of acute and chronic trauma such as joint disease in carpet layers and carpal tunnel syndrome as part of our HHE program.

Division of Safety Research

The DSR program concerned with musculoskeletal injuries includes three projects. One is a laboratory study to measure the biomechanical stresses associated with different design features of industrial tote boxes and other containers. The results will aid container manufacturers in the design of industrial containers that can be handled with minimum stress to those anatomical sites that are frequently injured, such as the low back and the wrist. A second laboratory study will evaluate the response of muscle fibers to sustained exertions such as are commonly found in assembly operations. The results will advance the understanding of the effects of muscle fatigue on the risk of musculotendinous injuries. The third project concerned with musculoskeletal injuries is an assessment of the potential of low back care/health promotion programs to reduce the large number of workdays lost due to low back pain.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY PLANNED COMPLETION				P M F R E U O C N			RESOURCES					
	I	C	1Q	2Q	3Q	4Q	G	H	D	PY	\$1000	\$1000	
7. Field Measurements of Workers Exposed to Whole-Body Vibration (T. Doyle, 684-8281) (1.1/75.8/80.0) (1.1/75.8/80.0) (100/VOG-Ofy-356) To characterize environmental whole-body vibration and noise impinging on vehicular operators.	83	85					0	b	a				Aefyy0 Aefyy0 Aefyy0 Aefyy0 Aefyy0 Aefyy0 E 0 E 0
DIVISION OF SAFETY RESEARCH													
8. Musculotendinous Injuries Related to Muscle Fatigue (Nelson 923-4454) (1.0/10.0/42.2)(100/VLD-OPy-825) Relate low levels of muscle contraction held to fatigue to musculotendinous injuries in the workplace.	83	85					0	c	a				EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0
9. Study of Falls Involved with Pushing and Pulling Tasks (Pizatella 923-4454)(VEb-FsN-820)(0.5/5.0/21.1) (100/VLD-OPy-820) To model the dynamics of pushing and pulling tasks to minimize the risks of injury.	81	84					0	a	a				EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0
10. Design of Containers to Minimize Biomechanical Stress (Pizatella 923-4454)(VEb-FyN-837)(0.5/4.0/20.1) (100/VLD-OPy-837) To evaluate the design and placement of handles on common type containers to minimize the risks of injury to manual materials handlers.	81	84					0	a	a				EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0
11. Low-Back Care Health Promotion Programs (Klein 923-4454)(1.0/9.0/41.2)(100/VLD-OPy-824) To assess low-back care health promotion programs aimed at reducing occupationally-related back injuries.	83	84					0	c	a				EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0
12. Develop NIOSH Musculoskeletal Disorder Plan (Jensen 923-4454)(100/VLD-OPy-823) Develop a joint DBBS/DSR ergonomic-based strategy plan to address the problems of occupational musculoskeletal disorders.	83	83					0	c	a				EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0 EbPyy0

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F			RESOURCES			
	I	C	1Q	2Q	3Q	4Q	O	C	N	NPF	TF		
							G	H	D	PY	\$1000	\$1000	
13. Worker-Identified Hazard Control System (Cleveland 923-4576)(VEa-Fst-809)(0.3/2.0/11.7) (100/VLB-Ost-809) To demonstrate the effectiveness of a worker identified hazard control system.	81	84					0	b	a				Easty0 Easty0 Easty0 Easty0 Easty0 Easty0 Easty0

Cancer, Other Than Lung

The occurrence of occupational cancer has been known for over 200 years with the discovery of scrotal cancer in chimney sweeps. The issue of how much cancer can be attributed to occupations has been particularly controversial following a 1978 DHEW report on this subject. It should be noted that each year about 400,000 Americans die from cancer. If occupation were a factor in only 5 percent of these deaths, then 20,000 deaths each year from cancer may be related to the workplace, at least in part. The only way to resolve this controversy is through additional scientific research.

One of the problems in identifying occupationally related cancer is that cancers generally become manifest in humans from 20 to 40 years after first exposure. In order to develop a comprehensive understanding of occupationally induced cancers, NIOSH has been conducting toxicologic and epidemiologic research. NIOSH can learn of possible cancer incidence in the workplace from individual workers, unions, industrial scientists, news media, government agencies, or scientific publications. With the more than 1,000 new chemicals being introduced into the U.S. workplace each year, occupational cancer-related problems may become even more complex in the future. NIOSH's laboratory cancer research program assesses (1) the carcinogenic potential of complex mixtures, (2) the modification of carcinogenic action by promoters and cocarcinogens, (3) the etiology of the carcinogenic process in various workplace environments, (4) the influence of personal and occupational factors and substituted materials on the mechanisms of the disease, and (5) the importance of the route of exposure.

Over the last several years approximately 50 percent of NIOSH's occupational cancer research was supported through an interagency agreement with NCI. Since its inception, NCI has provided NIOSH with more than \$18 million to conduct approximately 70 research projects dealing with a broad spectrum of topics related to cancer in the workplace. Approximately 10 projects are currently ongoing. NIOSH has worked closely with NCI under the interagency agreement and has participated in two collaborative workshops with NCI and EPA. Future collaboration between NCI and NIOSH will continue through joint project officers on interagency projects.

The 3-year objectives for this program area will be to continue NIOSH's active toxicologic and epidemiologic research in identifying and evaluating annually at least five new agents or combinations of agents, the major goal being the reduction of exposures to these newly identified carcinogens to the lowest level feasible.

Division of Surveillance, Hazard Evaluations, and Field Studies

The approach by which cancer research is conducted in DSHEFS involves several levels of epidemiologic study. Under DSHEFS' surveillance activities, cancer risk among occupational groups is assessed using existing record systems such as tumor registries, State and Federal vital statistics, and the SSA. In FY 1983, county-level maps for the United States will be systematically developed according to potential exposures to specific chemicals as sensed from NOHS and NOES, as well as by occurrence of specific diseases, including cancer. As described in National Standardized Mortality data sets, cancer will be one of several causes of death studied. The information generated from this surveillance effort will be assessed for further study by groups outside of NIOSH, as well as by researchers in DSHEFS.

Within the DSHEFS industrywide studies program, investigations are conducted to determine whether or not specific occupational exposure or work within certain occupational groups in general are associated with an increased risk of developing cancer. The ultimate goal of the studies is to identify whether or not certain industrial chemicals are cancer-causing agents. The research involves the identification of worker populations that lend themselves to epidemiologic research. In addition, detailed industrial hygiene surveys are usually conducted to describe the actual levels of exposure experience by the study population. Industrywide epidemiologic/industrial hygiene studies of this type have been instrumental in achieving lower exposures to certain chemicals in the workplace and in providing additional information regarding the etiology of certain types of cancer.

In order to more effectively assess the potential for conducting large-scale epidemiologic studies, a better system of feasibility testing has been established. Assistance in epidemiology and industrial hygiene also has been offered to unions, industry, and other parties interested in OSH problems.

In the past, NIOSH has conducted numerous retrospective cohort mortality studies to assess the cancer risk among workers exposed to various agents (e.g., vinyl chloride, asbestos, bischloromethyl ether, PCBs, benzene, talc, radiation, etc.). Several of the ongoing and proposed new studies will be designed using this methodology. In addition, because there is a need to examine an increasing number of cancer clusters brought to our attention by unions, industries, individual workers, the media, and other government agencies, we have vigorously developed the use of other approaches (e.g., proportionately mortality, case-control, and sample cohort studies) in order to better target more comprehensive and costly cohort mortality studies. The case-control study nested within a cohort mortality study also is an approach that will be used in an attempt to isolate an area or job at high risk within a large plant, so that potential carcinogenic occupational exposure can be identified. New methods of analysis continue to be developed and refined. Past studies which were completed but produced no definitive conclusions will be updated and reanalyzed during the next few years.

Division of Biomedical and Behavioral Science

The DBBS toxicology program in carcinogenesis extends beyond the bioassay screening of single chemicals by the National Toxicology Program, to include assessment of the carcinogenic potential of complex mixtures, the modification of carcinogenic action by promoters and cocarcinogens, the etiology of the carcinogenic process in various workplace environments, the influence of personal and occupational factors and substituted materials on the mechanisms of the disease, and the importance of the route of exposure.

Laboratory studies completed during FY 1982 have demonstrated: The carcinogenicity, through dermal exposure, of roofing asphalt fumes as compared to coal tar pitch fumes and the influence of simulated sunlight on this process; the dermal absorption capacity of MOCA in rats; the insensitivity of mice to commercial synthetic cutting fluids containing N-nitrosamines; a dose-response relationship of various fibrogenic materials to be used in future interaction studies; and the carcinogenicity of ethylene oxide and the noncarcinogenic activity of propylene oxide.

Ongoing efforts continuing into FY 1983 and beyond include: An evaluation of the cocarcinogenic and fibrogenic activity of substitutes for silica sand in foundries; a comparison of carcinogenic activity of pyrolysis effluents from various sand-mold binders used in foundries; the effects of fiber size on asbestos cancer; the interaction of ethylene dichloride, disulfiram, and ethanol; the effects of diesel exhausts and coal dust; the assessment of carcinogenic activity in insulation products; screening of promoters and cocarcinogens in the occupational environment using in vitro techniques; the effects of fluoride on asbestos cancer; the effects of dimethylformamide exposure; and comparison of route of administration, metabolism, and species susceptibility to azo dyes. Two new efforts planned in FY 1983 will include further assessment of the etiologic agents in asphalt fumes in order to identify an indicator substance for evaluation of workplace controls and development of behavioral modification methods to control carcinogenic exposures of roofing workers. Many of these efforts are related to lung disease, including cancer.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F R E U O C N			RESOURCES		
	I	C	1Q	2Q	3Q	4Q	G	H	D	PY	NPF	TF
										\$1000	\$1000	
DIVISION OF RESPIRATORY DISEASE STUDIES												
6. Kaposi's Sarcoma-Immunotoxicology of Isobutyl Nitrite (Lewis D 304-291-4256)(100/VKC-Myy-143) Project Objective: To determine if isobutyl nitrite vapors are immunotoxic to mice. This study provides technical support to the special study of the Centers for Disease Control.	83	83					M	c	a			C M C M CdyyyM CdyyyM CdyyyM CdyyyM CdyyyM CdyyyM CdyyyM
DIVISION OF SURVEILLANCE, HAZARD EVALUATIONS AND FIELD STUDIES												
7. Medical, Biometric and Industrial Hygiene Study of Emerging Problems (Bill Halperin - 513-684-2694) (VMH-MNy-543)(16.6/200.0/800.0)(100/VMH-Myy-543) Project Objective: To evaluate the feasibility of conducting studies on potential workplace hazards as they are identified.	80	C					M	b	a			D M D M DbyyNM DbyyNM DbyyNM DbyyNM DbyyNM DbyyNM DbyyNM
8. Epidemiologic Methods Development (Jay Beaumont - 513-684-2761) (VMH-Myy-547)(0.3/90.0/100.0)(100/VMH-Myy-547) Project Objective: Maintenance and development of epidemiologic methods used in NIOSH occupational health research.	80	C					M	c	a			DbyyNM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM
9. Mortality and Industrial Hygiene Study of Workers Exposed to Tetra Ethyl Lead (Marie Haring - 513-684-2761) (VMH-Myy-548)(100/VMH-Myy-548) Project Objective: To determine the mortality experience of employees engaged in the production of tetraethyl lead.	80	83					M	c	a			DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM DbyyyM
10. Registry of Dioxin Workers (Pat Honchar - 513-684-3346) (VMH-Mee-550)(3.9/25.0/150.0)(3.9/25.0/150.0)(100/VMH-Mee-550) Project Objective: This project examines the mortality outcomes of U.S. production workers exposed to dioxin during the production of 2,4,5-T and other related products.	80	85					M	c	a			DbeeeM DbeeeM DbeeeM DbeeeM DbeeeM DbeeeM DbeeeM DbeeeM

Traumatic Deaths, Amputations, Fractures, Eye Losses

Annually, about one of every ten workers employed in the private sector sustains an occupational injury. In the more hazardous industries, the injury rate is significantly greater. In 1980, work accidents were responsible for 13,000 deaths; additionally, roughly 2.2 million workers experienced disabling injuries, of which 80,000 were permanently disabled. The economic impact of such workplace accidents is staggering. Data from the SSA indicate the cost of workers' compensation payments to be approximately \$11.9 billion of which \$3.5 billion was for medical and hospitalization costs and \$8.4 billion was for wage compensation. These rapidly increasing costs are up 23 percent from the previous year. The 1980 indirect costs from occupational injuries, including lost productivity, were \$14.0 billion, an increase of 11 percent from 1979. Overall in 1980, workplace accidents cost our Nation \$30.2 billion, a figure representing 1.4 percent of the 1980 U.S. gross national product. This enormous toll in human and economic resources dictates the need for an intervention strategy designed to stimulate injury prevention in the workplace. By using a multidisciplinary approach, NIOSH is bringing to bear the necessary scientific tools and methodologies needed to favorably impact this drain on our national resources. Implementing epidemiologic techniques to define the causal factors involved, and subsequently defining solutions designed to ameliorate such contributing factors, constitute the basic thrust of the Institute's efforts.

Occupational injuries resulting in deaths, amputations, fractures, and eye losses are clearly among the most severe losses borne by U.S. workers each year. NIOSH's 3-year objectives in this program area grow out of the specific problem mentioned. Traumatic occupational deaths number between 4,500 and 13,000 annually, yet the characteristics of those killed and the circumstances surrounding the fatalities are not available for analysis. NIOSH's goals are to more accurately assess the incidence of traumatic job fatalities, to provide basic descriptive epidemiology of these deaths, and to begin to look for causes through a case-comparison study of accidents.

For amputations, fractures, and eye losses, the need for research also is clear. An estimated 15,000 amputations, 177,000 fractures, and over 290,000 eye injuries are anticipated for 1982. Of the eye injuries, roughly 5 percent or 14,500 will involve permanent partial or total loss of vision. NIOSH's 3-year plans here include construction safety studies, epidemiologic studies of falls, machine guarding and machine design for safety, and studies of personal protective equipment.

