

THE PRESIDENT'S REPORT ON OCCUPATIONAL SAFETY AND HEALTH

Including Reports on Occupational Safety and Health

By the

United States Department of Labor (Page 1)

**Occupational Safety and
Health Review Commission (Page 95)**

**United States Department of
Health, Education, and Welfare (Page 111)**

TRANSMITTAL LETTER OF THE PRESIDENT

TO THE CONGRESS OF THE UNITED STATES:

I am submitting today the third President's report on the occupational safety and health activities of Federal Government carried out under the Occupational Safety and Health Act of 1970.

This report—covering programs of the Department of Labor, the Department of Health, Education, and Welfare, and the Occupational Safety and Health Review Commission for calendar year 1973—indicates significant progress toward the goal of a safe and healthful work environment for all Americans. It also points to the tasks ahead.

Government efforts in occupational safety and health began to show significant results in 1973. Increased public attention was focused on the problems of workplace hazards. This awareness was reflected in a number of areas—collective bargaining agreements, union and industry safety and health program activities, and industry association and journal articles, among others.

Another achievement in 1973 was the development of State occupational safety and health programs. The Department of Labor approved twenty new State plans marking important progress toward development of an integrated Federal-State partnership in occupational safety and health.

During 1973, the National Institute of Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare—which has responsibility for occupational safety and health research—significantly increased knowledge of toxic substances and other causes of unhealthy working environments. It also further developed detailed criteria for use by the Department of Labor in establishing standards governing the use of hazardous substances in the workplace.

This report contains results of the first full-year occupational injury and illness survey, covering 1972. This survey by the Bureau of Labor Statistics will become the base for the future measure of progress in reducing deaths, injuries, and illnesses caused by workplace conditions.

The 1973 report is another step in providing a record of our Government's efforts in behalf of a safe and healthful work environment for all Americans. All of us share this goal of improving the welfare of the working men and women of our country.

THE WHITE HOUSE

GERALD R. FORD

U. S. DEPARTMENT OF LABOR

OFFICE OF THE SECRETARY

WASHINGTON

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

I am pleased to submit to you the report of the Department of Labor on occupational safety and health for the year 1973. This document is required by section 26 of the Occupational Safety and Health Act of 1970 and is a complete account of the Department of Labor's activities in this vital area. Documented here are the achievements in the following responsibilities under the Act: standards, enforcement, State program development, Federal agency programs, training, and voluntary compliance.

A major priority of the Department of Labor is to safeguard the lives of our working men and women. The right to work in a humane and decent environment is basic to our society's concept of justice. All of the gains achieved by the American workforce lose their value if the workplace proves deadly to those employed there.

I pledge that the Department of Labor will continue its efforts to insure a safe and healthful work environment in America so that American workers will receive no less than the maximum effort to protect their welfare.

Respectfully,

A handwritten signature in dark ink, appearing to read "Ray Borman", written in a cursive style.

Secretary of Labor

Enclosure



UNITED STATES OF AMERICA
OCCUPATIONAL SAFETY AND HEALTH REVIEW COMMISSION
1825 K STREET, NW
WASHINGTON, D C 20006

JAN 17 1975

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

I am pleased to submit the accompanying report of the Occupational Safety and Health Review Commission for its third year of existence.

Adjudication of job safety and health disputes arising under the Williams-Steiger Occupational Safety and Health Act of 1970 is the sole function of this agency. We attempt to perform this function justly and expeditiously. The report which follows will assist interested persons in determining how well we have done in achieving that purpose.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Robert D. Moran", is written over the typed name.

Robert D. Moran
Chairman



THE SECRETARY OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON, D. C. 20201

JAN 17 1975

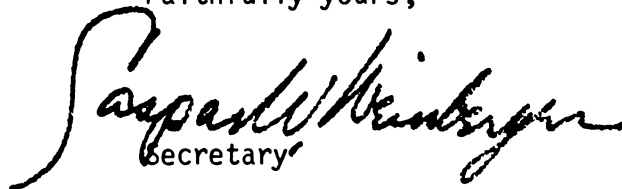
The President
The White House
Washington, D.C. 20500

Dear Mr. President:

I am pleased to submit this report for your consideration. It has been prepared pursuant to the requirements of sections 20(a)(7), 22(f), and 26 of the Occupational Safety and Health Act of 1970 (Public Law 91-596).

This report describes the 1973 activities of the National Institute for Occupational Safety and Health. Last year the report was in two parts. The first part describes the majority of the Institute's activities under the Act, including technical services, manpower development efforts, and research to develop criteria for toxic substances and harmful physical agents for recommendation of standards to the Secretary of Labor. The second part describes the Institute's industry-wide studies. However, this year the report appears as one document including Chapter 5 which describes the Institute's activities in the area of industry-wide studies. These studies investigate the effects of chronic or low-level exposure to industrial materials, processes, and stresses on the potential for illness, disease, or loss of functional capacity in aging adults.

Faithfully yours,


Secretary

Enclosure

REPORT ON OCCUPATIONAL SAFETY AND HEALTH

By the U. S. Department of Labor
Peter J. Brennan, Secretary

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Chapter 1

OVERVIEW STATEMENT

The Occupational Safety and Health Administration (OSHA) moved forward in all program areas in 1973, with special emphasis given to inspections, State plans, training and education, and occupational health. Efforts to strengthen Federal agency programs continued.

Perhaps equally important, the goals and concepts of the Occupational Safety and Health Act of 1970 received increased attention in many non-governmental areas—labor negotiations, public health discussions, and industry seminars. This indicates that public awareness of the Act has increased, in part as a natural result of OSHA's basic programs, and in part as a direct result of OSHA's efforts to achieve this end through training and education, voluntary compliance, and public information.

OSHA completed 2 years of operation in April 1973, and the date both literally and figuratively signaled the end of the agency's developmental phase. The transition to full maturity brought with it the need to establish long-range program goals, the opportunity to share job safety and health responsibility with the States, and the challenge of providing occupational health protection in an ever more complex industrial setting. But, above all, the transition to maturity demanded a continuation of those facets of the program that had proven successful in forming the basis for an effective national program for occupational safety and health.

ACTIVITY HIGHLIGHTS

The program activities of 1973 are the subject of this report. They are reflected, in brief, in the following highlights of the past year.

—Federal inspections increased from 36,100 in 1972 to 67,153 in 1973. From May through

December, inspections occurred at an annual rate of more than 75,000—OSHA's goal for FY-74—and more than twice the rate of inspections during the same 8 months of 1972.

—Training and education increased substantially. A \$3-million contract with the National Safety Council is providing nationwide free training on OSHA and the Act. A \$300,000 contract with the University of Wisconsin is, among other things, developing occupational safety and health courses for 13 unions. And a third is making job safety and health training available in American Indian communities. Courses at the OSHA Training Institute in Chicago were expanded in 1973 to upgrade the training available to Federal and State compliance personnel, additional private sector training courses were made available for purchase from the National Audiovisual Center (NAC), and others were under development.

—Ambitious speaking programs, a strong presence at the National Safety Congress in Chicago, new publications, films, and radio and television public service announcements helped explain OSHA and the Act to the public and substantially contributed to OSHA's successful voluntary compliance efforts.

—OSHA established an office of occupational health and streamlined its procedures for developing health standards. Working with the National Institute for Occupational Safety and Health (NIOSH), OSHA set initial priorities for more than a dozen needed key standards. Emergency temporary standards regulating the use of certain carcinogens and pesticides were issued in

1973. Both occasioned some controversy. The emergency temporary carcinogens standard, published in May, expired in November. Permanent carcinogens standards were developed by December and were undergoing prepublication review at the end of the year. The matter of whether OSHA or the Environmental Protection Agency (EPA) has jurisdiction over pesticides was not resolved in 1973, delaying the development of a permanent pesticides standard.

—Twenty State plans were approved in 1973, bringing to 23 the total number approved since passage of the Act, and moving the United States closer to the Federal/State occupational safety and health partnership intended by Congress. By year's end, 19 States with approved plans had enacted enabling legislation, and 15 had plans in operation. Twenty-three other States and jurisdictions had plans under review, and some of these are expected to be approved in 1974.

—The Office of Federal Agency Programs, which has responsibility for overseeing job safety and health programs of Federal civilian and military agencies, stepped up activity in 1973, evaluating more than 25 agency programs and giving technical and consultative assistance to more than 75 others. A new Federal-wide safety promotional campaign—Safety '76—was developed in 1973 to go into effect January 1, 1974, and continue through the Bicentennial year 1976. And, with the assistance of the Federal Agency Advisory Council, work was initiated on a set of detailed guidelines for Federal agencies to operate effective occupational safety and health programs.

—OSHA reorganized in 1973. Three associate assistant secretary positions were created to oversee national programs, administration, and regional programs. Authorized compliance officer staffing increased from 659 a year ago to 800 at year's end, and the number of field locations increased from 73 to 101.

Chapter 2

COMPLIANCE OPERATIONS

The inspection program is OSHA's primary means of ensuring safe and healthful working conditions for the more than 63 million working men and women protected by the Act. An OSHA compliance officer conducts an inspection by proceeding through a selected establishment, checking work areas for observance of the provisions of the Occupational Safety and Health Act of 1970. Notes are taken on the conditions observed, and probable violations are reviewed with the employer. A report of the inspection is prepared and discussed with the compliance officer's area director (see *Onsite Citations* section of this chapter). Any appropriate citations and notices of proposed penalty, the amount of which varies with the gravity of the violation and other related factors, are sent to the employer with time limits in which the employer must abate violations. These enforcement measures can be contested with the Occupational Safety and Health Review Commission if the affected party informs the Secretary of Labor of his intent within the established time limits. OSHA may follow up in certain cases to ensure that abatement has been achieved.

To provide greater protection in 1973, OSHA set for itself the goal of substantially increasing the number of inspections conducted in all industries without diminishing the quality of the inspections themselves. That goal was achieved, and inspections increased from 36,100 in 1972, to 67,153 in calendar year 1973. Increasing the number of inspections not only results directly in safer and more healthful working conditions in the establishments inspected, but also spurs voluntary compliance by increasing the probability of inspection for all employers.

Most of the inspection gains occurred in the 8-month period, May to December, when inspections

took place at an annual rate in excess of 75,000—OSHA's target inspection rate for FY-74. A number of factors contributed to this increase.

First, OSHA adopted a posture that emphasized inspections, removed certain routine and clerical responsibilities from compliance personnel, streamlined inspection paperwork procedures, and stressed efficient scheduling.

Second, OSHA developed an integrated program policy for all field offices, had a trained and experienced fulltime inspection staff, and had access to other resources (such as technical equipment) needed to conduct certain types of inspections—conditions that were not always present in previous years.

Third, by opening new area and district offices, OSHA reduced time previously lost to travel.

INSPECTION PROGRAM CHANGES

Although the number of inspections nearly doubled, there were only a few changes in inspection procedures.

Revised Inspection Priorities

The inspection priority system was revised, effective July 1, 1973, to give top priority to situations of imminent danger. The revised inspection priorities are:

1. *Investigation of evidence of imminent danger.*—Evidence of imminent danger suggests the expectation that loss of life or serious injury may occur if the dangers go uncorrected.
2. *Investigation of catastrophes and fatalities.*—Investigations of such situations not

only enable OSHA to determine whether violations of the standards were responsible—and a citation should be issued—they also provide insights into causes of serious injuries, illnesses, and fatalities.

3. *Investigation of valid employee complaints.*—Any employee complaint alleging a job hazard—other than imminent danger—is given third priority. Employee complaints have been found, in most cases, to reflect genuine concern on the part of the employee over working conditions.
4. *Inspections under special programs.*—OSHA continued to make inspections under its Target Industry and Target Health Hazards Programs (TIP and THHP), as well as special inspections to enforce emergency temporary standards. In addition, OSHA added a new dimension to its special programs effort—Special Emphasis Programs. A more complete discussion of these programs follows.
5. *Random general inspections.*—Establishments of all types and sizes, all over the country, are inspected on a random basis under schedules established by regional and area offices.

Special Emphasis Programs

OSHA added a new inspection effort in 1973, the Special Emphasis Program. The first Special Emphasis Program was begun in March and targeted to reduce the number of deaths (more than 100) and injuries that occur each year in trenching and excavation cave-ins.

A Special Emphasis Program is an intensive program that focuses on one particularly serious hazard or type of accident. It gives OSHA the flexibility to concentrate on making a permanent dent in major problem areas.

To implement the trenching and excavation program, OSHA sought and gained the cooperation of industry, labor, the public, and the news media. A special editors conference was held in Washington, and subsequent regional conferences followed.

Training materials, including films, were used to support the effort, both by OSHA and by private organizations. OSHA compliance officers were given special training on trenching and ex-

cavation standards, and area offices were directed to conduct special inspections for this type of violation.

At the end of the year, other hazards and accident types were being considered as possible future targets of Special Emphasis Programs.

Onsite Citations

Late in the year, area office directors were authorized to designate qualified veteran compliance officers to issue citations at the end of an inspection, rather than requiring all citations to be issued by the area director himself only after reviewing the compliance officer's report. This policy was temporarily suspended at the end of the year, however, pending review of objections and further consideration of proper implementation of the new policy.

The purpose of this proposed change in procedure was to speed the inspection and citation process. Under current procedures, delays of several weeks can occur between the inspection and the issuance of the citation. During this period, the employer may be unaware of corrective actions that need to be taken, and employees may continue to work exposed to the same hazards that were present before the inspection.