NIOSH's objectives in the area of trauma are planned primarily to scientifically assess the dimensions and seriousness of these problems, and to make recommendations to others for more effective injury prevention. State health departments are encouraged to participate in our epidemiologic studies by identifying cases for followup. Recommendations for safer workplace design are disseminated through NIOSH reports, journal articles, and often to OSHA for consideration as possible safety standards.

Division of Safety Research

DSR is the focal point of the Institute's accident and injury prevention programs, with an overall mission to decrease the number and severity of occupationally related injuries. Functionally, the program is comprised of injury surveillance and epidemiology, injury prevention research, and technology applications. Primary responsibilities of the Division include:

1. Developing a national data base of occupationally related injuries, to better assess workplace risk and set priorities for research.
2. Designing and conducting safety research aimed at preventing or mitigating injury to workers.
3. Developing criteria for recommended safety practices.
4. Developing performance criteria for respirators and other items of personal protective equipment.

The Division will establish a stronger scientific basis for occupational safety research and give increased emphasis to moving research results from the laboratory to practical workplace application and demonstration.

Broad-based data sources for surveillance of occupational injuries will be used to describe the main features of work-injury patterns in the Nation, and subsequently used as a basis for selecting research priorities, suggesting possible causal associations, measuring program impact, and providing baseline or background data for epidemiologic studies. Current priority areas have included manual materials handling, machine safeguarding, and projects targeting fall accidents. To broaden its impact, DSR plans to stimulate and enlist the cooperation of numerous groups. To accomplish this, DSR will:

1. Stimulate occupational safety research through interaction with the few universities that have a capability and interest in occupational safety research.
2. Focus on specific groups of workers such as machinists, laborers, building-construction workers, and waste dump cleanup workers.
3. Extend surveillance and epidemiology into risk assessment to include cataloging of cases of job injuries and developing injury rates for various risk factors.

Division of Biomedical and Behavioral Science

DBBS research in this program area includes the investigation of job tasks, tools, and personal risk factors that precipitate and/or aggravate musculoskeletal disorders (e.g., low back injury, wrist disorders, tendonitis) and injuries, and the study of the job requirements that impact psychophysiologic functions of consequence to workers' health and safety. The development and application of control measures for preventing these problems include workplace and tool redesign.

Activities completed during FY 1981 included publication of a Work Practices Guide for Manual Lifting, which contains a basis for rating the hazard of overexertion in lifting tasks and means for risk reduction, documentation of successful intervention strategies for reducing the incidence of wrist disorders in selected jobs, and the design of a worksite indexing system in conjunction with NOES for categorizing job tasks that pose risks to the musculoskeletal system. Proposed studies for FY 1983 will:

1. Focus on the effects of chronic trauma from light repetitive or sedentary work activities, particularly when the work period is extended or when workers are required to sit or stand in one place for long hours.
2. Apply the recommendations from research findings to workplace settings to demonstrate their effectiveness in reducing biomechanical hazards.
3. Identify worker groups and the extent of dermatologic disease produced by chronic physical trauma to the skin.

Cardiovascular Disease

Many exposures in the workplace have been shown to have an effect on the cardiovascular system of American workers. Many other exposures have not been evaluated with respect to their potential insults to the cardiovascular system. Most of the Institute's previous experience in cardiovascular research involved the heart and the major vessels of the cardiovascular system. This area needs to be continued and expanded. In addition, since the cardiovascular system of the lung is only a few micrometers from the airspaces in the lung, airborne contaminants can be expected to have an effect on the cardiopulmonary system. However, the effects of most workplace contaminants on the cardiopulmonary system have not been evaluated. NIOSH should support studies that evaluate the potential hazards involved.

It is particularly important to develop appropriate animal models for the testing and evaluation of workplace hazards. The results from the animal need to be coordinated with studies evaluating the potential hazards in the workplace, with epidemiologic studies, and with the groups developing control technology designed to eliminate or reduce exposure levels. The animal models will be helpful in elucidating disease mechanisms as well as confirming preliminary epidemiologic information. In fact, positive results in studies using animal models will permit epidemiologic studies to be initiated where potential cardiovascular problems may exist.

By FY 1986, the development of at least two bioassay systems will have been developed:

1. Isolated-Perfused Lung Model--Techniques for this system will have been perfected, and the effects of various substances on the cardiopulmonary system will have been tested.
2. Cardiovascular Smooth-Muscle System--This bioassay system is now in use, and by FY 1986 various suspected toxins will have been screened for the effects of contractility of blood vessels.

Epidemiology data collected by FY 1986 will be used to indicate appropriate substances to be screened in the bioassay systems described above. In addition, the results of bioassays will be considered in the planning of epidemiologic projects for FY 1986 and beyond.

Division of Surveillance, Hazard Evaluations, and Field Studies

DSHEFS has three ongoing studies where the effects of occupational exposure on the cardiovascular system are specifically being examined. (Excess risk of dying from cardiovascular disease is, of course, evaluated in all mortality studies that are conducted.) One of these studies involves workers exposed to nitroglycerin, which has been associated with symptoms of cardiovascular disease and sudden cardiac death. The results of this study, which is a retrospective cohort mortality design along with a detailed industrial hygiene survey, will be finalized in early FY 1983. The second study is a cross-sectional medical and industrial hygiene survey of workers exposed to carbon disulfide, which was finalized in FY 1982. The third study is a retrospective cohort mortality study of bridge and tunnel workers exposed to carbon monoxide. A study of motor vehicle examiners exposed to lower levels of carbon monoxide was completed in FY 1980.

Division of Respiratory Disease Studies

1. Appropriate animal models of cardiovascular disease need to be developed for laboratory testing of occupational hazards.
2. Epidemiology related to stress and cardiovascular disease will be continued and expanded.

Division of Biomedical and Behavioral Sciences

Chronic inhalation studies are being conducted to assess the potential toxic myocardial effects of selected aliphatic amines of industrial importance.

Relationships between the chemical structure of the amine and its biologic activity are emphasized. This approach includes study of physiological, biochemical, and histological techniques with the intent to develop noninvasive techniques in animals which would be suitable for monitoring exposed workers in their occupational environment.

A study of imminent danger from heat stress in mines is being conducted.

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PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER

*****CARDIOVASCULAR DISEASE*****

DIVISION OF BIOMEDICAL AND BEHAVIORAL SCIENCE

1. Occupational Cardiac Toxicity (D. Lynch, 684-8274)
(V00-Lhy-339) (0.1/1.0/4.9) (100/V00-Lhy-339)
Compare the cardiotoxic potential of industrially important ethyl substituted aliphatic amines.

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DIVISION OF RESPIRATORY DISEASE STUDIES

2. Primer for PFT and CWP Reporting to MMWR
(Hankinson J 304-291-4755)(100/VKH-Lyy-214)
Project Objective: To develop a primer for clinical interpretation of pulmonary function testing: to develop and evaluate a procedure for the reporting of CWP to the MMWR.

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DIVISION OF SURVEILLANCE, HAZARD EVALUATIONS AND FIELD STUDIES

3. Mortality and Industrial Hygiene Study of Workers Exposed to Carbon Monoxide (Frank Stern - 513-684-2761)
(VMH-Lyy-558)(2.5/15.0/90.0)(1.0/15.0/20.0)(100/VMH-Lyy-558)
Project Objective: To ascertain whether workers exposed to chronic carbon monoxide poisoning have an increased risk of cardiovascular disease mortality.

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Reproductive Effects

Recent research data have highlighted the fact that the occupational setting can be the source of reproductive effects as well as of the more commonly acknowledged effects such as lung dysfunction, cancer, and dermatitis. This research includes information on effects such as male sterility in dibromochloropropane workers, impotence in workers exposed to a neurotoxin, increased birth defects among children born to women pharmaceutical workers, concern about adverse effects from glycol ethers on the reproductive system of both males and females, and excessive spontaneous abortions among medical laboratory and office workers and hospital and dental personnel exposed to anesthetic gases. These facts have shown the need for better means to identify and evaluate hazardous chemicals and populations at risk and to determine whether an occupational cluster of adverse reproductive effects is actually a result of occupation. To accomplish this, a formal reproductive effects initiative was established within NIOSH in FY 1980. This initiative is being implemented in three ways: First, through laboratory methods aimed at identifying teratogens and mutagens that may be used in the workplace; second, by surveillance studies that use record systems to identify possible associations between parental employment and reproductive loss; and third, by means of epidemiologic studies of high-risk groups of workers. Important to this research is the development of new laboratory and field methodology for evaluating these reproductive effects. Completion of NOES also should enable NIOSH to identify workers most at risk once a hazard is identified.

The 3-year objectives for this program area are to (1) have identified the major priorities for field and laboratory studies; (2) have completed the development work on new laboratory and field methodology for evaluating reproductive effects; and (3) have completed the initial steps in developing a surveillance network for reproductive effects which would link the CDC birth defects registry, the NOES, and State surveillance systems.

Division of Surveillance, Hazard Evaluations, and Field Studies

DSHEFS performs two types of studies to examine the adverse reproductive effects that may be caused by occupational exposures to certain biological, chemical, and physical agents. These effects may be manifested as infertility, spontaneous abortion, fetal death, low birth weight, altered sex ratio, birth defects, developmental deficits, and childhood cancer. The two epidemiologic approaches employed by DSHEFS are case-control studies of reproductive failure and parental exposure cohort studies.

Surveillance studies utilize existing data to establish associations between reproductive failures and parental employment, and usually use the case-control design. The DSHEFS FY 1983 surveillance reproductive initiative program consists of six areas of research that were initiated in previous years, and that may result in hypotheses that will be tested by other NIOSH researchers.

1. An interagency agreement with NCHS is being utilized to collect data from their 1980 National Natality and Fetal Death follow-back study. Data from this study are now being analyzed.
2. Surveillance cooperative agreements with New York and Utah have provided data that are being analyzed to assess possible association between parental employment and fetal death.
3. A case comparison study of parental employment and fetal outcome for 4,000 births in New York City is being analyzed.
4. Data from a NIOSH-funded study of parental employment and spontaneous abortion conducted by the Research Foundation for Mental Hygiene, Inc. (Columbia University) are now available.
5. Identification has been made of groups of workers potentially exposed to teratogens in the workplace as sensed by means of the 1972-1974 NOHS.
6. County-level maps depicting potential workplace exposure to human teratogens have been prepared.

Reproductive hazards investigations that fall into DSHEFS' industrywide studies program are generally conducted using the parental-exposure cohort concept. The study designs and analytical tools necessary to conduct these investigations have been developed over the last few years. This effort has yielded a detailed reproductive-history questionnaire that has been tested in the field, and development of computer-based masterfile formats and analytical programs. The data for several field studies (wives of male lead workers, wives of male workers exposed to carbon disulfide, and female pharmaceutical workers) have been collected and computerized. Final reports for these studies will be available in FY 1983. Other projects that are being initiated or are continuing into FY 1983 include workers exposed to ethylene dibromide and polychlorinated biphenyls. Throughout the next few years the area of reproductive effects research will be refined and exposures of interest will be continually evaluated. The results generated from these studies will add significantly to our understanding of the effects of the reproductive system (male and female) from certain occupational exposures and may provide important information to help set standards and protect the health of the workers.

A new unit has been established within DSHEFS to focus on reproductive effects research. This unit has been given the responsibility of assessing the feasibility of conducting additional field studies and expanding into other study designs.

Division of Biomedical and Behavioral Science

DBBS's reproductive hazards program includes identification and assessment of chemicals that prevent or inhibit reproduction through effects on adults of either sex, interfere with normal development, are expressed either in utero or postnatally, and cause genetic disease and/or cancer through transplacental transfer. A total of 62 chemicals has been tested since the initiation of the program in 1974. Significant findings include the demonstration of adverse effects from glycol ethers on the reproductive systems of both males and females in various species including mice, rats, and rabbits.

The use of short-term tests have been instrumental in evaluating this class of chemicals. Methods involving the use of *Drosophila* for a short-term teratogenesis screening have been developed and are being validated. Also, methods are being developed to assess male reproductive dysfunction by videographic analysis of semen samples with eventual application to workers in the field. Studies have shown that radiofrequency radiation is teratogenic in rats, and the basic mechanisms causing these effects have been elucidated.

FY 1983 efforts will continue along these lines of investigation and will include: Further short-term screening of chemicals based upon structure activity relationships, validation of the *Drosophila* teratologic screening system, investigations of the effects of low-frequency radiofrequency radiation on morphology and function of the reproductive systems in both male and female rats, development and refinement of videographic analysis of semen samples, effects of glycol ethers on male reproductive outcome, chemical interaction studies on teratogenic outcome, postnatal evaluation to assess the severity of certain terata, metabolism and distribution studies of chemicals to determine the mechanisms of action of the glycol ethers, and a symposium on the reproductive effects of glycol ethers. Efforts beyond FY 1983 will continue toward the development of major long-term goals which are to:

1. Broaden the base of the reproductive toxicology program to develop a coordinated effort in reproductive physiology, teratogenesis, mutagenesis, postnatal functional testing, biotransformation and tissue distribution studies, and male reproduction dysfunction.
2. Establish a comprehensive research program to identify general classes of reproductive effects (fertility impairment, abnormal development, and genetic disease) and how they relate.
3. Take a lead role in developing and applying short-term laboratory screening methods for evaluating the potential of industrial chemicals and complex mixtures to adversely affect reproductive outcome by using a battery-tiered approach.
4. Rapidly disseminate scientific findings to other Federal and State agencies, potentially affected populations, and organizations, to reduce occupationally related reproductive health problems.
5. Participate in the coordination of interagency research on reproductive hazards through NTP.