INSPECTION STATISTICS

The inspections conducted by OSHA in 1973 can be useful in sketching an overall picture of the Federal enforcement effort. Just as injury statistics alone do not tell the story of human suffering, but do help us to understand the magnitude of the problem, so inspection statistics alone cannot tell us what is being done daily through individual inspections, but they can help us to understand what is being accomplished in the aggregate.

Inspections by Type

A breakdown of the 67,153 inspections conducted in 1973 by type shows:

- 46,623 were first-time inspections, and the number of employees in these establishments totaled 8,086,181;
- 10,941 were repeat inspections of establishments already inspected by OSHA; and
- 9,589 were followup inspections conducted to ensure that violations noted during an ear-

lier inspection were corrected within the abatement period.

Inspections by Major Industries

A breakdown of inspections by industry shows 29,109 in manufacturing, 22,100 in construction, 6,968 in maritime, 2,513 in retailing, 2,081 in transportation, 1,950 in wholesaling, 1,657 in services, and 775 in agriculture, finance, insurance and real estate, mining and other industries. See Table 1.

TABLE 1.—OSHA compliance activity 1971-1973

Compliance activity	April-December 1971	January-December 1972	January-December 1973
A. Inspections—total	14, 500	36, 100	67, 153
1. By type:			
Initial.....	13, 300	31, 500	57, 564
New.....	NA	NA	46, 623
Repeat.....	NA	NA	10, 941
Followup....	1, 200	4, 600	9, 589
2. By industry:			
Agriculture..	NA	NA	291
Mining.....	NA	NA	239
Construction..	1, 900	7, 300	22, 100
Manu- facturing..	NA	NA	29, 109
Transporta- tion, com- munica- tion,.....	NA	NA	2, 081
Maritime....	4, 300	8, 500	6, 968
Wholesale trade.....	NA	NA	1, 950
Retail trade..	NA	NA	2, 513
Finance, in- surance, real estate..	NA	NA	144
Services.....	NA	NA	1, 657
Other.....	NA	NA	101
General in- dustry ¹ ...	8, 300	20, 300	38, 085
3. By program: ⁴			
Accident.....	1, 000	2, 300	2, 535
Complaint...	1, 300	4, 500	7, 424
TIP.....	3, 800	14, 800	11, 771
THHP.....	NA	NA	2, 640
Scheduled...	12, 200	29, 300	57, 194
State 7(c)(1)...	1, 300	5, 500	16, 928
B. Number of em- ployees in ⁵ newly inspected establishments..	NA	NA	8, 086, 181
C. Total number of violations ⁶ disclosed.....	35, 800	125, 400	224, 786

See footnotes at end of table.

TABLE 1.—OSHA compliance activity 1971-1973—Continued

Compliance activity	April-December 1971	January-December 1972	January-December 1973
D. Total number of citations issued..	9, 500	23, 900	43, 099
E. Total amount of proposed penalties.....	737, 500	3, 121, 000	6, 059, 000

¹ During CY-1971 and the first 6 months of CY-1972, the breakdown of compliance activity was limited by type to initial and followup, and by industry to construction, maritime, and general industry.

² Includes SIC 4463, 373 in part and 162 in part.

³ Includes all industries except construction and maritime.

⁴ Unlike sections A1 and A2 of this table, the sum of the items listed under section A3 exceeds the total number of inspections because some TIP (Target Industry Program) and THHP (Target Health Hazards Program) were generated by complaints or accidents, and these counts are duplicated in the accident and complaint totals. Also, scheduled inspections include TIP and THHP and State 7(c)(1) inspections. Some State 7(c)(1) inspections were TIP or THHP inspections.

⁵ The number of employees in newly inspected establishments is not available for the first 6 months of calendar year 1972. The most nearly comparable measure is the number of employees in establishments receiving an initial inspection, which includes new and repeat inspections. For calendar year 1972, this total was 7,023,356 employees.

⁶ Excludes de Minimis violations.

NA=Not available.

Inspections by Establishment Size

By establishment size, approximately 58 percent of all inspections were of establishments with 25 or more employees, although these establishments account for only about 9 percent of the total number of establishments covered by the Act. Nevertheless, the logic behind targeting inspections to larger establishments is sound. Inspecting larger establishments protects a greater number of employees overall. The Bureau of Labor Statistics has shown that mid-sized establishments have the highest incidence rates by industry. Many smaller establishments are in the comparatively less hazardous industries of retailing, service, finance, and real estate. And further, the number of inspections directed at small establishments is sufficient to ensure a significant degree of protection to those employees. Table 2 provides a breakdown of inspections by number and percentage in establishments of all sizes.

Compliance Percentages

Of the total number of establishments inspected on an initial, repeat, or followup basis, 14 percent were found to have nonserious violations for

TABLE 2.—Percent of inspections and percent of establishments covered by the Occupational Safety and Health Act by size of establishment and by industry,¹ January–December 1973

	Percent of inspections by industry, employment size of establishment							Total
	1–9	10–24	25–49	50–99	100–249	250–499	500+	
U.S. total:								
Inspections.....	24	18	16	15	14	6	7	100
Establishments covered.....	77	14	5	2	1	(*)	(*)	100
Agriculture:								
Inspections.....	22	15	14	16	20	3	9	100
Establishments covered.....	91	6	2	1	(*)	(*)	(*)	100
Mining:								
Inspections.....	22	34	18	12	8	2	4	100
Establishments covered.....	60	19	11	5	3	1	1	100
Construction:								
Inspections.....	52	22	11	7	5	1	1	100
Establishments covered.....	76	15	6	2	1	(*)	(*)	100
Manufacturing:								
Inspections.....	7	14	18	19	20	10	11	100
Establishments covered.....	44	21	14	9	7	3	2	100
Transportation, public utilities:								
Inspections.....	13	16	16	18	18	8	10	100
Establishments covered.....	61	21	9	4	3	1	1	100
Wholesale trade:								
Inspections.....	18	25	25	18	10	3	2	100
Establishments covered.....	65	21	9	3	1	(*)	(*)	100
Retail trade:								
Inspections.....	18	27	25	18	8	2	2	100
Establishments covered.....	77	15	6	1	1	(*)	(*)	100
Finance/insurance/real estate:								
Inspections.....	25	30	15	12	10	6	2	100
Establishments covered.....	83	12	3	1	1	(*)	(*)	100
Services:								
Inspections.....	26	20	17	16	10	5	7	100
Establishments covered.....	82	11	4	2	1	(*)	(*)	100

*Less than 0.5 percent.

¹ Establishment size refers to the number of employees at the worksite inspected and not the size of the overall business, which may have many separate worksites.

which no penalties were proposed; 40 percent were found to have nonserious violations for which penalties were proposed; and 4 percent were found to have serious violations. No violations were found in the remaining 42 percent of these establishments, a matter of some concern which OSHA expected to remedy in 1973, as experience under the new law increased.

Retailing had the lowest percentage of establishments in compliance, 28%, followed by wholesaling at 32% and manufacturing at 33%. Construction at 9% and agriculture at 7% are the highest percentages of establishments with serious violations. The maritime industry had the highest percentage of establishments for which no violations were found, 74%. This statistic, though, must be considered in light of the fact that a program

for maritime inspections had been in force prior to OSHA which emphasized nearly daily inspections and no penalties for immediate and voluntary compliance. OSHA's policy in 1973 has been directed at creating a smooth transition from this earlier program which focused on a cease-and-desist type of approach for bringing about abatement of hazards to one consistent with OSHA's approach in other industries, whereby reliance on the issuance of citations and proposal of penalties would be the prime factor in encouraging compliance.

Table 3 shows a breakdown of inspections by percentage of establishments for which no violations were found, establishments with only nonserious violations for which penalties were not proposed, establishments with nonserious viola-

TABLE 3.—Percent of inspections by industry and severity of findings—1973 ¹

Industry	No citations ²	Nonserious violations no penalties	Nonserious violations and penalties	Serious violations
Total.....	42%	14%	40%	04%
Agriculture.....	49	16	28	07
Construction.....	45	13	33	09
Manufacturing.....	33	13	51	03
Transportation.....	46	16	34	04
Maritime.....	74	09	16	01
Wholesale.....	32	21	46	01
Retail.....	28	20	51	01
Finance, Insurance and Real Estate.....	39	24	34	03
Services.....	38	19	41	02
Other.....	65	13	22	00

¹ Based upon inspection and citation data received during calendar year 1973. Citation data received after December 31, 1973, related to 1973 inspections are not included.

² Includes followup inspections.

tions for which penalties were proposed, and establishments with serious violations.

Most Frequently Violated Standards

Table 4 lists the 20 most frequently violated standards found during inspections in 1973 by 8-digit standard identification numbers.

As shown by the table, the National Electrical

Code is the most frequently violated single standard, followed by machine guarding and portable fire extinguisher standards.

TIP AND THHP INSPECTIONS

OSHA's two special inspection programs (as distinct from limited duration Special Emphasis Programs), the Target Industry Program (TIP)

TABLE 4.—20 standards most frequently violated January–December 1973

Standard	Standard identification number	Number of violations		
		Total	Serious	Nonserious
Electrical.....	1910. 309	21, 891	50	21, 841
Mechanical power-transmission apparatus.....	1910. 219	16, 928	39	16, 889
General machinery requirements.....	1910. 212	12, 720	127	12, 593
Portable fire extinguishers.....	1910. 157	12, 319	3	12, 316
Woodworking machinery requirements.....	1910. 213	11, 630	145	11, 485
General employment requirements.....	1910. 22	11, 272	21	11, 251
Machinery and machine guarding.....	1910. 215	10, 520	6	10, 514
Floor and wall openings.....	1910. 23	9, 044	47	8, 997
Welding, cutting, brazing.....	1910. 252	8, 079	34	8, 045
Flammable and combustible liquids.....	1910. 106	6, 453	40	6, 413
Means of egress.....	1910. 37	6, 085	6	6, 079
Powered industrial trucks.....	1910. 178	5, 331	41	5, 290
Guardrails, handrails, and covers.....	1926. 500	5, 062	353	4, 709
Flammable and combustible materials.....	1910. 107	4, 438	18	4, 420
Portable, hand powered tools.....	1910. 242	3, 733	3	3, 730
Overhead and gantry cranes.....	1910. 179	3, 307	21	3, 286
General egress requirements.....	1910. 36	2, 962	8	2, 954
General environmental controls.....	1910. 141	2, 844	5	2, 839
Scaffolding.....	1926. 451	2, 713	178	2, 535
Posting requirement.....	1903. 2	2, 681	2	2, 679
Totals.....		160, 012	1, 147	158, 865

and the Target Health Hazards Program (THHP), remained in force in 1973. These two programs focus special inspection efforts on—one in high risk industries and the other against widespread serious health hazards.

The TIP effort places special inspection emphasis on five industries with high (more than double the national average) injury rates—longshoring, meat and meat products, roofing and sheet metal construction, lumber and wood products, and miscellaneous transportation vehicle manu-

facture. The THHP effort directs industrial hygiene inspections against five serious health hazards—*asbestos, carbon monoxide, cotton dust, inorganic lead, and silica.*

TIP inspections declined slightly from 14,830 in 1972 to 11,782 in 1973. This decline was not due to any deemphasis in the program, but rather to a realization that many establishments within the target industries had been inspected several times, and that a continuing assessment of OSHA's resource utilization is essential to the effectiveness of the overall program.

TABLE 5.—*OSHA inspection activity—Target Industry Programs—by industry, 1973*

Reporting period	Number of weeks in reporting period	Total TIP inspections	Roofing and sheet metal contractors	Meat and meat products	Miscellaneous transportation equipment	Lumber and wood products	Longshoring
Total.....	52	11,782	1,019	927	612	3,287	5,939
January.....	4	697	29	55	28	175	410
February.....	4	862	49	68	33	250	462
March.....	5	1,062	75	85	44	274	586
April.....	4	849	67	73	42	244	423
May.....	4	1,189	108	96	55	291	639
June.....	5	1,510	138	150	58	414	750
July.....	4	1,010	87	73	48	262	540
August.....	5	1,067	110	70	54	297	536
September.....	4	1,013	105	57	54	255	542
October.....	4	1,001	70	67	80	282	502
November.....	5	968	107	88	76	319	378
December.....	4	554	74	45	40	224	171

TABLE 6.—*OSHA inspection activity—Target Health Hazard Program—by hazardous substance, Jan.-Dec. 1973*

Reporting period	Number weeks	Total THHP inspections	Carbon monoxide	Silica	Lead	Asbestos	Cotton dust
Total.....	35	2,647	454	310	175	102	26
January.....	4	210	NA	NA	NA	NA	NA
February.....	4	231	NA	NA	NA	NA	NA
March.....	5	287	NA	NA	NA	NA	NA
April.....	4	184	NA	NA	NA	NA	NA
May.....	4	193	77	26	29	8	2
June.....	5	326	84	57	20	15	5
July.....	4	182	46	36	17	9	2
August.....	5	226	55	54	29	24	4
September.....	4	188	33	30	23	8	3
October.....	4	196	31	38	19	11	5
November.....	5	257	75	52	22	12	2
December.....	4	167	53	17	16	15	3

NA = Not available.