Division of Respiratory Disease Studies

This Division's development of systems and performance of mutagenic monitoring for selected workplace environments and worker groups serves several purposes: The detection of mutagens in the workplace; the determination of whether mutagenic compounds found in the workplace are sufficient to cause genetic damage to the workers; establishing the relationship between the level of workplace mutagens, genetic damage, and health hazards; and identifying worker population groups for epidemiologic and surveillance studies. The results of mutagenic monitoring might be used as an environmental or biological dosimeter for adverse health effects. Activities in this area include:

1. Development of suitable mutagenic monitoring systems for the workplace environment.
2. Development and/or validation of in vitro assay systems to study the mutagenic activity of workplace chemical complexes and mixtures.
3. Performance, validation, or improvement of human mutagenic monitoring systems which include urine analysis and cytogenetic studies.
4. Performance of in vitro mutagenesis studies for HHEs and other related projects within the Institute, and identification of occupational groups for mutagenic monitoring and epidemiologic studies.

Office of Extramural Coordination and Special Projects

A major part of the NIOSH reproductive effects research initiative is accomplished through the research grants program. Investigator-initiated research in this area was stimulated through a request for applications that appeared during FY 1980, and efforts continue to emphasize this area through the grants program. As of November 1, 1982, NIOSH was supporting eight active grants in the area of reproductive effects investigating the role of hyperthermia in congenital malformations, occupational risks of pesticide exposure for females, occupational exposures and rates of DNA damage, occupational hazards to male and female fertility, effects of carbon disulfide on male reproduction, spermatogenic transfer of the effects of mutagens, embryo culture/teratogen biotransformation systems, and occupational exposure of parents and tumors in offspring.

Neurotoxic Illness

Major episodes of neurotoxicity produced by occupational exposures (such as kepone, triorthocresylphosphate, mercury, polybrominated biphenyls) have dramatized the dangers of neurotoxic effects, but a far greater impact is seen in diverse exposures throughout industries where there are many minor occurrences involving a much larger total number of workers (e.g., through use of solvents, pesticides, heavy metals). Indicative of the overall extent of the problem is the fact that more than one fourth of the 575 significant chemicals assigned TLVs by the American Conference of Governmental Industrial Hygienists have such limits based at least in part on their neurotoxic properties. Industrial neurotoxins may produce effects ranging from mild to severe and include motor changes (inability to walk, tremors, loss of fine coordination), sensory changes (loss or diminution in vision, hearing, touch), and cognitive changes (loss of alertness, judgmental lapses, personality changes). The problem is undoubtedly far larger than it appears because known neurotoxins have, by and large, been identified by their conspicuous, severe symptoms rather than the sophistication of the tests. Neurotoxic effects are particularly serious because of (1) the relative lack of capacity to replace lost functions, (2) the irreversibility of most central nervous system damage, and (3) the critical function of the nervous system in detecting safety hazards. These neurotoxic effects represent not only major health problems but, prior to detection and treatment, also may be a cause of accidents both on and off the job. An added difficulty is that the more insidious problems induced by chronic exposures to occupational neurotoxins may lie undetected because such effects can be ascribed to advancing age rather than the cumulative effects of the workplace exposure.

By 1986, NIOSH will have assessed the adequacy of current workplace exposure limits for furnishing effective protection against combinations of industrial solvents and fumigants based on neurobehavioral measures, and will have developed new tests for acute neurotoxicity to rapidly screen would-be chemical hazards.

Division of Biomedical and Behavioral Science

DBBS research in neurobehavioral toxicology is directed toward the identification and characterization of chemical hazards, reevaluation and development of recommended limits, and recommendations for substitute chemicals or improved work practices to reduce exposure. Research in FY 1982 has identified neuropathological changes in the central nervous system but no effects in neurophysiology of the peripheral nervous system in animals given chronic exposures to propylene and ethylene oxide, and changes in reflex amplitude following acute exposures to methyl ethyl ketone in human subjects. Recovery in nerve conduction velocity measures following methyl bromide exposure in rabbits, and an evaluation of the impact of methyl bromide exposures near the PEL on nerve conduction and reflex response in rabbits were reported, and a neurobehavioral study of 155 workers using methyl bromide in structural fumigation was completed. In addition, reports of the behavioral effects of lithium, acrylamide, toluene, propylene, and ethylene oxide and carbon disulfide, and an evaluation of human neurotoxicity tests also were completed and submitted to or published in scientific journals.

In FY 1983, work will continue accenting the mix of animal and human laboratory and worksite studies. With regard to animal research, the current development of new animal test methods will culminate in screening instruments that will be used to identify chemical substances that produce reversible behavioral effects and those that produce more debilitating chronic effects. Such tests will be used as a major part of a decision strategy for choosing chemicals within selected classes for subchronic animal studies, acute human exposure research, and worksite evaluation of worker groups using those chemicals. In addition, acute and subchronic exposures will be conducted in animals to evaluate hypothesized mechanisms of straight-chain carbon neuropathy. Gestational exposures to cellosolve analogues will be completed with a report on the effects of chain length of cellosolves on behavioral teratology and related neurochemical measures. Gestational exposures to alcohol solvents will begin in a similar type of behavioral teratological study.

With respect to human testing, acute human laboratory exposures to ketone solvents will be evaluated both singly and in combination to provide information regarding acceptable short-term exposure limits or ceiling limits and to test the additivity rule in defining safe exposures for mixtures of agents. The agents selected for study here will be acetone, methylethylketone, and methylisbutylketone which have been noted frequently in HHE reports as occurring together. A report of the evaluation of the neurobehavioral effects of chronic exposures to spray paint solvents including ketones will be completed to provide a picture of the chronic exposure problems associated with such solvents. In addition, the evaluation of fumigators using neurotoxic compounds will continue with emphasis on carbon disulfide/carbon tetrachloride uses in commodity fumigation where combined exposures suggest added hazards. Workplace exposure concentration, jobs/work practices contributing to high exposures, and a characterization of the neurotoxic effects through neurobehavioral tests of exposed workers will be carried out.

Division of Surveillance, Hazard Evaluations, and Field Studies

DSHEFS is considering several future epidemiologic studies to examine the neurotoxic effects of certain chemicals on exposed workers. By 1987, DSHEFS should have a strong epidemiologic research program to evaluate neurotoxic effects in relation to occupational exposures. Currently, this effort involves the identification of worker populations where there are exposures to chemicals that have been shown to be neurotoxic in laboratory animals, such as the class of hexanes. This effort will continue to be conducted in collaboration with DBBS. Neurotoxic effects were evaluated as one part of a cross-sectional medical study of workers exposed to carbon disulfide.

Noise-Induced Hearing Loss

Control of occupational noise exposure and identification of the dose/response relationship between impulse noise and deafness are the primary approaches to reduction of occupational noise-induced hearing loss being taken by the NIOSH noise program in FYs 1983-1985.

Previous research by NIOSH has demonstrated that half of these workers are receiving less than half the attenuation potentially provided by their protectors. The most common question asked of the NIOSH noise staff is, "What is the proper way to select ear protectors?" To answer this question, and to intervene in the misuse of hearing protectors, three projects are being conducted: (1) A videotape explaining the proper selection and use of ear protectors is in production; (2) a method for training workers and field verification of earplug effectiveness is being evaluated; and (3) the compendium of available personal protective devices is being revised.

Impulse noise such as that from hammering and collision of materials causes high-peak sound levels that may produce hearing loss at a rate different from continuous noise. In addition, this type of noise may pose different problems for personal protection. In the next 3 years we will examine the hearing of workers who have been exposed to impulse noise, the parameters of which can be documented. We will determine if the patterns of loss are different from that expected for continuous noise-equivalent energy. As a continuation of our studies of personal hearing protectors, we will start examining the acoustics of impulse noise at the worker's ear and the effectiveness of earplugs in reducing exposure.

Division of Biomedical and Behavioral Science

The noise program at NIOSH addresses the problem of quantification and reduction of hazardous noise exposure. In the United States, approximately 5.1 million workers are exposed to continuous levels of hazardous noise and approximately 3 million others are exposed to potentially hazardous levels of impulsive noise. Studies include laboratory development of test procedures for protective-device effectiveness, development of personal protective devices, field evaluation of device use, development of instrumentation for noise measurement, and surveys of occupational noise exposure. These studies provide the state-of-the-art techniques for field studies designed to determine the health effect of continuous, intermittent, and impulse noise. NIOSH staff also are available to provide technical assistance to labor and management for infrasound and ultrasound measurement. This assistance and the research carried out by the Institute are the basis on which worker noise exposure is reduced to acceptable limits.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY PLANNED COMPLETION				P M F			RESOURCES				
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*****NOISE-INDUCED HEARING LOSS*****												
DIVISION OF BIOMEDICAL AND BEHAVIORAL SCIENCE												P
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1. Evaluation of Earplug Effectiveness (R. Tubbs, 684-8281) (VOG-Gfy-367) (100/VOG-Pfy-367) To validate the procedures proposed in a field method designed to test earplug effectiveness.	82	83					P	c	a			A
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Dermatologic Disorders

According to the BLS annual survey of occupational injuries and illnesses, skin diseases and disorders have accounted for more than 40 percent of all reported occupational illnesses each year from 1972 through 1980. Annual incidence of occupational skin disease for the private sector for 1972-1976 was 1.5 cases per 1,000 workers. During 1975 one of every 11 private-sector employees (9.1 percent) experienced a job-related injury or illness of some kind. The vast majority of these (96.7 percent) were classified as injuries; only 3.27 percent were classified as illnesses, and of these 1.49 percent were skin diseases or disorders. Comparison of the last two figures reveals the origin of the 40 percent figure for skin problems cited above.

Considered in perspective, these statistics seem to indicate that occupational illness is a minor proportion of total occupational health problems. However, a Stanford Research Institute report and the Discher Report, both of which evaluated existing data sources of occupational health statistics, cast considerable doubt on such a conclusion. The serious under-reporting of occupational disease and the inadequacy of the reporting system may mean that the true incidence is anywhere from 10 to 50 times greater than reported in the BLS data. Schwartz, Tulipan, and Birmingham have indicated that approximately 1 percent of the work force may be affected by occupational skin disease at any given time. Data from the 1976 BLS survey show that occupational skin diseases or disorders were unevenly distributed among industries. These diseases are more prevalent in agriculture and manufacturing: The agriculture industry, which employed 1 percent of the private sector work force, had 4 percent; manufacturing, with 30 percent of the work force, accounted for 65 percent of skin disease. The agriculture industry had the highest incidence for both total cases and lost workday cases, the second highest incidence rate for lost workdays, and the second highest for the other two types of cases. All other industries had low incidence rates for all three aspects of cases.

Annual cost of occupational skin disease could be used as a measure of the significance of occupational skin disease. Using the BLS data and averaging the 1975-1976 figures, approximately 200,000 lost workdays are attributable annually to occupationally induced skin problems. Assuming an average pay rate of \$6.00 per hour, this represents a direct economic cost due to the lost productivity of absent workers of \$9.6 million. Adding the cost of a less efficient replacement worker, indemnity, medical costs, and insurance could easily increase this figure two to three times (i.e., to \$20-30 million annually).

Often overlooked, because of the emphasis on respirators and engineering controls to limit the inhalation of chemicals, is the potential significance of dermal absorption. Absorption of chemicals through the skin, as the sole route of exposure or in conjunction with inhalation, has resulted in occupational illnesses from a variety of chemicals, pesticides, and metals. Despite respiratory protection, skin absorption may be as important as, or more serious than, pulmonary exposures alone for chemicals such as aniline, dimethylformamide, dibromochloropropane, and glycol ethers. Although RTECS lists 1,172 chemicals with skin LD50s, only 141 of these are addressed by TLVs or OSHA PELs. For most chemicals used in industry, little or no quantitative information is available on their ability to penetrate skin or on their potential contribution to the overall chemical body burden of workers. This is of concern where exposures to chemical carcinogens, teratogens, and other systemic occupational poisons are present.

The 3-year objectives for the Institute's dermatology program include:

1. Stabilize research grants support for dermatologic projects at academia and other eligible institutions.
2. Develop NIOSH's intramural dermatology competence, including employing at least one board-certified dermatologist.
3. Complete dermal absorption profiles for several aldehydes.
4. Identify worker groups and the extent of dermatologic disease produced by chronic physical trauma to the skin.

Division of Biomedical and Behavioral Science

The DBBS dermatology program addresses the skin both as a target of occupational injury and disease and as a route of entry into the body for hazardous substances contacted in the work environment. The program consists of intramural and extramural components and provides for liaison with other Federal

agencies involved in dermatologic research and the coordination of dermatologic research activities within NTP. As part of the extramural grants program in dermatology, DBBS assists in the Institute's secondary review of relevant grants and provides technical assistance once the grants are awarded.

Intramural research is directed largely to the development and evaluation of quantitative in vivo techniques for studying the extent and rate of the percutaneous absorption of chemicals. The techniques developed during FY 1982 will allow complete accountability of volatile chemicals such as benzene and carbon disulfide. During FYs 1983 and 1984, dermal absorption profiles will be completed for several aldehydes that have carcinogenic or mutagenic activities and have been shown to be capable of causing death in animals following topical applications to the skin. These studies will provide support for NTP skin carcinogenesis assays such as with gluturaldehyde and provide information to the Occupational Safety and Health Committee on the potential body burden resulting from skin exposures.

The effects of chronic repeated mechanical trauma to the skin also is being studied. A report, being developed under contract, will identify populations and job categories at risk, and provide an assessment of the extent of the problem. The report, which was completed in FY 1982, will be used to focus on worker populations where repetitive skin trauma, alone or in the presence of chemicals, leads to increased morbidity or illness. A small workshop is planned for FY 1983 to discuss the problem and to provide insight into controlling or reducing work-related hazards.

The DBBS program is expected to identify cutaneous hazards and to provide support for the development and evaluation of control technologies and protective clothing and to provide a sound basis for recommended work practices.

Office of Extramural Coordination and Special Projects

The main OECSP contribution to the NIOSH dermatology program is through the research grants. Studies supported during FY 1982 included: (1) Pathomechanisms of chemically induced depigmentation, (2) role of inflammatory proteinases in irritant dermatitis, (3) chloracne mechanisms of pathogenesis, (4) photochemical processes and occupational dermatoses, (5) accommodation and tolerance in humans and guinea pigs, (6) coal liquids--skin toxicity and mutagenicity studies, (7) factors in uptake and elimination of chemicals in the skin, (8) measurements of dermal exposure to chemical hazards, (9) epidermal langerhans cells in vitro studies, and (10) mechanisms of occupational leukoderma. NIOSH occupational skin disease evaluations also are conducted as part of the HHE program in DSHEFS.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY I C	PLANNED COMPLETION				O C N G H D	P M F R E U O C N G H D	RESOURCES	
		1Q	2Q	3Q	4Q			NPF	TF
								PY	\$1000
*****DERMATOLOGIC DISORDERS*****									
DIVISION OF BIOMEDICAL AND BEHAVIORAL SCIENCE									
1. Cutaneous Toxicity Hazards (A. Susten, 684-8357) (V00-Jhy-335)(2.5/39.6/120.0)(2.5/69.6/150.0)(100/V00-Jhy-335) Develop dermal absorption profiles for hazardous industrial chemicals. Support recommendations for protective clothing and work practices.	80	85					J c a		
2. Effects of Repeated Mechanical Trauma on the Skin (A. Susten, (V00-Jyy-336) (0.2/8.6/15.0) (100/V00-Jyy-336) Determine the number of workers affected, kinds of injuries, injury prognosis, those which jobs pose trauma to skin	81	84					J a a		

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Psychological Disorders

NIOSH's interest in worker mental health stems from empirical evidence linking job stress and psychological impairment (Copper and Marshall, 1976; Kasl, 1978; Smith, 1981), and recent epidemic-like increase in psychological signs of stress observed in working-age populations (Chase, 1971). Bearing on the latter, there have been substantial increases in workers' compensation for acute and chronic psychiatric disorders (Lublin, 1980; McClud, 1981). The annual productivity losses due to stress-related mental illness have been estimated to be \$17 billion (Yates, 1979). Once identified, many causes of job stress can be eliminated or controlled through environmental, job, or organizational redesign (Smith, 1981). Alternately, techniques involving worker stress-management training also have been used where the latter approaches are not feasible. Recently, spreading automation and new technology in the workplace have resulted in major changes in job tasks and organization structures with new forms of stress emerging (e.g., loss of job control, automatic monitoring of performance, task-imposed isolation, high sensory-motor-cognitive demands). These problems are most prevalent for the more than 25 million workers in offices and those in high technology jobs. By 1986, ergonomic guidelines for reducing stress and strain in video-display terminal-work operations will be available, as will methodologies for diagnosing and reducing stress/health problems in high-technology office-type jobs.

Division of Biomedical and Behavioral Science

Current DBBS job stress research is aimed at defining working conditions which produce mental and physical health problems and at developing and testing the efficacy of stress-control measures. Recent DBBS research into stressful factors in machine-paced job situations (postal sorting, poultry) and computerized video display terminal (VDT) operations has demonstrated acute psychological and physical complaints related to high workload, work pressure, performance monitoring, and, in some instances, fear of job loss (Smith, et al., 1981; Wilkes, et al., 1981). Reports to affected/user groups were widely disseminated and enhanced through NIOSH/DBBS-sponsored conferences.

Current laboratory and field studies are focusing on VDT operations with respect to selected job/work station/environmental features and health problems. Means for reducing the observed problems also are being ascertained. Other job stress research related to new technology deals with field studies of office workers and those in high technology/information processing jobs. The latter studies will emphasize aspects of cognitive load as a stressor both in psychological and physiological terms. These studies will continue into FYs 1984 and 1985. Finally, studies of the psychosocial impact of robotics automation on worker health will be examined in a pilot effort to be initiated in FY 1983.

DBBS stress reduction research has been underway since 1978, and has emphasized individual coping strategies. Progressive muscle relaxation, cue-controlled relaxation, and biofeedback training programs have been used successfully in worksite application to reduce apparent psychological and physical stress symptoms. Nurses, retail sales workers, and highway maintenance personnel have served as study groups in these programs, with significant reductions being reported in muscle tension, blood pressure, sleeping disorders, and alcohol consumption following the stress-management training (Murphy, 1982; Schleifer, 1982). Other stress reduction efforts have emphasized ergonomic redesign. One laboratory study of video display work stations has demonstrated positive influences of work station redesign on muscular complaints, with a significant increase in worker productivity (Dainoff, 1982).

Future research will continue to provide a balanced mix of studies defining stress-producing working conditions with those demonstrating and evaluating stress reduction approaches. Stress in information processing jobs/office work reflecting the impact of new technology will be the major program focus. Additionally, beginning efforts will be made with DSHEFS to ascertain more sensitive surveillance methods for tracking the nature and incidence of job-related psychological disorders.

CONTROL OCCUPATIONAL SAFETY AND HEALTH PROBLEMS

The policy of PHS and DHHS is to prevent disease and injury through health protection, health motivation, and the delivery of appropriate preventive health services. CDC protects the public health by recommending sound policies for intervention. One important area of intervention is the control of OSH problems, which is the heart of NIOSH's prevention efforts.

NIOSH, recognizing the importance of control, is in the process of establishing working groups for each of NIOSH's Ten Leading Causes of Work-Related Health Problems to focus on controlling diseases and injuries related to the workplace, beginning with lung disease, including cancer. This will be a 3-year effort in which each working group is to develop control strategies for specific OSH problems. As strategies are developed a comparative analysis will be performed and priorities established.

NIOSH controls OSH problems through discovering, assessing, and improving measures to reduce occupational hazards, especially through control technology, personal protective equipment, work practices, and hazard-detection devices.

The use of effective control strategies is the only means of ensuring a workplace free of exposure to harmful chemical and physical agents. Using the disciplines of engineering, ergonomics, and industrial hygiene and safety, NIOSH investigates and makes recommendations on: (1) Engineering control systems, work practices, and procedures, (2) respirators, (3) other personal protective equipment, and (4) monitoring or warning systems, specifically sampling/analysis and instruments/methods development.

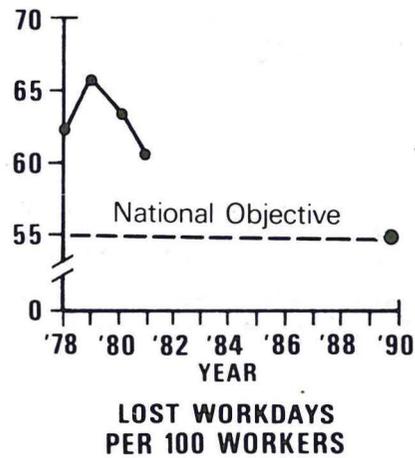
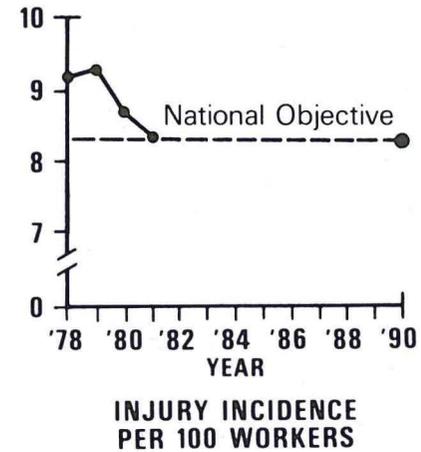
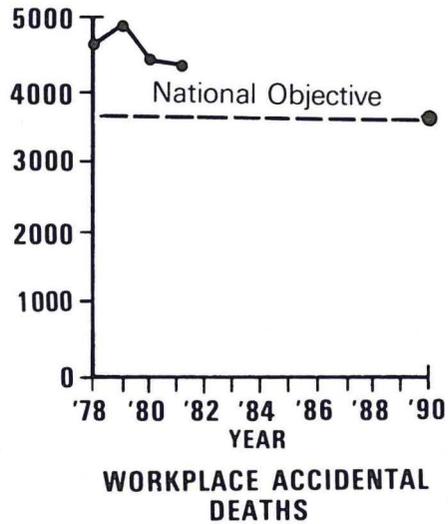
The following long-range objectives for the Nation are addressed by the control program:

1. Lung Diseases--By 1990, among workers newly exposed after 1985, there should be virtually no new cases of asbestosis, byssinosis, silicosis, nor coal miners' pneumoconiosis.
2. Traumatic Deaths, Amputations, Fractures, and Eye Loss--By 1990, workplace accidental deaths for employers with 11 or more employees should be reduced to less than 3,750 annually. The rate of work-related injuries should be reduced to 8.3 cases per 100 full-time workers.
3. Musculoskeletal Injuries/Disorders--Lost workdays due to injuries should be reduced to 55 per 100 workers annually.
4. Noise-Induced Hearing Loss--By 1990, the prevalence of workplace noise-induced hearing loss should be reduced to 415,000.
5. Neurotoxic Illness--By 1990, workplace-related heavy-metal poisoning (lead, arsenic, zinc) should be virtually eliminated.
6. Dermatologic Disorders--By 1990, the incidence of compensable workplace-related dermatitis should be reduced to about 60,000 cases.

The progress in meeting three of these objectives is shown below (Figure 3).

Figure 3.

PROGRESS IN MEETING THREE OF THE OBJECTIVES



Source: Bureau of Labor Statistics

Respirators

In recent years there has been a significant increase in interest in workplace respiratory protection, in large part due to our increased knowledge and awareness of the existence of toxic agents in workplace environments. As the interest in respiratory protection has increased, the demand for an improvement in both the quantity and quality of respirators also has increased. NIOSH has attempted to respond to this demand by improving the quality and efficiency of its respirator testing and certification program and by expanding its research activities to evaluate respirator performance and improve respirator performance standards and criteria.

The 3-year objectives of the NIOSH respirator program are:

1. Increase the quality and efficiency of the respirator testing and certification program.
2. Revise and update the respirator performance standards contained in 30 CFR Part 11 to improve the quality of certified respirators and to advance the state of respirator technology.
3. Expand the laboratory and field respirator research activities of NIOSH to permit NIOSH to improve its ability to accurately evaluate respirator performance.
4. Expand the NIOSH respirator audit-testing program to permit NIOSH to more accurately evaluate the quality control of respirator manufacturers.

Division of Safety Research

The Testing and Certification Branch of DSR operates the NIOSH/NIOSH respirator approval program; conducts complaint laboratory, and field investigations; and conducts a respirator research program. These efforts, which address the aforementioned NIOSH respirator program objectives, are conducted in cooperation with industry, labor, universities, and respirator manufacturers.

Research studies are being conducted to establish the technical basis for improved performance criteria and standards. Specific studies are under way to address questions of sorbent efficiency for organic vapor respirators, filter efficiency and optimum flow rate for aerosol air-purifying respirators, the effects of filter resistance and efficiency on protection factors and reduced air flow use in powered air-purifying respirators, and the physiological effects of using respirators in conjunction with protective clothing. Additionally, a draft revision to the respirator regulations (30 CFR Part 11) is being prepared.

Projects involving field research include:

1. A comparison of the protection afforded by respirators in actual field environments versus the protection during a controlled quantitative fit test.
2. Collection and analysis of data regarding the protection afforded by a respirator for a variety of occupations and respirator programs.
3. A comparison of quantitative facepiece fit data for a large sample size with two different test aerosols, NaCl and DOS, with training and methods as additional variables.

A project is under way to record and resolve complaints/problems with respirators and to develop the necessary systems for compiling and tracking them. The project is aimed at providing data on which to base respirator field research activities and off-shelf audit testing, that will lead to improved respirator protection for workers.

Division of Respiratory Disease Studies

DRDS in FY 1982 completed one study of the effects of added resistance to breathing in subjects with mild and moderate obstructive lung disease and in subjects with restrictive lung disease. In FY 1983 DRDS, in collaboration with DSR, will investigate the effects of respirator use under actual work conditions. The physiological demands of wearing a respirator will be studied both in the field and in the controlled setting of the Division's exercise-testing laboratory. The results of these studies will provide additional research information necessary for the establishment of criteria for determining whether a worker is medically fit to wear a respirator under actual conditions of employment.

Office of Extramural Coordination and Special Projects

During FY-1982, the NIOSH grants program awarded five respiratory research grants. These are: (1) An Occupational Cause of Pulmonary Fibrosis, (2) Byssinosis: the Recognition of an Occupational Disease, (3) Respiratory Disease in the Furniture Industry, (4) Dust and Silicosis in Mining and Mineral Industries, and (5) Breath Sampling for Industrial Solvent Exposure.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F			RESOURCES		
	I	C	1Q	2Q	3Q	4Q	O	C	N	NPF	TF	
							G	H	D	PY	\$1000	\$1000
13. Analytical Modeling of Respirators (Pallay 923-4331)(1.0/7.8/40.0)(100/VLI-Dyy-849) To develop an analytical model to characterize the performance of air purifying respirators to assist in testing, certifying, & problem investigation.	83	85					D	c	a			EdyyyD EdyyyD EdyyyD EdyyyD EdyyyD EdyyyD EdyyyD
14. Respirator Research Studies for Chemical Systems Lab, D.O.D. (Myers 923-4361)(100/VLI-Dyy-865) Support the Army in conducting field leak evaluation trials on the MI7AI protective mask.	83	83					D	c	a			EdyyyD EdyyyD EdyyyD EdyyyD EdyyyD EdyyyD

Control Systems

The control of occupational hazard is the logical sequel to the recognition and evaluation of these hazards. Effective control of occupational hazards usually requires a system of measures which interact to provide adequate protection under any foreseeable condition. Engineering control and work practices are the essential mainstays of an effective control system. Personal protection is used as a backup to these measures, and workplace monitoring provides feedback which indicates the effectiveness of this system of controls and allows appropriate corrections to be made.

Since NIOSH is neither a regulator nor an owner of manufacturing plants, the Institute's efforts toward controlling workplace hazards must be indirect. This effect may be achieved through workplace intervenors such as OSHA inspectors, insurance loss-control representatives, State health programs, or other health professionals both in industry and in unions. As a rule these health professionals are trained more in the recognition of hazards and less in their control. There is a general lack of published information concerning appropriate control systems available to them (especially in or relating to smaller firms).