THHP inspections, on the other hand, rose markedly from 1,100 in 1972 to 2,647 in 1973. This increase was made possible by the substantial increase in the number of industrial hygienists now employed by OSHA. *Tables 5 and 6* break down TIP and THHP inspections by month and industry/health hazard.

VIOLATIONS, CITATIONS, AND PROPOSED PENALTIES

The 67,153 inspections, conducted in 1973, alleged 224,786 violations—3,223 of them serious—resulting in 43,099 citations, proposing a total of \$6,341,590 in penalties. Of that amount, \$4,559,759 has been remitted to the Treasury. The balance represents funds not collected, plus penalties in cases appealed to the independent Occupational Safety and Health Review Commission and penalties reduced or vacated by the Review Commission. Penalties not collected by the area or regional director within the established time frames are referred to the regional solicitor for further attempts at collection without resorting to litigation. If this course of action fails, the regional solicitor decides on the appropriate means by which collection can be achieved.

Since April 1971, OSHA has conducted 117,745 inspections, resulting in 76,533 citations alleging 386,060 violations, with proposed penalties totaling \$10,118,451. Of that amount, \$7,225,597 has been remitted.

Of the 43,099 citations issued in 1973, 1,566 or 3.6 percent, were appealed to the Review Commission.

Each serious violation results in a citation, while any number of nonserious violations may be included in one citation. In proposing penalties, OSHA takes into account the size of the establishment, its history, the seriousness of the violation, and the good faith of the employer.

INSPECTIONS BY STATES WITH APPROVED PLANS

No discussion of Federal compliance programs would be complete without including some data on compliance actions taken by States with approved plans, not only because the approval of

State plans (*See Chapter 5*) allows the redeployment of Federal personnel to areas where the need for additional manpower is great, but also to compare the operation of such plans with the Federal effort.

Of the 23 States with approved plans, 19 began conducting inspections in 1973. During the period July–December, these States conducted 218,589 onsite consultation inspections and 24,733 enforcement actions. Proposed penalties resulting from these enforcement actions totaled \$386,386. Consultative onsite inspections were made by States without enabling legislation or by States without fully operational plans.

The State of Washington conducted the greatest number of enforcement inspections (8,667) and also proposed the highest dollar amount of penalties for violations (\$73,375). Maryland, with 4,156 enforcement actions and \$73,320 in proposed penalties, was second highest. These figures have raised some doubt at OSHA that the average penalty being proposed by both State and Federal inspectors is sufficiently high to encourage compliance. It is felt that the anticipated dollar amount of a penalty for a given violation must be high enough to discourage an employer from deciding to absorb the cost of a relatively low penalty rather than comply. OSHA plans to determine whether the penalties being proposed are an effective incentive for an employer to comply with the Act.

New York, without enabling legislation, conducted 175,940 onsite consultative inspections, far more than any other State. New Jersey, also without enabling legislation, conducted 24,636 nonenforcement inspections.

States with approved plans received 2,465 employee complaints in the second half of 1973. New York with 796, followed by New Jersey with 520, were the two highest among States without fully operational plans. Minnesota had the most of any State with a fully operational plan (159). *Table 7* shows actions taken by States with approved plans during the second half of 1973.

By comparison, *Table 8* shows a breakdown of OSHA inspections by region and States. Note that for purposes of this table, the proposed penalty figures were rounded to thousands; all other figures were rounded to the nearest 100, and the exact number of inspections conducted in 1973 does not correspond with the total shown by this table. Nevertheless, within hundreds, the table is accurate.

TABLE 7.—*Inspections by States with approved plans
July–December 1973*

	Number of in- spections	Penalties proposed	Employee com- plaints
Alaska.....	53	\$3, 325	6
California.....	*5, 613	-----	301
Colorado.....	*35	-----	0
Illinois.....	591	30, 745	45
Iowa.....	174	3, 718	41
Kentucky.....	641	35, 733	57
Michigan.....	*10, 613	-----	150
Minnesota.....	2, 157	77, 139	159
Montana.....	*267	-----	6
New Jersey.....	*24, 636	-----	520
New York.....	*175, 940	-----	796
North Carolina.....	1, 423	67, 896	7
Oregon.....	27	47, 745	117
South Carolina.....	1, 756	20, 200	4
Tennessee.....	988	26, 510	77
Utah.....	*1, 412	-----	0
Vermont.....	*73	-----	0
Washington.....	8, 667	73, 375	146
Total.....	243, 322	386, 386	2, 456
Operational States.....	24, 733	-----	-----
Nonoperational States..	218, 589	-----	-----

*Indicates inspections of States without fully operational plans.

TABLE 8.—*OSHA compliance data by State during 1973*

Region and State	Total inspections	Citations issued	Violations alleged	Penalties proposed
Total United States.....	67, 200	43, 000	224, 800	6, 059, 000
Region I—Boston.....	4, 800	3, 100	18, 200	529, 000
Connecticut.....	1, 000	700	3, 900	124, 000
Maine.....	500	400	2, 300	66, 000
Massachusetts.....	1, 800	1, 100	5, 700	210, 000
New Hampshire.....	500	300	2, 900	65, 000
Rhode Island.....	600	300	1, 400	25, 000
Vermont.....	400	300	2, 000	39, 000
Region II—New York.....	8, 500	4, 500	18, 800	934, 000
New Jersey.....	2, 400	700	3, 100	99, 000
New York.....	5, 400	3, 200	13, 600	686, 000
Puerto Rico.....	700	600	2, 100	149, 000
Region III—Philadelphia.....	6, 700	4, 100	17, 200	583, 000
Delaware.....	200	100	300	13, 000
District of Columbia.....	200	100	500	21, 000
Maryland.....	400	200	700	26, 000
Pennsylvania.....	4, 100	2, 700	11, 100	318, 000
Virginia.....	600	400	2, 000	98, 000
West Virginia.....	1, 200	600	2, 600	107, 000

TABLE 8.—*OSHA compliance data by State during 1973—Continued*

Region and State	Total inspections	Citations issued	Violations alleged	Penalties proposed
Region IV—Atlanta.....	13, 400	8, 800	40, 500	894, 000
Alabama.....	1, 200	700	3, 400	18, 000
Florida.....	5, 300	3, 600	14, 300	364, 000
Georgia.....	1, 500	1, 000	5, 300	96, 000
Kentucky.....	1, 100	900	5, 300	104, 000
Mississippi.....	500	400	1, 600	64, 000
North Carolina.....	1, 700	1, 200	5, 900	72, 000
South Carolina.....	300	100	400	13, 000
Tennessee.....	1, 800	900	4, 300	163, 000
Region V—Chicago.....	12, 100	8, 300	61, 100	1, 133, 000
Illinois.....	1, 400	1, 000	7, 500	168, 000
Indiana.....	1, 000	800	7, 000	98, 000
Michigan.....	1, 100	600	2, 700	66, 000
Minnesota.....	1, 300	800	4, 700	80, 000
Ohio.....	5, 200	3, 500	26, 500	507, 000
Wisconsin.....	2, 100	1, 600	12, 700	214, 000
Region VI—Dallas.....	7, 100	3, 800	21, 800	453, 000
Arkansas.....	700	500	5, 100	62, 000
Louisiana.....	2, 300	1, 200	5, 600	114, 000
New Mexico.....	300	200	1, 100	18, 000
Oklahoma.....	600	400	2, 700	69, 000
Texas.....	3, 200	1, 500	7, 300	190, 000
Region VII—Kansas City.....	3, 900	2, 800	12, 200	486, 000
Iowa.....	400	300	1, 000	79, 000
Kansas.....	600	400	1, 300	33, 000
Missouri.....	2, 200	1, 600	7, 200	193, 000
Nebraska.....	700	500	2, 700	181, 000
Region VIII—Denver.....	4, 600	3, 900	20, 100	418, 000
Colorado.....	1, 000	800	3, 800	151, 000
Montana.....	900	800	4, 300	77, 000
North Dakota.....	700	700	3, 400	47, 000
South Dakota.....	700	700	4, 000	39, 000
Utah.....	900	600	2, 900	70, 000
Wyoming.....	400	300	1, 700	34, 000
Region IX—San Francisco.....	3, 400	2, 100	8, 600	335, 000
Arizona.....	400	300	1, 000	60, 000
California.....	2, 400	1, 400	5, 800	213, 000
Hawaii.....	400	300	1, 000	49, 000
Nevada.....	200	100	800	13, 000
Region X—Seattle.....	2, 700	1, 700	6, 300	294, 000
Alaska.....	500	300	1, 500	42, 000
Idaho.....	800	600	2, 200	112, 000
Oregon.....	400	300	800	62, 000
Washington.....	1, 000	500	1, 800	78, 000

Chapter 3

TRAINING AND EDUCATION

Training and education encompasses two worlds: the immediate world of professional training for Federal and State compliance personnel and the larger world of training for employers and employees.

In 1973, it became increasingly apparent that OSHA's program for providing broad-base private sector training was inadequate for achieving substantial gains in voluntary compliance within a relatively short period of time, and the training that was available could not be given at the variety of locations necessary to make it practical for many employers and employees to attend. Therefore, OSHA signed contracts with three outside organizations to provide employer and employee training and to develop specialized occupational safety and health programs for workers in various fields. In the future these three organizations are expected to conduct job safety and health training on a self-sustaining basis.

THE NATIONAL SAFETY COUNCIL CONTRACT

The largest of these, a \$3 million, 2-year cost-reimbursable contract with the National Safety Council (NSC), was signed June 30, 1973. It requires NSC to develop, promote, and administer a national occupational safety and health training program directed primarily at employers and employees of small and medium-size businesses. Courses are given in as many locations as possible and are varied to meet local demand.

To carry out the contract, NSC made 38 of its approximately 80 local councils responsible for training. Instructors from or for each council were chosen and given training at the OSHA Training Institute in Chicago, where they were taught precisely how to conduct training and present mate-

rial so that instruction would be uniform throughout the Nation. The goal of the contract is 2,300 classes reaching more than 100,000 persons during the two years ending June 30, 1975. The NSC curriculum, developed by OSHA, consists of four courses to be given as follows:

- Orientation to OSHA Act*, one day, 997 classes, 44 percent of total.
- Occupational Safety and Health Programming*, one day, 507 classes, 22 percent of total.
- Safety and Health in Excavation and Trenching Operations*, one day, 489 classes, 21 percent of total.
- Voluntary OSHA Act Compliance*, four days, 303 classes, 13 percent of total.

The contract also provides that as many as six other special emphasis programs may be taught, in addition to the excavation and cave-in program. The first NSC courses were conducted on September 24, 1973, at New Brunswick, New Jersey, by the New Jersey State Safety Council and at Madison, Wisconsin, by the Wisconsin Council of Safety. During 1973, NSC councils conducted 285 courses, reaching 12,546 persons.

OTHER TRAINING CONTRACTS AND GRANTS

The two other contracts, negotiated and signed in 1973, were with The University of Wisconsin School for Workers and with the National American Indian Safety Council, Inc.

The University of Wisconsin contract is a 3-year, \$305,173 program to develop, conduct, and evaluate training for approximately 1,500 employees and employee representatives and to provide tailored programs for 13 unions. It includes developing plans for operating employee safety and

health committees, processing employee complaints, and advancing employer/employee job safety and health programs. In 1973, training was developed and conducted for the International Molders and Allied Workers, the Communications Workers of America, the Marathon County Wisconsin Labor Council, and for job safety and health specialists of the AFL-CIO. The university is also producing a 20-minute film that will explain employee rights and responsibilities under the Act.

The \$105,000 contract with the National American Indian Safety Council is making job safety and health training available for more than 2,600 employers and employees in approximately 90 American Indian and native Alaskan communities. The council furnishes Indian safety instructors to train employers and employees to recognize, avoid, and reduce or eliminate hazards, and to inform them of their rights and responsibilities under the Act. In 1973, more than 830 persons in Indian communities received training under this contract.

The Iowa Bureau of Labor received an experimental and demonstration grant under Section 23 (b) of the Act, to demonstrate the feasibility of providing job safety and health training to employers and employees through the State's community college system. Two colleges—Kirkwood Community College in Cedar Rapids, and Des Moines Area Community College in Ankeny—will develop and present courses focusing on the standards. At least two instructors from each of 15 of Iowa's community colleges will take the courses and teach them in turn at their own institutions.

OSHA PRIVATE SECTOR TRAINING

OSHA continued private sector training, primarily through seminars conducted by OSHA regional and area offices and through courses offered at the OSHA Training Institute. Other training aids, including an extensive correspondence course, a programmed self-instruction course, and training guidelines for employers were under development in 1973.

Regional and Area Office Training

OSHA regional and area offices continued to present 1-day seminars for both employers and employees. Approximately 91,700 persons attended these seminars during 1973. Seminars cover the

Act, its application, the basic steps of compliance, and individual rights and responsibilities of employees and employers under the Act. The same course is being given by NSC under the title *Employer/Employee Rights and Responsibilities Under the Occupational Safety and Health Act of 1970*—short title, "Orientation to the OSHA Act." It also may be purchased from the National Audio-visual Center (NAC) in a narrated script format suitable for self-study or group instruction.

Regional and areas offices also conducted, as part of OSHA's Special Emphasis Program on excavation and trenching cave-ins, a 1-day course on excavation and trenching safety. This course is also being offered by NSC and is available for purchase from NAC. In one of its three forms this course reached an estimated 22,500 persons in 1973.