In order to address the above needs, NIOSH has conducted a series of control technology assessments, the final reports of which are intended for use by the intervenors for identifying control options. Major areas covered or touched on to date include parts of chemical processing technology, nonferrous metals production, manufacturing processes such as tire building and spray painting, service industries such as dry cleaning, and control techniques such as air recirculation and push-pull local exhaust ventilation. DBBS has, in conjunction with DPSE, helped evaluate the work practices and motivational aspects in several of these studies. In addition to the control technology assessments, DPSE has initiated a control research program that will develop controls for those areas determined to need improvement.

The end product of the control technology assessment studies is a final report, which is intended to be used by intervenors (such as those listed above) for identifying control options in the workplace. In FY 1982, NIOSH began an ongoing dialogue with the loss-control portion of the insurance industry in order to ensure that our research effectively addresses the needs of these intervenors.

In addition to addressing the needs of intervenors in existing industries or processes, NIOSH also has studied control technology for emerging industries or technologies in order to document appropriate controls for inclusion in the design stage. Also, DPSE and DTMD have worked to promote an awareness of the need for hazard controls in engineering curricula.

Major research areas over the next 3 years will include chemical processing unit operations, dust control in unit operations with solid, dusty materials, unit processes used in general manufacturing, and important emerging technologies. These research areas will build on past work and will compile information together in a systematic treatment for use by workplace intervenors.

By 1985, improved monitoring technology should routinely provide workers exposure measurements taken on work environments directly related to them. Engineers should begin to design workplace controls into original equipment. The textile and primary metals industries are now redesigning their physical plants, making this an opportune time to design out health risks.

By 1986, NIOSH will develop new push-pull ventilation design guidelines which will be part of recognized engineering manuals. The push-pull techniques provide superior emission control and reduce operating costs. By placing the results of this research in appropriate design manuals, engineers will utilize the new developments, and several of the Ten Leading Work-Related Health Problems will be controlled.

Division of Physical Sciences and Engineering

The DPSE program is comprised of control technology assessments and control research and development.

1. Control technology assessments will continue, as discussed above. The information generated by these studies will be organized by commonly encountered processes or operations. Some effort will be directed toward observing poorly controlled plants in order to better understand the factors (technology, financial, awareness of control options, motivation to use available controls) which are allowing these exposures to continue. Studies will continue to be coordinated with DSHEFS and DRDS where appropriate, as will work on the motivation and work practice areas with DBBS.

2. DPSE and DTMD will continue to promote the development and inclusion of hazard control technology concepts into engineering curricula and training for graduate engineers.

3. Control monitoring instruments and techniques can provide information as to the operational status of control systems, providing warnings and corrective actions in the case of control failure or malfunction. Monitoring systems can be an integral part of the control system and in many cases can be utilized to obtain long-term worker exposure data. The DPSE control program is developing application and operation criteria for such instrumentation and thereby providing the impetus for instrument and system development.

Engineering control research projects are performed to provide design and operational criteria for effective control techniques. These projects are of a relatively short-term nature and are based on inputs from control technology assessments, HHEs, OSHA, labor, and industry. The projects are conducted in the laboratory and the field.

Efforts are made to demonstrate the criteria in the plant environment. Small demonstration projects are conducted to show both technical and economic feasibility.

The ultimate goal of this effort is to provide effective control techniques that can be used both to solve existing problems and to be incorporated into new process design and into machinery and plant construction.

Division of Biomedical and Behavioral Science

DBBS research in control systems seeks to show how behavioral/motivational/ergonomic (job design) approaches can augment engineering schemes in enhancing the level of OSH. Recognizing how technical feasibility and cost considerations can limit industry's adoption of preferred engineering control measures, these add-on techniques command greater attention. DBBS work in this area has taken two forms:

One is the use of demonstration/intervention studies where the utility of behavioral/motivation principles for controlling workplace hazards can be evaluated. In this regard, instituting a training-reinforcement program for gaining worker compliance with certain work practices and housekeeping procedures in laminated plastics-manufacturing plants resulted in a 50 percent reduction in their exposure to a known toxic substance, styrene, a hardening agent used in the production process. This was reported in FY 1982, and the nature of this study, involving interactions among behavioral scientists, industrial hygienists, and chemical engineers, has created a keener interest in work practices ideas for hazard control throughout NIOSH. Followup work to ascertain the maintainability of these work procedures as established at the original target sites is planned as a joint DPSE/DBBS effort in FYs 1983 and 1984, as are expanded investigations of the value of work practice approaches in other laminated plastics-manufacturing operations (e.g., boat-building).

The second type of activity has been to furnish ergonomics consultative inputs to the DPSE program in environmental control technology assessment. In FYs 1981 and 1982, DBBS ergonomics specialists took part in three worksite studies where ventilation systems for limiting worker exposure to chromic acid mist in electroplating operations was under study by DPSE engineers. Ergonomics outputs here included aspects of worker awareness of hazards (training, use/availability of personal protective equipment), work station and job task features which could moderate or intensify the exposure hazards (workplace location regarding exposure source, feedback devices to indicate control systems efficiency) and management policies and practices with respect to worker safety and health matters. These results are incorporated in an overall report on control technology assessment in electroplating operations being prepared by DPSE. In FY 1983, further consultative work of this kind is envisioned for DPSE-planned assessments of mercury-using industries and for dry chemical-bagging operations.

Within DBBS a number of different approaches are underway to address the toxicology of substitute materials and include those described under the sections on: (1) Cancer, e.g., silica sand substitutes and various foundry sand-mold binders, and (2) Reproductive Effects, e.g., structure activity relationships of the class of chemicals known as glycol ethers. Additionally, in the area of Cancer, behavioral modification methods will be evaluated to control the carcinogenic exposures of roofing workers. Future studies (see the section on Dermatologic Disorders) will assess the effectiveness of protective clothing in preventing percutaneous absorption of chemicals with various potential toxicologic effects.

Division of Safety Research

The DSR control systems program includes several projects that are aimed at developing or evaluating methods for controlling the risk of recognized hazards. Methods are being developed to reduce the risk of concrete building collapses during their construction. Methods for actuating and safeguarding press brakes and mechanical power presses are being studied to assess the risk factors associated with selected techniques. Finally, methods for reducing biomechanical stress associated with pushing, pulling, and carrying tasks are being experimentally investigated.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY		PLANNED COMPLETION				P M F			RESOURCES		
	I	C	1Q	2Q	3Q	4Q	G	H	D	PY	NPF	TF
											O	C
10. Control Monitoring of Workplace Atmospheres (R. Hughes, 684-4266)(100/VQX-Ejn-466)(100/VQX-Ehj-464) (1.2/5/40) Develop methods and criteria for effective engineering monitoring of workplace atmospheres.	83	84					E	c	a			BdPjhe BdPjhe BdPjhe BdPjhe BdPjhe BdPjhe BdPjhe

Other Personal Protective Equipment

There are a number of multifaceted approaches to injury prevention in the workplace. Included among the varied approaches to injury prevention in the workplace are workplace design, engineering controls, behavior modification, training, and personal protective equipment (PPE). It has often been cited that, with the increasingly tightening economic conditions, the use of PPE as an alternative to more expensive engineering controls will be an option exercised by more and more employers. PPE used commonly in workplaces include respirators, head protection (hard hats), eye protection (safety glasses), face protection (face shields), hearing protection (earplugs), foot protection (safety shoes), hand protection (protective gloves), motion restraints (safety belts), and protective clothing in various combinations. Due to resource constraints, the Institute has redirected its efforts and is now concentrating on respirator research, respirator testing and certification, chemical protective clothing (CPC), and hearing protection.

With regard to CPC, the States' Supplemental Data System (SDS) specifically notes chemical exposure as a causal factor in nearly half of the cases. Also, NIOSH and others have demonstrated that commercially available protective clothing allows many chemicals to permeate through in a very short time. Since this exposure would not be readily detectable by the user, exposure to carcinogens and other harmful materials could frequently occur.

Three-year goals in the area of PPE are to:

1. Evaluate the industrial need and use of chemical protective clothing (CPC).
2. Make existing permeation data available and encourage additional evaluations and development of predictive models.
3. Encourage the development and standardization of product evaluation methods.

Division of Safety Research

Activities within DSR have included work to establish test criteria and procedures designed to evaluate the performance of PPE. Such test criteria were designed to ensure that certain critical parameters characterizing the device perform in a reliable manner to provide the wearer with the protection needed. Tests were conducted on a number of protective devices on the market, including firefighters' helmets, miners' safety caps, linemen's rubber insulating gloves, women's safety-toe footwear, and flexible-fitting goggles. These tests, based on the American National Standards Institute's standards, also addressed possible improvements in test systems and were published as technical reports.

Due to resource constraints, DSR has redirected its efforts on PPE and is now concentrating on respirator research and certification, and CPC.

In response to the national concern regarding the exposure of workers in industry and chemical waste dump cleanup operations, the Division has initiated a program designed to evaluate CPC. With initial emphasis on glove material, the program would establish a standard permeation test designed to evaluate the permeability of various protective clothing materials by various hazardous chemicals. Such permeability tests could subsequently be combined with appropriate physical test methods such as abrasion, stretching, etc., and other chemical tests such as penetration, degradation, and product reuse, to determine the relative reliability of the protective clothing material to withstand the rigors and environments of actual use and still afford protection to the wearer.

Division of Biomedical and Behavioral Science

DBBS research on cutaneous effects, vibration, bioacoustics, and cold stress includes evaluation of PPE. Studies planned for FY 1983 include:

1. Research in percutaneous absorption, which is expected to facilitate early identification of cutaneous hazards and to provide support for control technologies and protective clothing.
2. Completion of the validation of a new, inexpensive method with workplace applicability for measuring the effectiveness of hearing-protection equipment, begin evaluation of problems of protection for impulse noise, and prepare a compendium of hearing protectors and a guide to their selection.

Sampling/Analysis

This program provides sampling consultation and analytical support to field research activities within NIOSH. Information is provided for the data base used by industrial hygienists and engineers to make decisions on hazard potential of workplace exposure, the association of exposure with disease, and the effectiveness of engineering control systems.

This program also provides support for MSHA by testing and certifying coal mine dust personal sampler units (CMDPSU) and by conducting research to improve existing regulations. The goal of the CMDPSU program is to ensure standardized coal mine dust atmospheric measurements under the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173).

Three-year objectives for this program area are:

1. By the end of FY 1983, to develop a manual of standard operating procedures for the prioritization, collection, handling, shipping, and analysis of samples to ensure more cost effective utilization of diminished resources.
2. During the period FY 1983 to FY 1986, to maintain the proficiency of the professional staff and its ability to perform state-of-the-art analytical measurements through training of personnel and updating of the instrumental capabilities.
3. In support of field activities, to provide an average of 20 method modifications or developments over the 3-year period. We would project that the following research areas will require substantial effort in this regard: diesel emissions in mines, welding and brazing, hazardous waste, amines, substituted PNAs, plastic decomposition products, and energy studies.
4. Continue over the 3-year period our efforts to contain costs while maintaining our current high level of quality assurance.
5. Revise and update the performance standards contained in 30 CFR 74 to improve the quality of certified coal mine dust personal sampler units (CMDPSU) and to advance the state of CMDPSU technology.
6. Continue research on improving tests used in the CMDPSU certification program.

Division of Physical Sciences and Engineering

The overall objective of the analytical support function is to provide the other research divisions of the Institute with timely and accurate results. To that end, we will continue to use the mechanisms of contracts for both routine and specialized analyses, and in-house capabilities for non-routine analyses and short-term methods development. We already have begun a cost-saving program by decreasing the workload on our routine sample analysis contract and embarking on a program of sample prioritization within surveys. We expect these trends to continue for the foreseeable future. However, the number of samples that will be analyzed will depend upon the level of activity in the research divisions. It is expected that an increase in the complexity of the samples combined with the continuing decrease in the use of contract effort will result in an increase in turn-around time.

In FY 1982, DPSE analyzed about 17,200 samples for a total of some 42,000 analyses. Of these, approximately 4,500 samples were done in-house and 12,700 by contractors. In addition, 18 methods were developed on a short-term turn-around basis.

Division of Biomedical and Behavioral Science

DBBS provides clinical and biochemical analytical support services for field studies and in-house research programs. Included in this activity are the analyses of urine, blood, tissue, and breath samples for the quantitation and characterization of worker and experimental animal exposures to industrial chemicals. In addition, service support is available for the physical and chemical characterization (sizing and analysis) of particulate materials, be they individual particles or fibers, bulk samples, or from biological specimens or an environment.

Division of Safety Research

The Testing and Certification Branch of DSR operates the MSHA/NIOSH coal mine dust personal sampler unit testing and certification program, conducts complaint and laboratory investigations, and conducts a limited research evaluation program. The limited research activity involves evaluation and validation of new performance methods and tests proposed by others. In addition, work is underway to modify the current joint MSHA/NIOSH certification regulation, 30 CFR 74, to reflect performance criteria rather than equipment specifications.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	PLANNED COMPLETION				O C N	P M F R E U G H D	PY	RESOURCES			
		I	C	1Q	2Q				3Q	4Q	NPF	TF
											\$1000	\$1000
*****SAMPLING/ANALYSIS*****										N		
										N		
										N		
DIVISION OF BIOMEDICAL AND BEHAVIORAL SCIENCE										A N		
										A N		
1. Particulate and Tissue Analysis Support (L. Stettler, 684-8337) (100/VOT-Ngn-387) Provide physical and chemical analysis of particulates to NIOSH research programs.	83	C					N c a			AdgnyN AdgnyN AdgnyN AdgnyN AdgnyN AdgnyN		
DIVISION OF PHYSICAL SCIENCES AND ENGINEERING										B N		
										B N		
2. Quality Assurance of Analytical Services (D. Smith 684-4217) (VQK-Vyh-420) (1.0/28.9/57.2)(100/VQK-Nnu-420) Insure the quality of all data generated by in-house and contract analytical groups.	82	C					N c a			BbhnyN BbhnyN BbhnyN BbhnyN BbhnyN		
3. Measurement Support Services (D. Dollberg 684-4262) (VQK-Nyy-422) (2.6/1432/1518) (100/VQK-Nnu-422) Provide contractual analytical support to Institute needs	81	84					N b a			BbyyyN BbyyyN BbyyyN BbyyyN		
4. Analytical Support to Institute Research (G.Choudhary 684-4217) (VQK-Nhy-423)(2.0/40.296.8)(100/VQK-Nui-423) Provide analytical chemistry support to Institute research programs.	82	C					N c a			BbhnyN BbhnyN BbhnyN BbhnyN BbhnyN BbhnyN		
5. Mining, Safety and Respiratory Diseases Analytical Support (M. Hawkins 684-4220) (VQK-Nin-426)(3.3/117.0/210.4)(98/VQK/Ndi/426) Provide analytical chemistry support.	82	C					N b a			BbniyN BbniyN BbniyN BbniyN BbniyN		
6. Support for the DBBS Diesel Exhaust/Coal Dust Study (D. D. Dollberg, 684-4262) (100/VQU-Nmi-440;100/VQU-Nmi-442; 100/VQX-Nim-467;2/VQK-Ndi-426) Provide analytical services and methods development support.	80	83					N c a			BbNPiN BbNPiN BbNPiN BbNPiN BbNPiN		

Instrument/Methods Development

Monitoring of the workplace environment represents one of the fundamental principles in the conduct of a successful preventive health program in the workplace. Of the thousands of chemicals being used by industry only 25 percent have established sampling and analytical methods that are validated at the recognized safe occupational exposure level. Now technology continues to be used to develop new devices and techniques that need to be investigated and evaluated before they are introduced into the industrial hygiene community. This program conducts research to develop new sampling and analytical methods as well as direct reading instruments for use in measuring potential contaminants in the workplace. The research has no direct role in intervention, but results in a tool that can be used by others to initiate intervention.

By 1986, NIOSH will complete its performance criteria for aerosol sampling. Accurate sampling data are important if risk factors are to be determined in mining, textiles, and primary metals industries. Diffusional sampling devices are finding increased usage in monitoring chemicals that are responsible for the Ten Leading Causes of Work-Related Health Problems as is evidenced by the numbers of papers appearing in scientific journals, and the peer review of articles by NIOSH scientists for journal editors. One point stands out: There are insufficient performance criteria for use of these devices that will affect the accuracy of the results. Out-year objectives will establish performance criteria for samplers based on new technology.

By 1986, NIOSH will have developed improved procedures for sampling and analyzing work environments, such as illegal chemical dump sites, foundries, coke ovens, and coal conversion plants, which contain complex mixtures of toxic and carcinogenic organic compounds. Such procedures will enable NIOSH to characterize worker exposures in such workplaces more completely and more rapidly.

By 1986, NIOSH will have developed eight new species-specific sampling and analytical methods to identify and monitor exposures in metal mines, in primary metals industries, and in inorganic pigment industries.

By 1986, NIOSH will publish performance specifications and test protocols for new passive monitors for users and manufacturers. The use of these criteria will increase the reliability of these samplers before they become commercially available.

To ensure standardized coal mine dust atmospheric measurements under the Federal Coal Mine Health and Safety Act of 1969, NIOSH established a certification program for personal samplers. The 3-year objective is to continue research on DOL's Niosh Planning Group's first priority item for MSHA's request for certification of new types of coal mine dust sampling and/or analysis equipment. (The current joint MSHA/NIOSH certification regulations, 30 CFR 74, will be modified in FYs 1984-1985.)

Division of Physical Sciences and Engineering

During FY 1982 this research program developed sampling and analytical methods for total isocyanates, four organotin compounds, chlorine dioxide, iodine, acrolein, vanadium pentoxide, and copper fumes, and validated a method for lead sulfide. Performance specifications, testing protocol, and evaluation criteria were developed for passive monitors. The collaborative testing of two quartz methods, one utilizing infrared spectroscopy and the other X-ray diffraction, were completed. This testing was a joint project with BOM. DPSE develops and evaluates sampling and analytical methods in support of NIOSH field studies, criteria documents, and other Federal agencies (i.e., OSHA, MSHA, BOM, etc.). DPSE also maintains an awareness of emerging and state-of-the-art analytical techniques and instrumentation. This awareness has introduced liquid chromatography and ion chromatography into the industrial hygiene analytical chemistry laboratory to fill gaps in the analytical methodology. With utilization of several classes of computers and laboratory automation, DPSE has increased productivity, provided better data management, increased its quality control, and improved analytical precision.

The Division develops and evaluates field and laboratory instrumentation useful for industrial hygiene research and applications. The results of this research include a real-time, direct-reading, aerodynamic particle sizer and the application of a high-adsorbant microcellular material (poroplastic) which can replace impinger sampling methods with adsorbent tube-type sampling method. Still in development are an in-respirator chemical vapor monitor and an intelligent portable direct-reading gas chromatograph. The direct-reading systems under development range from simple color-change devices to sophisticated yet small computer-controlled instruments. Theoretical studies that look at the response of diffusional samplers to varying gas concentrations and at particle dynamics of aerosols entering a sampler are in progress. These studies are an important aspect of understanding sampling parameters and sample accuracy.

Any sampling and analytical program requires a quality assurance component. The Division has its own QA/QC program and also operates a voluntary Proficiency Analytical Testing (PAT) program composed of 375 private and government industrial hygiene analytical laboratories. The program permits us to measure the relative quality of our research and the environmental data that are frequently used.

Division of Biomedical and Behavioral Science

Pharmacokinetics or toxicokinetics, the movement of chemicals in biological systems whereby a time-course of the chemical's absorption, distribution, biotransformation, and elimination can be plotted, is applied by DBBS to the development of methods for evaluating a worker's exposure to workplace chemicals. Such biological monitoring methods are developed in support of the Division's research investigations and for field studies. In FY 1982 biological monitoring methods were published for the assessment of exposure to benzidine-azo dyes, paint spray solvents, styrene, MBOCA, cresols, and pentachlorophenol. Methods to monitor exposures to formaldehyde and glycol ethers are in progress and will continue in FY 1983.

Instrumentation is developed for specific needs and when not commercially available for the assessment of physiological effects such as those induced by exposure to physical agents. FY 1982 accomplishments included development of an analyzer for determining the absorbed dose of microwaves in experimental animals, a device for the measurement of vibration characteristics of materials used for protective gloves, and instrumentation for the calibration and monitoring of radiofrequency microwave radiation.

DISSEMINATE OCCUPATIONAL SAFETY AND HEALTH FINDINGS AND RECOMMENDATIONS

One of NIOSH's program goals is to disseminate findings and recommendations on OSH problems by developing scientific policy for the prevention of occupational hazards. NIOSH scientists disseminate findings by recommending governmental actions (recommend standards), informing the public of identified problems and their solutions (research reports), and providing service and benefits (HHEs). Transferring information into private and public organizations through education, conferences, and joint action (government, management, and labor) is an integral link in the disseminating process so as to ensure prevention of identified problems on a much broader front than NIOSH has resources to accomplish. Priorities for dissemination are given to NIOSH's Ten Leading Work-Related Health Problems.

The following long-range objectives for the Nation are considered under the program goal of dissemination:

1. By 1985, 50 percent of all employers with more than 500 employees should have an approved plan of hazard control for all new processes, equipment, and installations, and, by 1990, all such employers should have such a plan of hazard control.
2. By 1985, all workers should be routinely informed of lifestyle behaviors and health factors that interact with factors in the work environment to increase risks of occupational illness and injuries, and should receive routine notification in a timely manner of all health examinations or personal exposure measurements taken on work environments directly related to them.
3. By 1990, 25 percent of workers should be able, prior to employment, to state the nature of their OSH risks and their potential consequences, as well as to be informed of changes in these risks while employed.
4. By 1990, all industrial managers should be fully informed about the importance of and methods for controlling human exposure to the important toxic agents in their work environments.
5. By 1990, at least 70 percent of primary health care providers should routinely elicit OSH exposures as part of a patient's history and should know how to interpret the information to patients in an understandable manner.
6. By 1990, at least 70 percent of all graduate engineers should be skilled in the design of plants and processes that incorporate OSH control technologies.
7. By 1990, generic standards and other forms of technology transfer should be established, where possible, for standardized employer attention to medical monitoring requirements and major common hazard problems such as chronic lung, neurologic, carcinogenic, mutagenic, and teratogenic.

A STRATEGY FOR DISSEMINATING KNOWLEDGE

<u>Prevention Measures</u>	<u>NIOSH Products</u>	<u>Intended Audiences</u>
Information and Education	Criteria Documents Scientific Publications Training Materials Curriculum Development Current Intelligence Bulletins Articles in CDC's MMWR Technical Reports Conferences Registry of Toxic Effects of Chemical Substances Press Releases	Regulatory Agencies Academia OSH Professionals Industry and Labor Public Health Community Media
Technical Assistance and Cooperation	Scientific Publications Training Materials Curriculum Development Surveillance Reports HHE Reports	Academia OSH Professionals Industry and Labor Public Health Community
Service Delivery and Grants to the States	Curriculum Development Training Materials Training Grants Research Grants	Academia OSH Professionals Public Health Community
Economic and Other Incentives	Criteria Documents Training Materials Conferences	Regulatory Agencies Academia Industry and Labor Public Health Community
Research and Surveillance	Worker Bulletins Criteria Documents Scientific Publications Surveillance Reports Articles in CDC's MMWR Technical Reports	OSH Professionals Regulatory Agencies Academia Public Health Community Media

Information Dissemination/Document Development

This is a continuing program area for NIOSH, and all the O/Ds are involved. It is necessitated by the Institute's statutory mandates to conduct research, evaluate occupational hazards, and develop criteria that can serve as a basis for OSHA's and MSHA's regulatory activities. Inherent in these functions is the need to disseminate findings, conclusions, and recommendations. These need to be made available to workers directly and to others who have responsibilities for improving OSH. Projects in this program area will focus on (1) ensuring scientific and technical quality, (2) improving methods for setting priorities, (3) expanding the audience by diversifying the types and formats of informational products, and (4) developing more efficient dissemination strategies. The results of the various Institutes research efforts, from all the research divisions, are made available to the general and professional publics through publication in appropriate professional journals and government reports, and in public presentations. These output documents also include the reports resulting from the HHE programs maintained by both DSHEFS and DRDS.

Division of Standards Development and Technology Transfer

In developing recommended standards under the OSHA and MSHA mandates, DSDTT draws upon the breadth of NIOSH expertise. DSDTT has the NIOSH Clearinghouse of the world's scientific and technical literature to draw upon in the development of Institute documents and recommendations. NIOSH scientists supported by DSDTT staff critically evaluate scientific data and produce recommendations for OSH standards and good practices.

Recommendations for control of occupational hazards require current awareness of emerging scientific, technical, and policy information, and literature search and assessment of data in order to apprise the OSH community of fast-breaking problems and to disseminate recommendations.

DSDTT will maintain the Institute's current awareness information acquisition and storage systems, including the computer data bases and the libraries. Information will be disseminated through publications (e.g., criteria documents, technical reports, HHE summaries and reports), exhibits, and direct responses to requests for technical information and computer searches. Planned changes in specific services include the following:

1. Based on the results of a proposed OMB-approved user survey, the Editorial Review Board of the Registry of Toxic Effects of Chemical Substances (RTECS) will suggest new formats so that RTECS can be used by a wider audience.
 2. Wider accessibility to the Institute's Technical Information Center (NIOSHTIC) will be encouraged through licenses with data-base vendors via the National Technical Information Service, U.S. Department of Commerce.
 3. Information dissemination strategies will be reviewed to achieve greater efficiencies.
 4. The Document Inventory of Directory System (DIDS) will be modified to include legislative and policy statements.
 5. A unified procurement policy for all the Institute's libraries will be developed.
- DSDTT proposes to improve development of documents by a combination of organizational and programmatic changes:

DSDTT proposes to improve development of documents by a combination of organizational and programmatic changes:

1. DSDTT's 3-year objective is to merge the Division's health and safety document development processes. DSDTT will merge all document production under one branch and simultaneously create sections of the branch in Morgantown and Cincinnati. The Morgantown section will emphasize documents relating to safety and mining. Although these documents may not conform to a rigid format, they will be comprehensive assessments of occupational hazards with recommended methods for control. These documents will be usable by OSHA and MSHA for regulatory activities and by the workers and safety and health professionals who have responsibilities involving workplace hazard control. The Division also will produce other types of publications and reports that convey important scientific and technical information in formats designed specifically for an intended audience.

2. DSDTT will develop a hazardous waste comprehensive guidance manual as part of the Superfund National Contingency Plan. DSDTT produces occupational health guidelines for use by occupational health practitioners. Using the procedures and decision logics developed under the NIOSH/OSHA Standards Completion Program, the project will develop guidelines annually for 20 new subjects and revisions for 20 existing subjects.

Division of Surveillance, Hazard Evaluations, and Field Studies

In FY 1982, DSHEFS continued with its efforts to actively disseminate the results of its field investigations to professionals in the OSH field and to appropriate employers and employees. Such efforts included (1) submission of over 300 reports on completed industrial hygiene and medical studies (i.e., industrial plant HHE and IWS reports) to NTIS; (2) publication of one NIOSH technical report, with six in press; (3) publication of 63 articles in technical journals, with 40 approved for publication; (4) publication of six articles in CDC's MMWR; (5) publication of two HHE Program Summaries (summarizing the results of approximately 80 recently completed HHEs); (6) publication of three articles in industry/labor trade journals describing hazards found and means for reducing the hazards; (7) providing 200 reports to requesters of information regarding potentially hazardous industries or agents identified in NOHS-I; and (8) giving 55 presentations pertaining to the results of DSHEFS studies before technical, academic, and professional groups.

In FY 1983 (and subsequent years), the DSHEFS dissemination program should continue at about the same level of output or increase slightly. In addition, subject to the lifting of the moratorium on new publication series, DSHEFS will begin publishing a new series of Surveillance Reports containing information on high-risk industries and occupations, four to six of which will be published each year. Each will be directed to a specific target audience (government, industry, labor, academic decision makers) depending on the nature of the hazard/health effects identified.

Division of Safety Research

DSR prepares information for dissemination to employers and workers in specific industries, industry and labor organizations, OSH professionals, and organizations such as government regulatory, research, and service agencies.