As 1973 came to a close, OSHA moved to reduce the training task as one of the assignments for its area offices so that the full force of its compliance officers could be directed toward making workplace visits. To fill the training void, OSHA will rely heavily on contract training services and grants to State-designated agencies and on self-initiated training programs by colleges and universities, professional societies, trade associations and organized labor.

OSHA Training Institute

Private sector training at the OSHA Training Institute included *A Guide to Voluntary Compliance*, a 1-week course designed primarily for employers, but containing valuable information for employees as well; 932 persons attended a total of 42 classes. This course is also included in the NSC curriculum under the title *Voluntary OSHA Act Compliance*. A shorter 1-day course focusing on job safety and health program development was derived from *A Guide to Voluntary Compliance*. Entitled *Safety and Health Programming*, it was not given at the Institute, but is part of the NSC curriculum. NAC is currently offering the full 1-week course for purchase, and the 1-day programming course will be available from NAC by mid-1974.

The Training Institute also conducts courses in construction safety and, in 1973, trained 601 instructors in 25 construction safety and health courses given at the Institute and in other locations throughout the country. This training provides a good example of the "multiplier effect" that is ob-

tained when instructor training and training materials are made available to individuals who train others. It is estimated that since 1971, the 2,495 instructors trained by OSHA have trained 76,773 construction supervisors who, in turn, have reached more than 1.5 million employees.

The construction course taught at the Institute is available for purchase from NAC in two formats. The longer version, *Construction Safety and Health Training*, is a 30-hour course that includes 466 slides and an instructor's manual. The shorter version consists of 290 slides, an instructor's manual, and 10 one-hour audio-tape cassettes. Training covers all phases of construction, from pre-planning to project completion, with special attention given to individual protective equipment and the hazards in materials handling and heavy equipment operation. At the end of 1973, more than 1,200 sets of these construction courses had been sold to businesses, employee organizations, schools, and others.

Other Employer/Employee Training Aids

Four employer/employee training aids were under development in 1973 and are expected to be available by mid-1974.

To assist employers and employees to comply with standards that require training, OSHA is developing a series of 48 guidelines—25 for general industry, 15 for construction, and 8 maritime. Each focuses on a separate training requirement in the standards and discusses when training is required and how it may be accomplished. These guidelines were being tested in industry, by OSHA, and by others in 1973. Training guidelines will be available from the National Technical Information Service (NTIS).

To provide individuals with a basic background in occupational safety and health, OSHA is developing a 30-hour programmed instruction course. Entitled *Principles and Practices in Occupational Safety and Health*, it is intended primarily for first-line supervisors. The course will be available from the U.S. Government Printing Office.

The third training aid is an extensive 120- to 150-hour correspondence course entitled, *Fundamentals in Occupational Safety and Health*, being developed jointly by OSHA and NIOSH. This course is intended primarily for persons who are interested in preparing for a career in occupa-

tional safety and health, including union officials. It will be offered by schools with an accredited home study department and in some institutions as part of the regular classroom curriculum.

In November 1973, OSHA published draft versions of proposed alphabetical digests to both its general industry and construction standards and introduced them for comment at the 1973 National Safety Congress. When finalized, these digests will greatly aid employers, supervisors, and safety personnel in their efforts toward achieving voluntary compliance by providing an alphabetical reference to approximately 90 percent of the subject standards and by putting these standards in simple terms. These digests will not be intended to be used as a substitute for the original standards, but rather, they will serve as a tool for determining applicability of standards to specific situations.

As a result of the expanded private sector training currently available and under development, private sector training at the Training Institute will be cut back in 1974. This reduction in employer/employee training will enable the Institute to devote more of its resources to its primary objective—training a well-qualified corps of Federal and State compliance officers and industrial hygienists.

COMPLIANCE OFFICER TRAINING

Every compliance officer and industrial hygienist, regardless of background, undergoes an intensive 4-week course, at the Institute, that covers compliance procedures, the legal requirements of the Act, and the standards. Personnel with only limited occupational safety and health experience also take a 2-week orientation course in job safety and health principles and a 1-week course in instrumentation.

Nine other technical courses are available at the Institute to enable compliance officers and industrial hygienists to further their professional training. Four of these courses were added to the curriculum in 1973:

—*Occupational Injury Investigation*. This is a 4-day course in occupational injury investigation that was given to 75 compliance officers. A more detailed 3-week investigation course is under development for 1974. Both courses teach the skills needed to conduct in-depth investigations and to write

accurate and informative reports of findings. The skills imparted through this course are aimed at assuring that investigations determine: (1) whether a violation of OSHA standards contributed to the occurrence; (2) whether, as a result of investigatory findings, such standards may require revision; and (3) what can be done to prevent recurrence of such events.

—*Electrical Standards*. This 1-week course offers a detailed look at the National Electrical Code and how to recognize sophisticated electrical hazards.

—*Hazardous Materials and Compressed Gases*. This 2-week course examines the problems of hazardous materials use and storage, the standards that apply, and how to interpret them.

—*Crane Safety and Gear Certification*. This 1-week course offers an in-depth understanding of the hazards, inspection procedures, and standards that relate to industrial, construction, and maritime cranes, with special attention to maritime crane certification requirements.

Other courses offered by the Institute to compliance personnel include a 1-week construction

safety course, a 1-week maritime safety course, a 2-week radiation monitoring course, a 1-week machine guarding course, and a 1-week instructor training course.

In 1973, 413 Federal and 377 State compliance officers attended 96,360 hours of formal instruction at the Institute. Federal personnel accounted for 36,440 hours and State personnel, although fewer in number, 59,920—primarily because most of the State officers were receiving their basic 4-week training while many of the Federal personnel, having already taken the class, were back for additional shorter courses.

Not all States send their compliance officers to the Institute. Those that do, do so pursuant to Section 18(b) agreements with OSHA. States that conduct their own training, such as New York and Hawaii, plan formal and on-the-job training programs comparable to OSHA's.

A compliance officer's training does not end when he leaves the Institute. Once assigned to an area office, he begins on-the-job training under the direction of the area director. There he accompanies veteran compliance officers on inspections until the area director is confident he is capable of inspecting on his own.

Chapter 4

STANDARDS

OSHA's Office of Standards Development proposed new standards in agriculture, construction, general industry, and maritime; issued emergency temporary standards covering pesticides and carcinogens; and made more than 3,000 revisions to various provisions of the existing standards in 1973. Major revisions included an extensive modification of the standards covering flammable and combustible liquids.

OSHA standards were reprinted and made available in loose-leaf format as part of OSHA's Subscription Service. Volumes I, II, and III of the five-volume set contain the general industry standards, the maritime standards, and the construction standards—all currently available from the Government Printing Office. Subscribers may purchase any or all of the volumes and for a one-time fee receive the standards and all subsequent changes indefinitely. Volume IV covers other regulations and Volume V is the Field Operations Manual.

A reorganization of the Office of Standards Development occurred in 1973, reflecting OSHA's increased attention to occupational health. Separate subdivisions of safety standards and health standards were created. While the Division of Safety Standards continues to review, revise, and develop new safety standards, the Division of Health Standards has a more specialized role that includes (1) establishing closer liaison with NIOSH, (2) establishing an orderly priority of health standards development, and (3) providing general guidance to OSHA's occupational health thrust.

NATIONAL CONSENSUS STANDARDS AND ESTABLISHED FEDERAL STANDARDS

OSHA's authority to adopt national consensus standards—standards such as those issued by the

American National Standards Institute (ANSI), the National Fire Protection Association (NFPA), and the American Society for Testing and Materials (ASTM); and established Federal standards—without going through the procedures of proposal, comment, review, and final publication required by the Administrative Procedure Act expired April 28, 1973, two years after OSHA came into being, as provided in the Act.

During the period January 1 to April 28, OSHA continued to review consensus standards but adopted none under the special authority granted. During the entire year January 1 to December 31, OSHA reviewed 43 new, revised, or existing consensus standards and proposed adopting several under Section 6(b) of the Act (since authority under Section 6(a) had expired) including an entire standard covering the use of industrial slings. OSHA also maintained liaison with national consensus standards-setting organizations, and several OSHA standards officials served on review boards of consensus organizations.

EMERGENCY TEMPORARY STANDARDS

Under Section 6(c) of the Act, OSHA has the authority to issue emergency temporary standards if it is determined that "(A) . . . employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards, and (B) that such emergency standard is necessary to protect employees from such danger."

In 1973, OSHA issued two emergency temporary standards. One, published April 30, prescribed reentry times for workers returning to fields that had been sprayed with certain pesticides. The

other, issued May 1, limited employee exposure to 14 known or suspected carcinogens.

The pesticide standard was revised in June and later vacated by an appellate court decision that held that no danger severe enough to warrant an emergency temporary standard existed. OSHA continued development of a permanent pesticide standard, but the question of whether OSHA or the Environmental Protection Agency (EPA) had authority over pesticide regulation became a further factor. As indicated by the discussion in Chapter 9, this question was not resolved as of December 31, 1973, and a permanent standard had not been proposed by the end of the year.

The emergency temporary carcinogens standard expired after six months in force, as required by the Act. Following promulgation of the emergency standard, OSHA began developing 14 permanent standards—one for each chemical agent. These standards were undergoing final refinement at the end of the year and were scheduled to be promulgated as final rules in early 1974.

CRITERIA DOCUMENTS

NIOSH furnishes OSHA with research documents on the effects and means of control of various hazards. These reports are called criteria documents. In 1973, NIOSH provided OSHA with six criteria documents on the following substances and conditions: chromic acid, coke oven emissions, mercury (inorganic), toluene, toluene diisocyanate (TDI), and trichloroethylene.

These added to the seven received in 1972—*asbestos, beryllium, carbon monoxide, heat stress, lead (inorganic), noise, and ultraviolet radiation*—bring to 13 the total number of NIOSH criteria documents sent to OSHA since April 1, 1971.

Of these, one (*asbestos*) has been the basis for a completed and promulgated standard. Five—*beryllium, carbon monoxide, lead, noise, and TDI*—have been reviewed by OSHA, and proposals for standards were being evaluated in-house at the end of the year. Two—*heat stress and noise*—have been studied by advisory committees. On December 29, recommendations for a revised standard were submitted by the advisory committee on noise and were undergoing final review at year's end.

Health standards that are developed based on criteria documents or other detailed research go beyond establishing exposure limits in protecting

employees. For example, packaging, labeling, handling, storage, or the use of chemicals in combination with other chemicals are included in health standards. And where appropriate, a standard shall prescribe medical examinations for the affected employees to be either furnished or paid for by the employer.

STANDARDS ADVISORY COMMITTEES

OSHA has the authority under the Act to appoint standards advisory committees to assist in the development of standards. These committees usually consist of 15 members chosen for their specialized knowledge and representing different interests, i.e., labor, management, and other public agencies. See *Appendix J* for the members of the standards advisory committees.

OSHA maintains continuing advisory committees for agriculture and construction. In 1973, OSHA appointed ad hoc committees to study proposed standards on heat stress, noise, and carcinogens. Ad hoc committees for standards covering marine terminal facilities and hazardous materials labeling were under consideration at the end of the year. The ad hoc standards advisory committee on asbestos was dissolved in 1972, following issuance of that standard.

Continuing Committees

- The advisory committee on agriculture met six days in full session; various subcommittee meetings were also held. The committee submitted recommendations on (1) temporary housing for migrant farm workers, (2) pesticide reentry intervals, and (3) farm machine guarding.
- The advisory committee on construction met eight days in full session and submitted recommendations on (1) fenders on construction vehicles, (2) amendments to the tunnel and shaft standards, (3) a proposed rope guided hoist standard, (4) ground fault circuit interrupters, and (5) miscellaneous amendments to the construction standards.

Ad Hoc Committees

- The standards advisory committee on noise met 12 days in full session and submitted its recommendations for a revised noise

standard on December 20. The committee has been dissolved.

- The standards advisory committee on heat stress met 13 days in full session. Final recommendations have not yet been submitted, but are expected in early January. The committee is still standing.
- The standards advisory committee on carcinogens met 27 days in full session and, on August 27, submitted final recommendations for permanent standards for 14 known or suspected carcinogens. The committee has been dissolved.

NEW STANDARDS ACTIVITY

OSHA proposed a number of new and revised standards in 1973. A major revision of the flammable and combustible liquids standard and less extensive revisions of the standards covering fire extinguishers and machine guarding were issued. See *Appendix G* for a complete chronology of all standards activity.

General Industry

A notable new permanent standard proposed in 1973 appeared August 28. The proposal is a new *Subpart T* to the general industry standards to protect employees in the telecommunications industry. The proposed standard is noteworthy in two respects: First, as a comprehensive standard in its own right; and second, because it is based largely on the recommendations of a 28-member telecommunications industry standards committee composed of representatives of telephone companies, communications unions, and other affected groups.

The standards primarily cover problems of falls and electrocutions—serious risks in this industry. Other portions of the standards focus on training and equipment. The development of these standards was initiated, independently of OSHA, by the telecommunications industry, and as such represents a new dimension in voluntary standards development. The industry also recommended making OSHA's construction standards covering helicopters and aerial platforms applicable as general industry standards.

On August 30, OSHA proposed adopting, with minor modifications, the ANSI standard B30.9—1971, covering the use of industrial slings. On September 6, a proposed major revision of *Sub-*

part D—walking-working surfaces—was published.

Agriculture

Major proposed new standards requiring roll-over protective structures for farm tractors, guards for power transmissions and other power components, and safety provisions for electrical farm equipment were in final stages of development at the end of 1973, and scheduled for proposal early in 1974. A study by the National Safety Council found deaths from tractor turnovers occurring at an annual rate of 8.6 per 100,000 tractors. Other evidence shows that 20 percent of all farm injuries involve farm machinery.

Farm standards, of course, apply only to farms employing labor, not to farms owned and operated by family members.

Construction

Construction standards activity focused mainly on two subjects, fenders on construction vehicles and ground fault circuit interrupters at construction sites. Standards that would have required both were suspended pending further study.

Maritime

Proposed changes to the maritime standards involved revisions of the standards covering deck openings and edges, working surfaces, lifesaving equipment, and other measures of protection from drowning.

IMPACT STUDIES

In proposing a standard, OSHA considers the effect of that standard primarily as it relates to employee safety and health protection. But other factors—particularly the economic and environmental impacts—also are weighed. Most safety standards have no environmental impact, but may have significant economic impact. On the other hand, many health standards have both economic and environmental impact; for example, a standard requiring exhaust ventilation of a substance into the atmosphere would have environmental impact. Environmental impact statements, where applicable, are required by the National Environmental Policy Act.

Standards requiring changes in equipment or production procedures have, or can have, substantial economic impact. In considering a revision of the noise standard, for example, OSHA contracted with a private firm to provide a cost-to-industry estimate of both a 90-decibel standard and an 85-decibel standard.

Environmental and economic impact studies protect employers and the public from unforeseen economic effects and possible environmental damage, by providing an analysis of the various implications of a standards proposal on society.

VARIANCES AND PETITIONS

Employers may apply for temporary or permanent variances from the standards. A permanent variance may be granted if it can be shown that by doing so equal or better employee protection will be provided. A temporary variance may be given when an employer demonstrates he needs extra time, after a standard's effective date, to get materials or professional assistance or to complete construction necessary to comply with a standard. The employer must take all available steps to protect his employees and comply with the standard as quickly as possible. When a variance promises an improvement in working conditions, it is taken under consideration for possible adoption as a permanent standard.

Pending a decision on the variance, an interim order may be requested. This order would grant temporary relief upon publication in the *Federal Register*.

OSHA received 152 requests for variances from the standards in 1973, bringing the total number of requests received to 481 since April 1971. The following table provides a breakdown of the status of these requests, as of December 31, 1973.

The 60 interim orders granted apply to 1,215 separate establishments. Many of the requests were submitted jointly by several—in some cases by several hundred—employers. Unless an employer is party to a request, however, a variance may not be used in his establishment. Nevertheless, once a variance is granted, other employers having identical situations may apply for the same variance and in most cases have their requests approved.

Employers may also petition for changes in the standards. A determination is made when a petition is received as to its merits relative to other petitions pending, and processing order is assigned

Requests for Variances

Total received.....	481
Total closed.....	277
Approved	12
Denied	6
Handled as clarifications.....	50
Variance request withdrawn.....	42
Variance request inadequate and not followed up by applicant.....	78
Standard not applicable, or subsequently modified or revoked.....	59
Miscellaneous other reasons.....	30
Total pending.....	204
Published in the <i>Federal Register</i> for comment, with interim orders granted.....	60
Published in the <i>Federal Register</i> for comment	24
Being prepared for publication in the <i>Federal Register</i> for comments.....	59
Being held in abeyance pending anticipated changes to standards.....	31
Waiting follow-up information from the applicant	30

accordingly. OSHA received 43 petitions in 1973, bringing the total of such petitions, since April 1971, to 197. The following table provides the status of these petitions as of December 31, 1973.

Petitions for Changes or Revocations

Total number received since April 1971.....	197
Total number closed.....	76
Standard modified.....	21
Standard revoked.....	4
Petition denied.....	22
Closed for other reasons.....	29
Handled as clarifications.....	10
Standard cited not applicable.....	7
Petition inadequate and not followed-up by petitioner.....	12
Total pending.....	121
Published in the <i>Federal Register</i> for comment	3
Being processed and/or prepared for publication in the <i>Federal Register</i>	77
Being held in abeyance pending anticipated changes to standards.....	38
Waiting follow-up information from the applicant	3

LABORATORY ACCREDITATION

Some OSHA standards require that certain items of equipment be of an "approved" type. "Approved" has been understood as meaning approved

by a nationally recognized testing laboratory such as Underwriters Laboratory, Inc. (UL), or Factory Mutual Research Corporation (FMRC).

Shortly after OSHA promulgated its standards, other laboratories sought accreditation from OSHA. Testing backlogs at UL and FMRC made it apparent that additional testing laboratories were needed.

In 1972 OSHA initiated a study to determine criteria and procedures for laboratory accrediting. The study was completed in 1972, and became the basis for regulations published September 11, 1973,

in the *Federal Register* entitled *Accreditation of Testing Laboratories—Criteria and Procedures for Accrediting Testing Laboratories*. These regulations spelled out criteria to be met by laboratories seeking accreditation from OSHA and became effective October 11.

Following publication, some opposition emerged to the requirement that laboratories must be independent of the firms whose products they test. As a result, OSHA's laboratory accreditation program was suspended until further hearings could be held in 1974.

Chapter 5

STATE PLANS

OSHA moved closer toward its Presidential objective of developing an integrated Federal/State partnership in occupational safety and health by giving initial approval, in 1973, to 20 State plans submitted pursuant to Section 18(b) of the Act. These 20 plans, together with those approved in 1972, bring to 23 the total number of States authorized under the Act to administer and enforce a State program.

In order for the State to exercise this authority and be recognized by OSHA as having achieved operational status under which Federal enforcement activity is withdrawn for issues covered by the approved plan, certain requirements must first be met: The State must have enacted enabling legislation, have promulgated standards as effective as OSHA's, have available a staff sufficient to enforce its standards, and have in operation a review system by which employers and employees can contest enforcement actions.

Of the 23 States that had received initial approval by year's end, OSHA determined that 15 had satisfied the requirements for operational status, and four had passed enabling legislation, while not meeting all the other requirements. The remaining four States of the 23 with approved plans may pass enabling legislation in 1974. In addition to the 23 approved plans, 23 plans are undergoing review by OSHA; four State plans were submitted but later withdrawn voluntarily, and five States and the Trust Territories have not submitted plans.

The 23 approved plans protect more than half of the 63 million men and women covered by the Act. In addition, most State plans also protect State, county, and municipal employees who are not protected under the Federal program. *Table*

9 provides additional information about each State and jurisdiction plan and shows the status of all plans as of December 31, 1973.

IMPACT OF STATE PLANS ON OSHA

The transition from a Federal occupational safety and health program to a Federal/State partnership, in which the States administer their own plans within the guidelines and framework of the Act, will continue for at least the next several years. OSHA recognizes the need to make certain adjustments to ensure an orderly transition.

As each State plan becomes operational and effective State enforcement begins, OSHA will withdraw Federal enforcement in all industries covered by the plan. State plans may cover all industries except off-shore industries, which are required by law to be regulated by the Federal Government. Of the 23 approved plans, more than half cover all industries except those prohibited constitutionally. The major exception in most plans is on-shore maritime activity. The New York plan, for example, excludes shipbuilding and repairing.

As Federal enforcement is withdrawn, OSHA compliance personnel will be transferred from States with operational plans to other States. This will increase inspections in all States, because all operational State plans provide for more compliance officers than were initially assigned to those States by OSHA, and the transfer of additional Federal compliance personnel to States without operational plans increases Federal inspection force in those States. However, not all personnel will be transferred. Some will remain in States to conduct inspections in industries not covered by the State plan, and others will remain to monitor

State operations. The purpose of monitoring is (1) to ensure that State plans perform at the level of effectiveness required, (2) to provide information to be used in determining whether final ap-

proval should be given, and (3) after Federal enforcement is withdrawn, to determine whether it should stand or whether action should be initiated by OSHA to resume Federal enforcement.

TABLE 9.—*Report of State plan review activity*

Jurisdiction	Approved plan (approval date)	Plan in review	Enabling legislation passed	Without enabling legislation	Exempted industries for approved plans	Plan withdrawn	No plan submitted
Alabama.....		×		×			
Alaska.....	×	(8/6/73)	×		On-shore maritime.....		
Arizona.....		×	×				
Arkansas.....		×		×			
California.....	×	(4/24/73)	×				
Colorado.....	×	(9/7/73)	×				
Connecticut.....	×	(12/28/73)	×				
Delaware.....				×			
Florida.....		×		×			
Georgia.....						×	
Hawaii.....	×	(12/28/73)	×		On-shore maritime, shipbuilding.		
Idaho.....		×		×			
Illinois.....	×	(10/30/73)	×				
Indiana.....		×	×		Maritime.....		
Iowa.....	×	(7/12/73)	×		On-shore maritime.....		
Kansas.....							×
Kentucky.....	×	(7/23/73)	×				
Louisiana.....							×
Maine.....		×		×			
Maryland.....	×	(6/28/73)	×				
Massachusetts.....		×		×			
Michigan.....	×	(9/25/73)		×	On-shore maritime.....		
Minnesota.....	×	(5/29/73)	×		On-shore maritime.....		
Mississippi.....		×		×			
Missouri.....		×		×			
Montana.....	×	(11/30/72)		×	Maritime.....		
Nebraska.....							×
Nevada.....	×	(12/28/73)	×		Maritime.....		
New Hampshire.....						×	
New Jersey.....	×	(1/22/73)		×	Water transportation, shipbuilding and repairing.		
New Mexico.....		×	×				
New York.....	×	(5/14/73)		×	Water transportation....		
North Carolina.....	×	(1/26/73)	×		On-shore maritime.....		
North Dakota.....						×	
Ohio.....							×
Oklahoma.....		×		×			
Oregon.....	×	(12/22/73)	×				
Pennsylvania.....						×	
Rhode Island.....		×	×				
South Carolina.....	×	(11/30/72)	×		On-shore maritime.....		
South Dakota.....							×
Tennessee.....	×	(6/29/73)	×		On-shore maritime.....		
Texas.....		×		×			
Utah.....	×	(1/4/73)	×		Maritime.....		
Vermont.....	×	(10/1/73)	×				
Virginia.....		×	×				

TABLE 9.—*Report of State plan review activity—Continued*

Jurisdiction	Approved plan (approval data)	Plan in review	Enabling legislation passed	Without enabling legislation	Exempted industries for approved plans	Plan withdrawn	No plan submitted
Washington.....	× (1/22/73)		×		On-shore maritime.....		
West Virginia.....		×		×			
Wisconsin.....		×		×	On-shore maritime.....		
Wyoming.....		×	×		Maritime.....		
American Samoa.....		×		×			
District of Columbia..		×		×			
Guam.....		×	×				
Puerto Rico.....		×		×			
Trust Territories.....							×
Virgin Islands.....	× (8/31/73)		×		On-shore maritime.....		

MONITORING STATE PLANS

In November, OSHA implemented a system that contained revisions to its original proposal for State plan monitoring. Among the improvements of the new system was a provision for continuing visits as needed for evaluation rather than the periodic 6-month visit that was originally proposed. Also provided for by the new plan was a retention of the quarterly and annual reports that were already being provided by the States. These reports provided an overview of the State program. In addition, by comparing them with similar reports from the Federal program, they reveal problem areas within a State plan. Another element of the monitoring program involves investigating complaints about State plans. The complaint, the findings, and the State's response become part of the evaluation file. As a further guarantee of State performance, OSHA personnel periodically accompany State compliance officers on inspections to evaluate their performance and ability.

During the phase when State plans are operating under initial approval, monitoring focuses on the developmental progress being made by the State. Progress is measured against the timetable submitted by the State as part of its plan. State plans must achieve full development within 3 years, or the Secretary shall initiate proceedings to determine whether or not to rescind initial approval. Monitoring also provides an opportunity to alleviate unforeseen problems that later could prevent final approval from being granted. More importantly, monitoring helps assure continued effective protection within the State.

After a plan has been in operation for 3 years and operating at the full development level for at least 1 year, OSHA will conduct a comprehensive evaluation of all aspects of the plan to determine whether final approval should be granted (No State plan was given final approval during 1973 since none had been operational for the required time period). Following final approval, monitoring continues to ensure that the State remains "at least as effective as" OSHA. If evidence at any time suggests that this is not the case, OSHA will initiate proceedings to withdraw final approval and resume Federal enforcement.

Although not strictly a part of the monitoring process, BLS statistical data on occupational injury and illness rates within the States are also considered during all phases of monitoring. For example, unusually high or rising rates of job injuries and illnesses in certain industries in a State would suggest that the plan is not meeting the level of effectiveness required and would be grounds for further investigation by OSHA.

CHANGES IN STATE PLANS

When a change occurs in a State plan, it must be reviewed and approved by the Secretary of Labor, pursuant to Section 18(c) of the Act. A change to a State plan generally occurs when:

- a State completes a developmental step or fails to complete a developmental step on schedule,
- a change in the Federal program requires a similar change in State programs in order to make them equally effective,

—an OSHA evaluation determines that a State plan is not performing as effectively as the Federal program,

—a State on its own initiative modifies its plan.