During FY 1982, DSR continued development of comprehensive safety recommendations for specific industries with higher than average worker injury and illness rates. These documents focus on recommended safe work practices for direct use in the field by industry. Documents addressing hazards encountered in the precast concrete products industry, the land-based oil and gas well drilling industry, the fabricated structural metal products industry, and the grain elevators and feed mills industry are nearing completion in FY 1983. Additionally, publications of findings from studies of hazardous energy control methods during maintenance and servicing, interlock devices and applications, fall protection during construction/erection, and PPE selection and use for hazardous materials control are planned for FY 1983.

A NIOSH/DSR-sponsored study of excavation, trenching, and shoring practices yielded results to be published jointly with the National Bureau of Standards (NBS) in FY 1983. The document provides the framework and rationale for a revised Federal construction standard on excavations.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY I C	PLANNED COMPLETION				P M F R E U O C N G H D	PY	RESOURCES	
		1Q	2Q	3Q	4Q			NPF	TF
								\$1000	\$1000
*****INFORMATION DISSEMINATION/DOCUMENT DEVELOPMENT*****									H
DIVISION OF SURVEILLANCE, HAZARD EVALUATIONS AND FIELD STUDIES									H
1. The Material Locator System for Unions (Herb Venable - 513-684-2706) (VMO-Hyy-630)(1.0/32.0/50.0)(100/VMO-Hyy-630) Project Objective: To compile and automate data on potential exposures received from unions.	81	C				H c a			D H D H DcyyyH DcyyyH DcyyyH DcyyyH DcyyyH DcyyyH DcyyyH E H E H
DIVISION OF SAFETY RESEARCH									
2. Ongoing Safety Standards and Document Development Activities (Pettit 923-4574)(VEc-HyN-842)(7.5/245.6/487.0) (100/VLF-HyN-842) Develop workplace safety recommendations based upon scientific data	82	C				H b a			EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH
3. Effect of Safety Tasks on Worker Injuries (Simons 923-4574)(VEc-Hyy-805)(2.0/30.0/94.4)(100/VLF-Hyy-805) To identify and correlate tasks performed by occupational health and safety professionals with worker injury rates.	82	84				H c a			EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH
4. Relationship of Worker Casualties to Fire Protection Strategies (Bochnak 923-4574)(VEc-Hyy-848)(100/VLF-Hyy-848) Determine which fire protection strategies provide the greatest degree of worker protection.	81	83				H b a			EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH
5. General Industries Applications of Mine Safety Technologies (Stanevich 923-4574)(VEc-Hyy-804)(1.0/100.0/132.2) (100/VLF-Hyy-804) Apply effective mining safety technologies to the construction industry in order to prevent construction worker fatalities/injuries.	82	84				H b a			EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH EcyNyH

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	PLANNED COMPLETION				O C N	P M F R E U G H D	PY	RESOURCES					
		I	C	1Q	2Q				3Q	4Q			NPF	TF
													\$1000	\$1000
6. Effectiveness of Hazardous Energy Control Methods (Cohen 923-4574)(100/VLF-Hiu-866) Evaluate effectiveness of recommended hazardous energy control methods.	82	84					H c y					EciuyH EciuyH EciuyH EciuyH EciuyH EciuyH G H G H		
DIVISION OF STANDARDS DEVELOPMENT AND TECHNOLOGY TRANSFER														
7. Quantitative Risk Assessment - Mazzuckelli, L. - (513)684-8311 (VID-Hyy-089)(2.5/177.0/259.4)(VID-Hyy-085) The object of this project is to provide additional data to support recommended occupational health and safety standards.	70	C					H b a					GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH		
8. SCP Guidelines - Mackison, F., DSDTT - (301)443-3680 (VIA-Hyy-082)(4.3/54.9/194.9)(VID-Hyy-086) Complete development and publication of 40 Occupational Health Guidelines for Chemical Hazards (40 inhouse).	70	C					H c a					GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH		
9. Criteria Document Development - Mazzuckelli, L. - (513)684-8311 (VID-Hyy-089)(22.3/221.2/983.9)(VID-Hyy-089) Develop Institute policy documents that provide health and safety recommendations to OSHA, MSHA and the occupational safety and health community.	70	C					H c a					GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH GbyyyH		
10. NIOSH Information Systems - Lewis, R., DSDTT - (513)684-8317 (VII-Byy-087)(6.5/52.2/261.4)(100/VSL-Hyy-095) Provides for the development of information systems to support the OSH data needs of the Technical Information Branch, DSDTT, other NIOSH Divisions, and the public.	70	C					H b a					GbyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH		
11. Registry of Toxic Effects of Chemical Substances - Tatken, R., DSDTT - (513)684-8317 (VII-Byy-087)(2.3/406.0/480.0)(VSL-Hyy-096) Provides for the collection, verification and input of toxicological data in a computerized file used to produce legislatively mandated publications.	70	C					H b a					GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH GdyyyH		

Work Force Development

The NIOSH mission established by the Occupational Safety and Health Act of 1970 is two-fold in scope: Section 20 of the Act mandates the NIOSH research function, and Section 21 mandates the training and education function. The Work Force Development program is designed to implement Section 21 of the Act by increasing the numbers and competence of the OSH work force.

NIOSH is set up primarily as a prevention-oriented research institute responsible for identifying OSH hazards, conducting research and field studies on these problems, and conveying the results to OSHA, MSHA, other Federal agencies, and the OSH professional community at large. Work force development activities are based on the premise that these results are of limited value unless they are actually applied to the protection of the worker. NIOSH as a research institute has two major objectives: To produce significant, valid information, and to get this information out to the workplace where it can be used to improve conditions and protect the worker. The latter objective is a primary one because the research, no matter how good, cannot be effective until translated into action programs. This NIOSH program provides the mechanism for NIOSH research to be brought to bear upon prevention, intervening before worker exposure occurs.

The Work Force Development program with its subactivities of technical training and education, curriculum development, manpower assessment, and educational resource development is an OSH hazard "prevention" program consistent with the DHHS agency-wide research-in-prevention initiative and, at the same time, carries out one of the two mandates of the NIOSH mission.

Beginning in FY 1983, the following objectives will be addressed and accomplished in the 3-year period ending September 30, 1986:

1. To develop an Occupational Health and Applied Industrial Hygiene Course for sanitarians and other State health department personnel.
2. To provide educational consultation and to deliver pilot training programs to 15 State health departments.
3. To present continuing education programs to 35,000 OSH practitioners via NIOSH direct training courses and the Educational Resource Centers.
4. To present vocational/industrial arts OSH train-the-trainer workshops for secondary school teachers in four State departments of education.
5. Under the cotton dust standard, to approve/re-approve applications from 100 training organizations for provision of pulmonary function testing training courses.
6. To develop three instructional programs on the problems related to the disposal of hazardous wastes: emergency spills, uncontrolled waste sites, and a supervisory train-the-trainer workshop.
7. To implement hazardous waste training-program delivery systems for 20 State/Regional agencies.
8. To provide academic programs in the core and allied OSH disciplines for 6,000 trainees through the ERC and small training-grant mechanisms.
9. To produce 2,000 graduates from NIOSH-supported OSH academic programs.
10. To complete the OSH Labor Market Survey of Supply/Demand Characteristics.
11. To incorporate OSH educational content into the engineering curriculum for four major colleges of engineering.
12. To incorporate OSH educational content into the business curriculum of four major colleges of business administration.

Division of Training and Manpower Development

Continuing Education--NIOSH conducts technical training courses for the Department, for other Federal, State, and local government agencies, and for the private sector including OSH practitioners in industry, management, and labor unions. Courses are provided to new NIOSH personnel for orientation and to existing staff member for maintenance of competence and career development.

In 1970, the Act established a tuition-free training program within NIOSH. Since 1973, the Institute's training program has been conducted on a reimbursable, self-sustaining basis. In FY 1974, the first year of reimbursable training, 50 courses were presented, 1,100 professionals were trained, and the Institute realized over a quarter of a million dollars in tuition fees. The number of trainees trained directly by NIOSH steadily increased until 1977 when mechanisms were developed with outside organizations to provide "indirect" training to meet the ever-increasing demand. The ERC grant program contributed a large part to the indirect training efforts. In FY 1982, the ERC programs, coupled with the Institute's own direct training program, trained over 10,000 OSH practitioners.

In FY 1982, special customized training courses were presented to the U.S. Navy, State of New Jersey Health Department, State of Arizona Health Department, MSHA Training Academy, and Case Western University. In addition, cooperative training programs were conducted for NIOSH staff; e.g., environmental epidemiology (DSHEFS), respiratory protection and quantitative fit testing (DBBS), and orientation on VDT workplace hazards for supervisory and clerical staff (presented jointly with DBBS). Visitors from several foreign governments were received and training mechanisms were discussed to accommodate international students in future NIOSH-sponsored courses. The vocational-industrial arts OSH training program was presented to vocational education teachers in six states--Ohio, California, Minnesota, Arizona, Florida, and New York.

In FY 1983, NIOSH again will offer a full schedule of short courses in industrial hygiene, occupational safety, industrial toxicology, occupational health nursing, and occupational medicine at the Cincinnati headquarters and in the field. Courses will be conducted by the direct mechanism, using DTMD faculty supported by the research divisions' staff, and by the indirect mechanisms including ERC continuing education courses. Special courses will be conducted for NIOSH personnel, including strategies and statistics for OSH studies. Specialized training to outside organizations will include State agencies, OSHA New Directions Grantees, labor unions, and the Federal sector, including MSHA, OSHA, and DHHS agencies. Training consultation to foreign governments and accommodation of foreign visitors in NIOSH courses will continue. The pulmonary function testing training course approval system will be maintained as required under the cotton dust standard. The vocational/industrial arts OSH training program will be expanded to other regions of the country through train-the-trainer sessions.

Curriculum Development--The outputs of most research organizations are, by their specific nature, aimed at or appeal to a limited audience. Furthermore, the reporting format is designed in a manner that meets the need for publication in technical journals. It is through the assimilation and correlation of facts and information produced through the Institute's research program that the OSH curriculum development activity custom designs programs to meet the needs of various disciplines at varying levels of complexity. A train-the-trainer program to introduce and sensitize science teachers to the hazards of their working environment has resulted in the training of over 100,000 secondary school teachers in 3 years at a cost of little more than one dollar (\$1.00) per trainee. Not only has this program been extremely cost beneficial but its impact has resulted in major curriculum changes in recently published high school science text. A series of audiovisual presentations on the problems of asbestos removal from school buildings was developed jointly with OSHA, EPA, and NCI. The series consisted of an overview of the problem, a program on personnel and medical monitoring, and a program on sample screening (Kupel-Kim Method). Over 1,000 copies of these programs were disseminated through NIOSH, EPA, and OSHA for loan in conduction contractor training sessions.

Several instructional modules were developed in FY 1982 that represent a direct relationship to NIOSH research output. Videotape programs were produced on the subjects of health hazards associated with spray painting, radiofrequency heaters and sealers, and VDTs. Nine video tapes have been produced based on presentations in the DBBS Seminar Series. A training manual entitled "Maintaining and Donning Self-Contained Breathing Apparatus" for use by firemen and other emergency workers has been completed. An occupational Safety and Health Simulation Module (ELCAB) was designed to give students an opportunity to apply problem recognition and analysis skills to realistic occupational activities via the classroom setting. The simulation was pilot tested in an Advanced Safety Management Class in a university setting.

The major thrust again this year will be the development of educational materials in conjunction with the NIOSH research divisions based on significant research outputs and/or special training needs for their personnel. The activities proposed represent translation of current high-priority Institute research projects into easily utilizable information for dissemination to broader audiences than the audience for which most research reports are traditionally designed. The impact of this plan should be such that the necessary changes will be made in hazardous workplace situations jointly by management and worker representatives to eliminate or reduce the potential of workers to injury and illness. Programs which will be continued in FY 1983 include the development of an instructional program on the problems related to the disposal of hazardous wastes, a program dealing with the problems associated with confined space entry, engineering control of hazards in the dry cleaning industry, OSH lecture materials for academic engineering courses, and the update and revision of the NIOSH Syllabus, "The Industrial Environment--Its Evaluation and Control."

Educational Resource Development--The OSH Act calls for an adequate supply of resources; i.e., qualified personnel and educational/informational programs to carry out the purposes of the Act. The educational resource development activity investigates and employs strategies and mechanisms to assess these resource requirements and continually evaluate current programs. Ongoing assessment of OSH professionals identifies trends toward and gaps between manpower needs and supply/demand. A primary use for this information to more effectively utilize Institute funding and expertise is to foster and support educational and training programs in the academic and non-Federal sectors.

Over the last 5 years, the Institute has conducted research investigations relating to manpower supply and demand. Since the early 1970s, NIOSH training grants have provided a progressively increasing pipeline of highly qualified graduates to serve as educators, researchers, or practitioners in the OSH field. Numerous other institutions received non-financial assistance from NIOSH to develop new educational programs. Since 1977 ERC outreach activities to new, emerging programs have been significantly increased. NIOSH has a continuing program of promoting the OSH field as a career choice to pre-baccalaureate students as well as to workers who are seeking early or mid-career change. Career brochures, academic program directories, continuing education schedules, and the like are distributed widely to support guidance counseling and recruitment efforts.

In FY 1983, the Institute will continue to administer and monitor all training grants, including the 14 ERCs. The OSH Labor Market Contract awarded in FY 1982 will be monitored and completed. The educational consultation and technical assistance to academic and similar institutions will continue both intramurally and through ERC outreach programs. Special consideration will be given to investigation of alternative funding sources for educational programs. The NIOSH OSH Career Guidance and Information Service also will continue. A symposium on occupational health nursing will be designed and conducted in joint sponsorship with NIOSH research divisions and ERC nursing programs. The efforts to impact key non-OSH professions and disciplines through their educational systems will continue with programs designed to influence schools of engineering and schools of business.

Division of Surveillance, Hazard Evaluations, and Field Studies

As discussed in DSHEFS's section under the Surveillance Program Area, the project on mortality surveillance of occupation and industry supports the Institute's efforts in assisting States to collect and code decedent employment history data. The Division's FY 1983 objectives are (1) to provide training to State health department personnel for industry and occupation (I/O) coding, and (2) to provide a deferral of coding costs for selected States.

Division of Physical Sciences and Engineering

The Division is establishing cooperative agreements with schools of engineering for purposes of curricula development. The curricula are to train engineering students in the control technology applicable to occupationally related illnesses and injuries. In FY 1982, five site visits to universities were conducted.

In FY 1983, additional contact will be developed with engineering schools and a teaching institute will be conducted to incorporate occupational safety and health materials into engineering curricula.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY I C	PLANNED COMPLETION				O C N G H D	P M F R E U PY	RESOURCES	
		1Q	2Q	3Q	4Q			NPF	TF
								\$1000	\$1000
*****WORK FORCE DEVELOPMENT*****									K
DIVISION OF TRAINING AND MANPOWER DEVELOPMENT									K
1. Continuing Education (E. Leininger 684-8228) (VUI-210-792) (9.9/106.0/403.0)(100/VUI-Kyy-766) Project Objective: To provide short term training programs to practicing occupational safety and health professionals.	71	C					K b a		H K H K HayyyK HayyyK HayyyK HayyyK HayyyK HayyyK
2. Curriculum Development (N.J. Berberich 684-8229) (VUH-211-782)(8.8/269/593)(100/VUH-Kyy-765) Project Objective: To design and develop educational materials, training course modules and new research technology teaching packages.	76	C					K b a		HbyyyK HbyyyK HbyyyK HbyyyK HbyyyK HbyyyK HbyyyK
3. Hazardous Waste Training Program (N. J. Berberich* 684-8229) (VUH-211-782)(3/250/250) (100/VUH/Kuu-770) Project objective: To develop training courses for supervisory and non-supervisory personnel working in hazardous waste exposure situations.	82	C					K d c		HcuuuK HcuuuK HcuuuK HcuuuK HcuuuK HcuuuK HcuuuK
4. Educational Resource Development (T. Purcell 684-8240) (VUE-212-772)(5.5/5826/5992) (100/VUE-sXy-764) (100/VUE-Kyy-773) Project objective: To assess the need/supply/demand for Occupational safety and health personnel and to administer the Educational Resource Centers and Training Project Grants.	79	C					K n a		HcyyyyK HcyyyyK HcyyyyK HcyyyyK HcyyyyK HcyyyyK HcyyyyK

ADMINISTER INSTITUTE PROGRAMS

NIOSH's goal, in administering Institute programs, is to provide the methods for establishing and achieving the Institute's objectives. The administration program is an Institute-wide system for managing over 350 projects. These components--planning, execution, and evaluation--provide necessary financial and program information, systematically organized into significant and measurable program elements. Administering the NIOSH program in this manner produces a sense of total commitment to the highest principles of public stewardship. NIOSH's management system monitors three dimensions of accountability--resources (input), organization (who is accountable), and results (output).

Management principles used by NIOSH include long-term planning; management-by-objectives; program hierarchy; program evaluation and review techniques; planning, programing, and budgeting systems; project management; and control, feedback, and management-by-exception.

1. Long-Term Planning which entails establishing objectives and programs in excess of 1 year (generally), and focuses on an integrated approach of achieving goals, with flexibility to respond to opportunities in a changing environment.

2. Management-by-Objectives (MBO) for which a systematic approach depends on the following characteristics: (a) Managers at all levels set objectives, (b) supervisors and subordinates agree on work plans, (c) project plans are developed that identify the activities and organizational efforts necessary to achieve the objectives, and (d) objectives are set again for the future--and the process is repeated.

3. Program Hierarchy requires that each objective support the next higher objective and, conversely, that each upper objective is the guide for objectives at the next lower level.

4. Program Evaluation and Review Technique (PERT) is applied in NIOSH to define critical milestones and costs for each project for each quarter which, if slipped, reflect probable slips in the final report.

5. Planning, Programing, and Budgeting Systems (PPBS) is an approach to objective-oriented management. Budgeting in NIOSH focuses on person years and non-personnel funds. The sequence in establishing programs is to: (a) Decide what needs to be done, (b) consider alternative ways to do it, (c) establish the costs of alternatives, and (d) set the best alternatives.

6. Project Management Goals are the commitments to milestones and project completion, and must include: (a) the project organization chart (WHO), (b) the work-breakdown structure (WHAT), (c) the assignment of tasks (WHO does WHAT), (d) an account code number structure, (e) a project schedule (WHEN), (f) person years and cost estimates (HOW MUCH), (g) space, facilities, and equipment plan, and (h) a protocol (including safety considerations).

7. Control, Feedback, and Management-by-Exception: In NIOSH, milestones and costs are the indicators of action. A missed milestone leads to analysis of the variance from the plan; this feedback of analysis is then considered as an exception in the operation of the Institute and requires managerial attention.

In FY 1983, NIOSH will develop management innovations. Management techniques to be explored include automation, to set priorities based upon the "vital few problems vs. the trivial many" (Pareto's law), and Management-by-Results.

1. Automation: The human operator or clerk is less a part of the ongoing production process and more a first-level controller of that process. The automated process is nearly autonomous, carrying on functions for a significant time without direct human intervention.

2. Pareto's Law: In the 1890s an Italian economist, Vilfredo Pareto, observed that, "The significant items in a given group normally constitute a relatively small portion of the total." As an example, 67 percent of all injuries account for 6 percent of total injury costs--the "trivial many." More important, 33 percent of all injuries account for 94 percent of total injury costs--the "vital few."

3. Management-by-Results: Management-by-Results concentrates on doing the right things as opposed to doing things right. Management-by-Results must start with an analysis of the economic structure of the Institute. This analysis must include interactions both of resources with results of efforts and achievements, and of revenues and costs.

An enterprise cannot control resources or customers but can control costs. A cost analysis identifies cost centers, finds cost point in each, looks at the Institute as a cost stream, defines costs, and produces a cost diagnosis.

The following are the Institute's 3-year objectives in administering the Institute program:

1. NIOSH will develop an automated system which will enhance our current management efforts in the area of cost analysis, and which will yield a more sophisticated programmatic analysis of the Institute's outcome objectives.

2. NIOSH will explore and develop innovative management techniques which will further refine a more rational approach (purpose precedes action) to the decision-making process of the Institute.

Office of the Director

The Office of the Director (OD), in providing management leadership for the National Institute for Occupational Safety and Health, plans, directs, and coordinates the national program to develop and establish recommended occupational safety and health standards and to conduct research, training, technical assistance, and related activities to ensure safe and healthful working conditions for men and women.

Among the activities conducted by the OD are management of all NIOSH facilities, an Equal Employment Opportunity program, a Senior Advisory Staff, an information program, and a career development program involving long-term postgraduate training each year for about 1 percent of the total Institute staff.

Office of Administrative and Management Services

The OAMS provides administrative management information, advice, and guidance to the Institute as a whole and coordinates management activities in the areas of financial management, labor relations, personnel liaison, administrative services, grants, procurement, property, printing, internal safety, and automated data processing and word processing services for all NIOSH Offices/Divisions.

The NIOSH Management Manual, developed in this office with the assistance of other management personnel throughout the Institute, provides supervisors and program officials with the guidelines and instructions on both programmatic and administrative policies and procedures. These issuances are written in abbreviated form to supplement existing regulations and have been developed for internal management use.

Office of Extramural Coordination and Special Projects

OECSP has responsibility for managing the Institute's research grants program and regional activities, as well as international programs. Research grants are a means to enlist the resources of America's colleges, universities, and State and local governments in this effort. Nationally renowned scientists as well as investigators beginning their careers provide a diversity of expertise needed to develop a credible research base to address a myriad of OSH problems. Support to a wide variety of institutions ensures many sites of expertise, as well as many innovative approaches to solving these problems.

Thus the purpose of the research grants program is to encourage established researchers at universities and elsewhere to focus greater attention to OSH problems and to support the long-term integrity of the field by maintaining a stable science base that contributes to the development of the available pool of scientific and medical experts. In this regard, research programs at universities provide an additional opportunity for students to become familiar with OSH needs and issues that would not be derived from contract research conducted at non-university facilities.

The major program activity of the NIOSH regions involves the conduct of HHEs/TAs. The upsurge in hazard evaluations conducted by regional personnel parallels the overall Institute growth in this area. The regions currently conduct nearly half of the total NIOSH-conducted HHEs/TAs. Although the regions are concerned primarily with HHEs/TAs, their overall mission is much broader. The regional offices are the "eyes and ears" of the Institute, being in daily contact with industries, unions, individual workers, professional organizations, academic institutions, and the general public in an effort to provide information and technical assistance as needed. Thus, regional offices reflect the entire Institute program.

Within the area of international activities, OECSP coordinates overall Institute international programs and travel. Interest in the OSH field has grown dramatically throughout the world. Priorities in this regard for NIOSH include the development of bilateral programs with Finland and Sweden, among others, and furthering the cause of OSH through scientist-to-scientist exchanges with many countries, including a special concern for the needs of developing countries. OECSP played a major role in the development of a cooperative agreement with the World Health Organization in the area of OSH.

Office of Program Planning and Evaluation

OPPE plans and coordinates the development of the strategy and philosophy of the Institute regarding mission and objectives, conducts policy analyses, conducts or participates in special studies for program planning and evaluation, and conducts the necessary control functions to ensure operational compliance toward program objectives within the Institute. Program planning provides for control over resources and performance. OPPE has developed a project management system to evaluate variances in cost and technical performance as well as variances in project scheduling. Program review is tailored to monitor and analyze these variances. Program planning also is based on opportunities to intervene in economic, legal, and technical processes to prevent hazards in the workplace. Policy analysis provides baseline information on these processes and permits special assessment of possible intervention targets.

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	I	C	PLANNED COMPLETION				O	C	N	G	H	D	PY	RESOURCES	
				1Q	2Q	3Q	4Q								NPF	TF
															\$1000	\$1000
DIVISION OF SAFETY RESEARCH																
6. Testing and Certification Branch Management (Bollinger 923-4331)(VED-Wyy-852)(4.5/55.2/200.0) (100/VLI-Wyy-852) To supervise and support evaluation, certification and research of personal protective equipment and hazard measuring instruments.	72		C													E W E W EdyyyW EdyyyW EdyyyW EdyyyW EdyyyW EdyyyW EdyyyW EdyyyW EdyyyW
7. Safety Division Management (Oppold 923-4595)(VEE-Wyy-802)(8.0/200.0/457.5)(100/VLA-Wyy-802) To administer and direct the Division of Safety Research.	72		C													EEyyyW EEyyyW EEyyyW EEyyyW EEyyyW
OFFICE OF EXTRAMURAL COORDINATION AND SPECIAL PROJECTS																
8. Research and Demonstration Grants (McCracken, J. 443-4493) (VCE-Wyy-874)(8/0.068/0.323)(100/VCE-Wyy-874) (VCE-Xyy-875)(0/4.740/4.740)(100/VCE-Wyy-875) To develop grant programs, review applications and support and monitor research and demonstration grants in priority areas of scientific investigations.	71		C													F W F W FayyyW FayyyW FayyyW FayyyW FayyyW FayyyW FayyyW FayyyW FayyyW
9. International Activities (Bursenos, 443-3136) (VCA-Hyy-878)(1.5/0.378/0.426)(VCA-Wyy-878) To plan, coordinate, organize and manage NIOSH international activities in furtherance of NIOSH mission.	71		C													W f a FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW
10. Special Projects and Liaison Activities (Bridbord, 443-6437) (VCA-Wyy-873)(4/0.054/185.9)(VCA-Wyy-873) To provide ongoing support for critical Institute programs including seeking fiscal support for NIOSH programs.	76		C													W c a FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW
11. Office Management (Bridbord, 443-6437) (VCA-Wyy-872)(1/0.010/0.049)(VCA-Wyy-872) To provide direction and management of OECSP operations.	81		C													W c a FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW FFyyyW

PROJECT OBJECTIVE DESCRIPTION - MILESTONES - PROJECT OFFICER	FY	I	C	PLANNED COMPLETION				O	C	N	P	M	F	RESOURCES					
				1Q	2Q	3Q	4Q							G	H	D	PY	NPF	TF
																		\$1000	\$1000
18. TAPS and Common Services (Dorsey Boyd, 443-1518) To provide for charges from upper-level management.	83		C												JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW				
19. Standard Level User Charges (SLUC) (Dorsey Boyd, 443-1518) Payment charges to GSA for leased space.	83		C												JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW JbyyyW				
20. Management Systems Branch (Dr. Andrew T. Sumner, 236-3913) (VGP-Xyy-044) Support and improve ADP & WP capabilities and developed NIOSH-wide management information systems.	83		C												JcyyyW JcyyyW JcyyyW JcyyyW JcyyyW JcyyyW JcyyyW JcyyyW				
21. Procurement, Grants & Property Management (F. Dense, 443-6268) (VGJ-Xyy-039) Conduct Institute R&D procurement, grants, and property programs.	83		C												JdyyyW JdyyyW JdyyyW JdyyyW JdyyyW JdyyyW JdyyyW JdyyyW				
22. Office of the Director, OAMS (Larry W. Sparks, 236-2838) (VGA-Xyy-033) Provide management to all OAMS Branches.	83		C												JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW				
23. Internal Safety Program (Joseph Dixon, 684-8391) (VGA-Xyy-062) Coordinate internal safety program.	83		C												JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW JJyyyW				
OFFICE OF THE DIRECTOR														K	W				
24. Institute Policy (J. Donald Millar, M.D., 236-3751) (VAA-Wyy-003) To provide management and policy direction.	83		C												KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW				
25. Senior Advisory Staff (R. Yodaiken, M.D., 443-6377) (VAA-Wyy-028) Senior advisory staff to the Director.	83		C												KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW				
26. Equal Employment Opportunity (Margaret Bell, 443-3744) (VAA-Wyy-004) Administer a NIOSH-wide EEO program.	83		C												KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW KKyyyW				

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Centers for Disease Control

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