When a State fails to complete a developmental step on schedule, it must submit a revised schedule showing that full development can be completed within the original 3-year period; otherwise approval must be withdrawn. All other changes are reviewed to ensure that the State is, and will remain, at least as effective as OSHA.

A State may make a change to its plan and begin operating accordingly before OSHA completes its review. But a State must cease operating under a change if it is rejected by OSHA. States may request advisory opinions from OSHA before putting changes into effect to reduce the likelihood of this occurring.

Major changes in 1973 included revised developmental schedules for the Montana, New Jersey, and New York plans, setting new target dates for enabling legislation.

STATE PLAN GRANTS

OSHA continued to fund 90 percent of the developmental cost of State plans until June 30, 1973, when authority for such funding expired. Developmental grants were awarded at the regional level according to procedures established by the national office.

In 1973, a total of \$2,719,551 in planning grant funds was awarded to 35 jurisdictions (*See Table 10*). Since development grants began in June 1971, \$12,206,044 has been granted to the 50 States, the District of Columbia, Puerto Rico, Guam, American Samoa, and the Virgin Islands. Planning projects include drafting legislation, developing plans for compliance activity, designing training programs for enforcement personnel, and studying the special needs of employers and employees in various industries. As States completed their plans, or elected not to submit them, remaining funds were returned to the U.S. Treasury.

The Act also authorizes OSHA to fund up to 50 percent of the operating cost of approved State plans. The national office, regional offices, Bureau of Labor Statistics, National Institute for Occupational Safety and Health, and the Office of the Solicitor take part in the review and approval process. A Department of Labor auditor ensures

TABLE 10.—*State planning grants awarded in calendar year 1973*

State	Amount of Grant
Alabama.....	\$59,330
Alaska.....	74,060
American Samoa.....	41,500
California.....	272,496
Colorado.....	46,515
Connecticut.....	49,500
Delaware.....	83,137
District of Columbia.....	22,097
Florida.....	43,000
Guam.....	42,239
Hawaii.....	79,200
Idaho.....	170,392
Indiana.....	63,925
Kentucky.....	50,000
Maine.....	69,025
Maryland.....	136,668
Massachusetts.....	67,572
Michigan.....	48,479
Mississippi.....	20,000
Missouri.....	199,886
Montana.....	32,598
New Hampshire.....	55,166
New Jersey.....	77,028
New York.....	47,250
Ohio.....	85,160
Oregon.....	44,551
Pennsylvania.....	173,788
Puerto Rico.....	114,954
Rhode Island.....	56,808
Tennessee.....	54,716
Vermont.....	72,100
Virginia.....	66,510
Washington.....	44,172
Wisconsin.....	25,888
Wyoming.....	129,841
Total.....	2,719,551

that each State's accounting system will produce accurate and timely expenditure reports, that proposed expenditures are reasonable within the context of the plan, and that disbursements are consistent with generally acceptable accounting principles and meet all regulations and guidelines. If a State's accounting system is inadequate, remedial measures are prescribed and must be adopted before grants will be approved.

In 1973, 21 jurisdictions received operating grants totalling \$25,732,882 (*See Table 11*). This total includes an amendment to the initial \$300,000 grant to Montana awarded in December 1972, and the subsequent termination of the North Dakota

grant after that State withdrew its plan. Grants awarded before June 30, 1973, were for one year and were later amended, or will be amended, to extend through June 30, 1974. Beginning July 1,

TABLE 11.—State operational grants awarded in calendar year 1973

	Date of grant award	Amount of grant
Alaska.....	10/1/73	\$520, 786
California.....	6/1/73	5, 656, 104
Colorado.....	10/1/73	535, 908
Illinois.....	11/1/73	1, 167, 934
Iowa.....	8/1/73	381, 455
Kentucky.....	8/1/73	984, 167
Maryland.....	6/30/73	1, 406, 788
Michigan.....	10/1/73	2, 190, 168
Minnesota.....	6/30/73	673, 036
Montana ¹	² 6/30/73	191, 310
New Jersey.....	3/1/73	1, 130, 420
New York.....	8/1/73	3, 971, 768
North Carolina.....	4/1/73	955, 508
North Dakota ³	2/1/73	25, 000
Oregon.....	6/30/73	1, 547, 509
South Carolina.....	1/1/73	911, 977
Tennessee.....	6/30/73	875, 137
Utah.....	2/1/73	393, 817
Vermont.....	10/1/73	257, 980
Virgin Islands.....	9/1/73	75, 106
Washington.....	3/1/73	1, 881, 004
Total.....		25, 732, 882

¹ Montana grant for \$300,000 awarded 12/1/72.

² Amended.

³ North Dakota plan withdrawn, and grant closed out, June 30, 1973.

1974, all operating grants will be awarded on a fiscal year basis; and beginning July 1, 1974, grants will be awarded at the regional level.

Grants in effect at year's end included funds for 1,674 State compliance officers. All grants were awarded at the maximum 50 percent funding level.

WITHDRAWAL OF STATE PLANS

Four States that had submitted plans subsequently withdrew them in 1973—Georgia, New Hampshire, Pennsylvania, and North Dakota. Organized labor, in 1973, opposed the State plan concept in general and led the opposition to further expansion of the role of the States in this program.

In spite of the requirement of the Act that all State plans must be at least as effective as OSHA, and in spite of the monitoring program in effect, labor organizations opposing the State plan concept argued that a return to State enforcement will lessen the protection the Act now provides.

Some industries, apparently fearing that different standards in different States could create hardships, also came out in opposition to State plans.

Whether this opposition would continue, and whether it will have influence in the future, remained an unanswered question in 1973.

STATE INSPECTIONS

See Chapter 2

STATE RECORDKEEPING

See Chapter 7

Chapter 6

VOLUNTARY COMPLIANCE

Voluntary compliance is a basic thrust of the Act. The law declares that it is the purpose of Congress to assure safe and healthful working conditions

. . . by encouraging employers and employees in their efforts to reduce the number of occupational safety and health hazards at their places of employment, and to stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions. . .

It is significant that this provision is listed first among 13 specific means by which the overall purpose of the Act is achieved. The Secretary of Labor thus holds a Congressional mandate to act not only as an instrument of standards-setting and enforcement, but also as a catalyst to bring about improvement in occupational safety and health by stimulating others to work toward this goal.

PROGRAM OBJECTIVES

To carry out this mandate OSHA encourages employers and employees to seek information on the Act, on occupational safety and health in general, and to develop viable programs within the workplace. To assist employers and employees, OSHA has recommended a 10-point program that encourages and assists them to:

- establish safety policies and attitudes, including written accident prevention policies that comply with and supplement the Act, and to promote these policies and attitudes at all management levels, making use of steering committees where possible;
- fix responsibility and accountability for occupational safety and health and include among the criteria considered in determining promotions the manner in which this responsibility and accountability has been handled;
- formally organize and focus safety and health activities by establishing committees and assigning specific responsibilities to individuals (such organization lends continuity to safety and health programs and committees and are well suited to cooperative labor-management efforts);
- include specific industry-oriented job safety and health training as part of the overall program (OSHA and the National Safety Council are two sources for this training, and many others exist);
- establish systems of self-inspection and encourage employees to report unsafe conditions or practices;
- fully investigate all job injuries, illnesses, and deaths and keep the records required by OSHA (information so gained can provide fuller understanding of hazards and causes of accidents, and can be used to correct or prevent them);
- fully assess overall working conditions to determine if problem areas exist;
- fully assess work methods—especially in hazardous industries—to determine if special equipment, precautions, or different methods are required;
- establish first aid programs and training, and provide professional medical care when needed (medical training should include informing employees of health dangers from chemicals or other substances or conditions in the environment and professional industrial hygienists should be brought in when needed); and

—promote job analysis by individuals to determine if special accident prevention measures may be warranted in certain critical operations.

These objectives are promoted in many ways—in public forums, through exhibitions, in OSHA literature, and in public presentations to interested groups. In 1973, they were specifically outlined at meetings held by the Environmental Management Association, the Middle Atlantic Lumberman's Association, the Public Works Administration, the Protective Coatings Association, and various other management and labor organizations.

PUBLIC INFORMATION

Voluntary compliance is more than a program of fixed objectives. It is essentially an effort to increase public understanding of the seriousness of occupational injuries, illnesses, and deaths and to help employers and employees alike to do something about them. Furthermore, while it is an addition to OSHA's enforcement effort, it is not separate from it, and an overall part of voluntary compliance is providing information to help employers understand and comply with standards and regulations.

Therefore, OSHA carries out a broad program of information, both formally and informally.

Informally, OSHA national, regional and field office personnel answer hundreds of thousands of requests for information each year by telephone, letter, and personal contact.

Formally, OSHA national and regional personnel participate as speakers before hundreds of interested groups and trade associations each year, including, in 1973, an extensive presentation at the National Safety Congress in Chicago.

As part of the formal information program, OSHA maintains a number of publications available from the Government Printing Office that provide factual information about programs, standards, and specific occupational hazards. *All About OSHA*, a comprehensive booklet explaining the agency and its program, was published in 1973, and more than 1.5 million copies have been distributed. Other publications in 1973 included:

- Training Requirements of the OSHA Standards*
- Employer/Employee Safe Practices for Excavation and Trenching Operations*
- Trenching and Excavation . . . a Checklist*

—*Contractor Planning for Job Safety and Health in Excavation, Trenching and Backfilling*

—*Questions and Answers to Part 1910—The General Industry Standards*

OSHA's official magazine, *Job Safety & Health*, which publishes informative articles on occupational safety and health written in nontechnical style, converted from bi-monthly to monthly publication in 1973, and circulation increased to more than 42,000.

Finally, four volumes of the five-volume OSHA Subscription Service were published in 1973. Volumes I, II, and III contain the general industry, maritime, and construction standards; Volume IV, other regulations and procedures; and Volume V is the *Field Operations Manual* (expected to be ready in mid-1974). Any or all of the volumes may be ordered. For a one-time subscription fee, subscribers receive all changes as they are published for an indefinite period. The Subscription Service is available through GPO. Order blanks are available from OSHA offices.

A complete list of all OSHA publications is found in *Appendix H*.

OSHA, in 1973, released *This is OSHA*, a basic film about the agency and its program that met with widespread acceptance. Requests for the film outdistanced the number of copies available and waiting periods of up to 6 weeks were not uncommon.

A second film, *OSHA Ahead*, previewed at the National Safety Congress, was undergoing re-editing for public release in 1974. This film used the newest available film-making techniques in a setting that equates the workplace environment to the natural environment we seek to preserve.

OSHA works closely with the media in making news and information readily available to the public. Spanish and English public service announcements for television and radio continued, and new public service announcements are being developed. An editors' conference in May in Washington attracted approximately 150 representatives of the press. The 1-day conference included talks by various OSHA officials and an open question-and-answer session. Similar editors' conferences took place in some regions. Not only did these conferences, in many cases, result in articles about OSHA, they also established closer relations with the media that resulted in more detailed reporting of subsequent OSHA-related stories.

RESULTS

Partly, it is believed, as a result of these efforts occupational safety and health enjoyed increased attention by individuals and organizations outside government. This new awareness was evident in labor-management negotiations, where several major contract settlements focused on job safety and health provisions. For example:

- A contract agreement between the United Auto Workers (UAW) and the Chrysler Corporation included commitments by management to correct or eliminate hazardous and unsanitary conditions from plants, and to prevent future hazards from being introduced. This set a precedent in the automobile industry, and similar agreements were reached later in the year between UAW and Ford Motor Company and the General Motors Corporation.
- A pact signed by the International Brotherhood of Teamsters and the National Automobile Transporters Division declared it to be their policy to “assure as far as possible every employee represented . . . a safe and healthful place of employment. . . .” OSHA played an active role in this agreement.
- The Oil, Chemical, and Atomic Workers International Union (OCAW), AFL-CIO, signed agreements with a number of employers that included numerous provisions to ensure safe and healthful working conditions, and struck one major oil company over the issue. Union President A. F. Grospron stated, “I believe the Act provided the necessary catalyst that made it possible for

the parties to deal effectively with the safety and health problems in the industry.”

A survey of 20 international unions representing a broad cross-section of industry—construction, manufacturing, transportation, and utilities—posed the question: What effect has the Act had on the collective bargaining process?

Responses varied in degree, but there was agreement that the Act has had a positive impact in resolving safety and health issues, and a general conclusion that a marked improvement in settling individual grievances also has resulted.

An industry-funded survey of 1,150 employers found that 84 percent had initiated safety and/or health programs as a result of OSHA.

Labor and industry have also cooperated in proposing standards. The telecommunications industry (*See Chapter 4*) developed a complete standards package that has been proposed for adoption by OSHA. The textile industry, the paper bag manufacturing industry, and others have undertaken similar efforts. And other trade associations have worked jointly to devise means of complying with OSHA requirements for their membership.

Equally important, is that a marked change has taken place in much of the public comment in newspapers, magazines, trade association publications, union publications, professional journals, and others in regard to OSHA and occupational safety and health. More and more, the articles compare their comments with the statistics of death, injury, and illness, and reach the conclusion that the problem is real, the challenge genuine, and that a response is necessary.

Continuing to increase this public, industry, and labor awareness is a key to OSHA's program.

Chapter 7

THE STATISTICAL PROGRAM

Significant progress was made during 1973 by the Bureau of Labor Statistics (BLS) in carrying out its responsibilities, as designated by the Secretary of Labor, for the statistical programs required by the Act.

The injury and illness data collected from employers for the year 1972, unlike that collected in the 1971 survey which covered only 6 months, provides a base with which to compare future, annual survey data. Also available for this report are some 1973 survey results, enabling comparison with 1972 data for selected industries. In 1972, and carrying on into 1973, the sampling of reporting units was expanded to provide not only national estimates of incidence rates and numbers of fatal and nonfatal injuries and illnesses, but also comparable State estimates. The incidence rate is a ratio expression between the number of injuries and illnesses and exposure time (hours worked) per 100 full-time employees. This standard expression enables direct comparisons by industry, the various classes of recordable cases, and by other variables such as employment size.

As a second major achievement, the recordkeeping system basic to the statistical reporting program was thoroughly reviewed, and proposed revisions were published in the *Federal Register*.

Thirdly, under our Statistical Grant Program, nearly all States and jurisdictions became active participants in developing their own statistical programs under BLS procedures and guidelines.

Finally, progress was made in establishing a comparable recordkeeping and reporting system among Federal agencies and in the collection of State workers' compensation data.

SURVEY CHARACTERISTICS

The Occupational Safety and Health (OSH) survey is a Federal-State cooperative effort. It is

conducted by the BLS in conjunction with those States which are participants in the cooperative program. BLS determines the sampling ratios and identifies the reporting units that are to be included in the survey, by State. States cooperating in the survey manage the data collection and processing of the sample portion for their particular State. The OSH survey is the only mandatory survey conducted by BLS and subjects employers to fines and other penalties under the Act, if they refuse to participate.

Both the 1972 and 1973 surveys of occupational injuries and illnesses administered by BLS involved a sample of approximately 650,000 employers in private industry. Excluded from the OSH sampling frame of both surveys were employers covered by other safety and health legislation (coal and metal and non-metal mining, and railroads); the Federal Government, which is under a separate reporting system; and exempted classes of employees under the Act (State and local government employees, self-employed individuals, and domestics). Although farms were not included in the 1972 OSH survey results, they were included in 1973 and will continue to be included in future years.

Approximately 200,000 of the 650,000 units made up the national segments of the sample that provide estimates of the number of deaths and non-fatal injuries and illnesses, as well as injury and illness incidence rates by industry for the Nation as a whole. The other 450,000 units represent the State supplement of the sample needed to develop State estimates of injuries and illnesses for use in State occupational safety and health programs. Fifty-three States and jurisdictions were granted a total of approximately \$2 million to process the annual survey results and to develop their injury and illness estimates.

Sample selection is based on procedures established to obtain optimum allocation sampling. All establishments within the scope of the survey are stratified by industry and by employment size. The sample includes all units above a specified employment size and declining proportions of units in smaller employment sizes. Injury and illness data for all reporting units in each industry are expanded by the inverse of the sampling ratio and benchmarked to the appropriate employment level in each industry to obtain the estimates.

About 85 percent of the 200,000 employers in the 1972-73 national sample segment completed and returned the survey questionnaire. The survey questionnaire asked for (1) the average number of employees; (2) total number of hours worked; (3) type of business activity; (4) injuries and seven categories of occupational illnesses broken down by fatalities, lost workday cases (including the number of days lost), and nonlost workday cases; and (5) terminations and permanent transfers resulting from job-related injuries or illnesses. The variable section of the questionnaire sought information on the type of medical services provided by employers in the 1972 survey and, in the 1973 survey, on injuries and illnesses by month and the month of the OSHA inspection, if any.

The estimates from the 1971 survey do not provide a data base for comparison with the 1972 and 1973 survey estimates—for two reasons. First, because the 1971 survey covered only six months (July-December) instead of the full calendar year, seasonal factors may have affected the results. Secondly, because the recordkeeping system was new to employers in 1971, some confusion over interpretation of definitions occurred. Therefore, the 1972 survey results provide the original data base required for comparison with 1973 data and for trend analysis in future years under the OSHA definitions.

1972 Survey Results

The national estimates indicate that in 1972, the first full year of recordkeeping under the Act, almost 5.7 million recordable work-related injuries and illnesses occurred in private non-farm industries covered by the survey (*See Appendix C*). The survey covered approximately 58 million employees, so on the average, one out of every 10 workers experienced a job-related injury or illness

during the year. Recordable cases include all job-related deaths and illnesses and any injuries which require more than first aid treatment.

Occupational illnesses numbered 210,500, or about 4 percent of all recordable cases. It is generally recognized that underreporting of occupational illnesses is prevalent due to problems of identification and measurement. These include the lack of facilities and trained medical personnel for proper diagnosis; long latency periods thwarting timely detection; questions of occupational illness coverage under workers' compensation; and factors outside the work environment that cloud the work relationship concept.

Of the total recordable cases, there were about 5,500 work-related deaths outside of farms, mines, railroads, and government. If the estimates for the excluded industries and the self-employed were added to the 5,500, the BLS estimate for 1972 would be approximately 11,000. This estimate is somewhat lower than the National Safety Council estimate of 14,100 deaths in all industries in 1972.

In the total private nonfarm sector, the incidence rate for all recordable cases was 10.9 (*See Appendix D*). Rates for major industry divisions ranged from 2.5 in finance, insurance, and real estate to 19.0 in contract construction (*See Table 12*). Manufacturing had the second highest incidence rate, 15.6. Rates in each of the other major industries that together accounted for more than 2.2 million recordable cases were substantially below the construction and manufacturing rates.

In general, incidence rates for lost workday cases were less than half the incidence rate for nonlost workday cases, and the total number of lost workday cases accounted for only about 30 percent of all nonfatal cases. Nevertheless an estimated 24.7 million workdays were lost due to job-related injuries and illnesses in 1972.

This figure, which does not include fatalities, is equivalent to nearly 100,000 employee-years of work. The average number of lost workdays per lost workday case was 14—ranging from 12 in finance, insurance, and real estate to 16 in transportation and public utilities.

Reporting units with less than 50 or more than 1,000 employees tended to have lower incidence rates than units in the mid-size classifications. The highest incidence rates were reported by units of 100-249 employees. This establishment size had a total nonfarm industry rate of 14.7, over one-third higher than the overall 10.9 rate (*See Table 12*).

Contract construction accounted for almost 570,000 recordable injuries and illnesses, about 10 percent of the total. These resulted in an estimated 180,000 lost workday cases with an overall loss of 2.6 million workdays, or more than 10,000 employee-years of work. The average number of lost workdays per lost workday case in construction was 15. There were only slight differences in the average number of days lost per lost workday case among the three major industry groups—special trade contractors averaged 14, and general building contractors and heavy construction contractors averaged 16.

Manufacturing, accounting for approximately one-third of total employment in the private non-farm sector, had almost half of all injuries and illnesses. Approximately 27 percent of all manufacturing cases involved lost workdays, averaging 15 days per case, and accounting for 11.5 million workdays, or more than 45,000 employee-years of work. Again this does not include fatalities. Among the 21 major industry subdivisions, 10 had incidence rates above the 15.6 manufacturing average—lumber and wood products (25.4); fabricated metal products (22.8); primary metal industries (21.1); food and kindred products (19.4); furniture and fixtures (19.3); stone, clay, and glass products (18.8); transportation equipment (18.8); rubber and plastics products (18.4); machinery except electrical (17.1); and paper and allied

products (16.0). Seven of these are durable goods industries.

1973 Survey Results

The number of recordable cases increased by almost 5 percent from 5.65 to 5.92 million; this increase was largely attributable to an increase in total hours of exposure worktime, as employment rose by nearly 3 million from 1972 to 1973 in comparable industries (based on benchmark-revised employment data). The 1973 incidence rate for all industries in the private sector covered under the Act was 11.0 per 100 full-time workers, virtually the same as in 1972 (10.9) (*See Table 13*).

Results of the 1973 survey indicate that there were some improvements over the 1972 record. First, for comparable industries, the number of work-related fatalities declined from 5,500 in 1972 to 5,100 in 1973, or more than 7 percent; the largest decline occurred in contract construction, including trenching and excavation activities of which OSHA gave special emphasis in 1973 (*See Appendix E*). Secondly, all five industries in the OSHA target inspection program (roofing and sheet metal, meat products, lumber and wood products, miscellaneous transportation equipment, and water transportation services) showed a decline in incidence rates from 1972 to 1973, ranging from 2.6 percent in water

TABLE 12.—Recordable occupational injury and illness incidence rated by size of unit and industry—1972¹

Number of employees	Private nonfarm sector ²	Contract construction	Manufacturing	Transportation and public utilities	Wholesale and retail trade	Finance, insurance and real estate	Services ³
All sizes.....	10.9	19.0	15.6	10.8	8.4	2.5	6.1
1 to 19.....	5.7	14.3	11.8	8.0	4.6	2.1	2.7
20 to 49.....	10.3	19.8	16.5	12.7	8.9	1.9	4.6
50 to 99.....	13.3	22.8	19.5	12.6	11.1	2.9	7.6
100 to 249.....	14.7	24.9	20.2	11.6	12.1	2.8	7.9
250 to 499.....	13.7	24.2	17.3	9.0	11.5	3.0	8.4
500 to 999.....	12.2	19.7	14.3	10.0	12.4	2.9	9.4
1,000 to 2,499.....	10.9	15.1	11.9	11.3	11.9	2.8	8.9
2,500 and over.....	11.1	12.7	12.4	11.4	10.2	1.8	6.4

¹ The incidence rates were calculated as: $N/MH \times 200,000$, where

N=number of injuries and/or illnesses

MH=total hours worked by all employees during calendar 1972

200,000=base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year)

² Does not include railroad and mine activities other than oil and gas extraction (SIC 13).

³ Includes agricultural services, forestry and fisheries (SIC 07-09).

Source: Bureau of Labor Statistics, U.S. Department of Labor.

TABLE 13.—Recordable occupational injury and illness incidence rates for comparable industries, private nonfarm sector, by industry, United States—1973 and 1972

Industry	Incidence rates per 100 full-time workers ¹					
	Total recordable cases		Lost workday cases		Nonfatal cases without lost workdays	
	1973	1972	1973	1972	1973	1972
Private nonfarm sector ²	11.0	10.9	3.4	3.3	7.6	7.6
Contract construction.....	19.8	19.0	6.1	6.0	13.6	12.9
Manufacturing.....	15.3	15.6	4.5	4.2	10.8	11.4
Transportation and public utilities ³	10.5	10.8	4.6	4.5	5.9	6.3
Wholesale and retail trade.....	8.6	8.4	2.7	2.8	5.9	5.6
Finance, insurance, and real estate.....	2.4	2.5	.8	.8	1.6	1.7
Services ⁴	6.3	6.1	2.0	2.0	4.3	4.1

¹ The incidence rates represent the number of injuries and illnesses per 100 full-time workers, and were calculated as: $(N/EH) \times 200,000$, where

N = number of injuries and illnesses

EH = total hours worked by all employees during calendar year

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

² Includes oil and gas extraction which is not a component of the industry divisions listed. Other mining activities are not included.

³ Excludes railroads (SIC 401).

⁴ Includes agricultural services, forestry, and fisheries (SIC 07-00).

Source: Bureau of Labor Statistics, U.S. Department of Labor.

transportation services to 5.1 percent in lumber and wood products (*See Table 14*). Although the number of occupational illnesses also declined by about 7 percent between the two years, this change requires cautious interpretation because of the difficulties of measurement as indicated above.

In both 1972 and 1973, about three in every 10 injuries and illnesses resulted in absence from the job or work limitations, though the average number of days lost per lost workday case rose slightly in 1973, to 15 from 14 in 1972. The incidence rate of lost workdays (number of lost workdays per 100 full-time workers), another measure of severity, increased from 47.9 in 1972 to 52.0 in 1973.

Estimates for employees working on farms, available for the first time, indicated that their job-related injury and illness experience paralleled that for all employees covered by the survey. Approximately 66,000 injuries and illnesses were estimated in 1973, of which 40 percent resulted in lost worktime.

The 1973 rates for all major industry divisions ranged from 2.4 in finance, insurance, and real estate to 19.8 in contract construction (*See Appendix F*). Despite the substantial drop in fatalities in construction, the 1973 incidence rate overall was over 4 percent higher in this industry, compared with the 1972 rate.

The incidence rate in manufacturing decreased slightly, from 15.6 in 1972 to 15.3 in 1973. Among

the 21 major industry groups within manufacturing, 10 had incidence rates above the average for this industry division. Reductions in incidence rates also occurred in 1973 in transportation and public utilities and in finance, insurance, and real estate; while in wholesale and retail trade and in services slight increases in rates were posted.

More complete data covering 1973, including mining and railroad injury and illness statistics, to be furnished by the Mining Enforcement and Safety Administration and the Federal Railroad Administration respectively, will be made available in a bulletin to be published in early 1975.

WORKERS' COMPENSATION DATA

In addition to statistics derived from the annual survey, BLS received work-related injury and illness data based on workers' compensation records through contractual arrangements with several States. Unlike annual survey data that provide industry incidence rates, the workers' compensation data provides information on such factors as the nature of the injury (cut, fracture, etc.), part of body affected (hand, leg, etc.), the source or agency of the accident (machine, ladder, etc.), and the type of accident (struck by, fall, etc.). These four analytical categories are based on the American National Standard Institute's method of recording basic facts relating to the nature and oc-

TABLE 14.—Recordable occupational injury and illness incidence rates for target industries, United States—1973 and 1972

Industry	SIC code ¹	Incidence rates per 100 full-time workers ²		
		Total recordable cases		
		1973	1972	Percent change
Roofing and sheet-metal work.....	176	27.7	28.9	-4.2
Meat products.....	201	27.2	28.2	-3.5
Lumber and wood products.....	24	24.1	25.4	-5.1
Miscellaneous transportation equipment.....	379	35.5	36.5	-2.7
Water transportation services.....	446	26.2	26.9	-2.6

¹ *Standard Industrial Classification Manual*, 1967 Edition.

² The incidence rates represent the number of injuries and illnesses per 100 full-time workers, and were calculated as: $(N/EH) \times 200,000$, where

N = number of injuries and illnesses

EH = total hours worked by employees during calendar year

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Source: Bureau of Labor Statistics, U.S. Department of Labor.

currence of work injuries (ANSI Z16.2), or variations thereof. This more detailed information on the characteristics of work injuries and illnesses is potentially useful in standards setting, special inspections, and safety training.

The New York Study

In 1973, the New York State Department of Labor, under contract with BLS, published a 10-volume Special Bulletin (No. 243) containing tabulations of closed workers' compensation cases in the State of New York for the period 1966-1970. Entitled *Characteristics and Costs of Work Injuries in New York State*, this bulletin presents work injury data for 100, 3-digit SIC industries that together accounted for 80 percent of all compensated cases closed in the 5-year period. The New York publication provides information about the characteristics of injuries in much greater detail than was published previously and should provide new insights into specific problem areas. In addition to injury characteristic information, the bulletin also furnishes data on the indemnity and medical costs associated with the injuries. Cost data are considered useful indices of injury severity.

During the 5-year period, the New York State Workmen's Compensation Board compensated and closed out approximately 423,000 cases in these 100 industries, involving combined indemnity and medical costs of \$816 million. The average cost per case in all industries covered was \$1,930. The aver-

age cost for each separate SIC category ranged from \$1,140 in the motor vehicle and equipment manufacturing industry to \$4,257 in nonhighway heavy construction.

The 10-volume set is available from the New York State Department of Labor, Division of Research and Statistics, 80 Centre Street, New York, New York 10013.

The Five-State Project

BLS also contracted in 1973 with five States—California, Florida, Maine, Nebraska, and Wisconsin—to obtain tabulations of their workers' compensation data for the most recent 2-year period. In addition to the data output, which will include injury-characteristic information by industry, the contracts call for a report by a State safety specialist, focusing on the safety aspects implied by the data. The report will be based on an analysis of data from 10 selected industries with consistently high incidence rates. As the tabulations and safety specialists' reports are received, they will be transmitted to OSHA for possible use in OSHA activities.

Other State Workers' Compensation Data

Finally, in an effort to obtain for OSHA detailed information on fatalities in the work environment, BLS asked the States to furnish listings of work-related deaths in 1972, based on workers' compensation data and including (1) the age,

sex, and occupation of the deceased, (2) the type of industry and size of establishment, and (3) the nature and source of injury and the type of accident.

Forty-two States responded to the request. The data may provide important insights into the nature of work-related fatalities.

RECORDKEEPING

Vital to the statistical and other programs established under OSHA is the recordkeeping system administered by BLS. A detailed description of the OSHA recordkeeping system is contained in the Recordkeeping Requirements booklet that was mailed initially to more than 6 million employers throughout the country. Since July 1971, millions of pieces of recordkeeping materials have been distributed to employers in response to their requests.

Recordkeeping Aids

To keep employers up to date on their recordkeeping responsibilities, BLS, from time to time, publishes an addendum to OSHA Recordkeeping Requirements containing changes in rules and regulations. Other specialized aids also have been developed to meet employer demands for information. *What Every Employer Needs to Know About OSHA Recordkeeping*, a booklet that answers more than 160 frequently asked questions, is available free; more than 1.5 million copies have been distributed. Also available, at a nominal charge, is a cassette tape package—*An Audio Aid to OSHA Recordkeeping*—that gives an interesting and informative oral explanation of how recordkeeping forms are to be completed. To date, nearly 3,500 of these cassette packages have been purchased by employers, trade associations, and other organizations. Another aid, *The Accident Bug*, is an animated 16-millimeter (sound) color film that gives a complete explanation of the recordkeeping procedures. Developed for use in group training conferences and seminars, it has been purchased by an estimated 250 employers.

Petitions for Exemptions

The recordkeeping procedures include a provision whereby employers who wish to maintain records of occupational injuries and illnesses in a manner different from that prescribed in the regulations can petition for a recordkeeping excep-

tion. Many employers indicated a desire to petition for an exception shortly after the recordkeeping regulations became effective in July 1971. It was possible to satisfy almost all of the petitions by amending the regulations, and thereby giving relief not only to the petitioners but to many others who had not petitioned.

Only one petition had been granted as of the end of 1973—that of the American Telephone and Telegraph Company (AT&T). On July 12, 1972, AT&T was given permission to keep injury and illness records for its field operations on the basis of occupational groups subject to comparable hazard exposure, rather than at each worksite as the regulations require, on grounds that AT&T's major contentions were well founded, namely that their present recordkeeping method maximizes the usefulness of the statistics, and that the costs of conversion would be excessive. One other petition was under active consideration in 1973 for the same reasons, but no decision had been made by the end of the year.

Review of the System

In 1973, after 18 months of operation, the recordkeeping system underwent a comprehensive review. More than 150 individuals who have been actively engaged in occupational safety and health activities in labor, management, public interest groups, and government were given the opportunity to comment by mail on BLS-proposed options or to submit their own proposals for changes. This advisory group generally opposed changes that would alter the basic structure of the system, but agreed that the system as presently constituted could be improved.

As a result, a proposal to revise the recordkeeping regulations, incorporating most of the suggestions of the task force, was published in the *Federal Register* of November 14, 1973. Major changes on the log form (OSHA No. 100) and the summary form (OSHA No. 102) include a breakdown of lost workdays into two categories—days away from work and days of restricted work activity—and the addition of a column for the total number of cases. Editorial changes were proposed to improve the appearance and readability of the log form and to make provisions for the required signature and date on the summary form. The new forms are scheduled to become effective January 1, 1975.

Another proposed change in regulations would allow access to the log of occupational injuries and illnesses by authorized employee representatives. This change is to improve the effectiveness of the recordkeeping system in keeping employees informed of safety and health conditions in the workplace. This change in the OSHA recordkeeping system will become effective only after all comments are considered and a final notice is published in the *Federal Register*.

QUALITY MEASUREMENT SURVEYS

BLS is attempting to maintain quality control measures at all stages in the collecting and editing of data for each of its regular survey programs. The quality measurement survey for the occupational injury and illness program has two objectives: (1) to obtain quantifiable estimates on the validity of data reported on the annual occupational injuries and illnesses survey form (OSHA No. 103), and (2) to examine the recordkeeping system as it is maintained by employers. The results of this survey are used to improve collection procedures and to assist in the analysis of data relating to occupational injuries and illnesses.

The first of these surveys was conducted in 1972, and focused on responses to the 1971 occupational injury and illness survey. This effort was mostly concerned with developing a methodology for quality measurement surveys. Only about 1 percent of the employers who submitted reports of their injury and illness experience in 1971 were included in the survey; and because of the small sample size, no publishable data resulted.

Based on the experience of this first survey, BLS, in 1973, undertook an expanded quality measurement survey to study the data compiled from the 1972 annual survey. Approximately 2,000 employers were visited, mostly by personnel from State agencies cooperating in the OSHA survey. Unlike the first survey, the 1973 survey reached some employers who did not respond to requests for 1972 data. As a result, the injury and illness experience of nonrespondents may be compared with that of respondents.

COMPARABLE RECORDKEEPING PROCEDURES

Also in 1973, BLS continued discussions with other Federal agencies to develop a national pro-

file of work-related injuries and illnesses and to eliminate duplication in collecting information, thereby reducing the burden imposed upon employers in some industries by multiple recordkeeping and reporting requirements.

The Mining Enforcement and Safety Administration, U.S. Department of the Interior, furnished BLS with data collected under its occupational safety and health program that depicted the injury and illness experience in coal mining in the last nine months of 1972. Comparable metal/non-metal mining data will be available on an annual basis, beginning with data for 1973.

The Federal Railroad Administration, U.S. Department of Transportation, is in the process of modifying its recordkeeping and reporting regulations to collect and furnish comparable injury and illness data from the railroad carriers, beginning in 1975.

THE STATISTICAL GRANT PROGRAM

Statistical planning activities continued in 45 of the 53 States and jurisdictions participating in the BLS statistical grant program in 1973. Federal funding totaled nearly \$1.5 million, about \$400,000 more than money allocated for planning in 1972 (See Table 15). The special authority under Section 23 of the Act to fund up to 90 percent of State planning costs expired June 30, 1973. Thus, future planning for new statistical programs will be funded as a supplement to the operational statistical grant, pursuant to Section 24 of the Act, at levels not to exceed 50 percent.

Each of the States used a major portion of the planning funds to complete the development of a computerized system to (1) maintain and update an address file for survey mailouts, (2) screen data to ensure accuracy of employer reporting, (3) tabulate summaries of data for analytical purposes, and (4) prepare State estimates of injuries and illnesses comparable to those produced at the national level. In addition, planning grants to 28 States were used to develop standardized procedures for processing data from first reports of injuries filed under State workers' compensation laws, thereby facilitating study of accident causation factors.

Series of recordkeeping seminars were conducted by 22 States to ensure that employers and employees were knowledgeable of the concepts, definitions, and instructions for the forms required

by the Act. States themselves have also been encouraged to establish recordkeeping and reporting procedures covering State and local government employees; those with approved State plans must develop such procedures.

Operational statistical programs under Section 24 of the Act were carried out in 1973, in 48 of the 50 States and in the District of Columbia, Puerto Rico, the Virgin Islands, Guam, and American Samoa. This widespread participation reflects the broad interest and apparent need for a uniform body of relevant and reliable statistics to measure the incidence of injuries and illnesses at the State level. The Federal Government contributed 50 percent of the approximately \$5 million spent on the statistical program. The participating States mailed OSHA forms to more than a half-million employers throughout the Nation. The sample design for each State, regardless of

differences in employment levels, permits detailed industry estimates of the number and incidence of injuries and illnesses. Because uniform procedures have been adopted by the States, statistical findings will be comparable and consistent with national estimates.

Monitoring State performance under the statistical grant program is carried out primarily by continuing visits by representatives of BLS's regional offices located throughout the country. Trained specialists furnish onsite technical assistance and conduct formal training sessions. In addition, the States are required periodically to complete a one-page form that identifies progress on the various program objectives covered by the grant. Financial reporting is required quarterly.

Finally, State estimates of injuries and illnesses are scrutinized for validity, accuracy, and reliability.

TABLE 15.—*Summary of State Grants Activity—1973*

Jurisdiction	Planning Grants Section 23(a)	Statistical Planning Grants (23(a)(3))	Statistical Operational Grants (24)	Agreements (7(c)(1))	Operational Grants 23(g)	Experimental and Demonstration
Region I—Boston:						
Connecticut.....	\$49,500	0	\$45,542	0	0	0
Maine.....	69,025	\$19,692	22,280	\$41,146	0	0
Massachusetts.....	67,572	67,400	82,409	0	0	0
New Hampshire.....	55,166	42,863	18,621	15,432	0	0
Rhode Island.....	56,808	1,840	18,614	43,450	0	0
Vermont.....	72,100	21,260	12,302	91,277	\$257,980	0
Region II—New York:						
New Jersey.....	77,028	57,499	47,605	0	1,130,420	0
New York.....	47,250	0	149,138	0	3,971,768	0
Puerto Rico.....	114,954	9,954	20,450	47,760	0	0
Virgin Islands.....	0	2,027	14,948	6,209	75,106	0
Region III—Philadelphia:						
Delaware.....	83,137	37,787	22,094	38,261	0	0
District of Columbia.....	22,097	53,063	45,100	49,738	0	0
Maryland.....	136,668	78,786	59,937	0	1,406,788	0
Pennsylvania.....	173,788	67,410	90,084	202,070	0	0
Virginia.....	66,510	45,542	57,106	30,000	0	0
West Virginia.....	0	46,141	47,424	55,430	0	0
Region IV—Atlanta:						
Alabama.....	59,330	0	31,488	0	0	0
Florida.....	43,000	0	42,968	192,681	0	0
Georgia.....	0	0	0	52,625	0	0
Kentucky.....	50,000	0	44,201	60,977	984,167	0
Mississippi.....	20,000	13,539	33,191	11,035	0	0
North Carolina.....	0	49,847	44,502	0	955,508	0
South Carolina.....	0	76,863	54,889	0	911,977	0
Tennessee.....	54,716	29,274	54,308	26,037	875,137	0

TABLE 15.—Summary of State Grants Activity—1973—Continued

Jurisdiction	Planning Grants Section 23(a)	Statistical Planning Grants (23(a) (3)	Statistical Operational Grants (24)	Agreements (7(c) (1)	Operational Grants 23(g)	Experimental and Demonstration
Region V—Chicago:						
Illinois.....	0	45, 000	53, 921	0	1, 167, 934	0
Indiana.....	63, 925	31, 936	58, 748	0	0	0
Michigan.....	48, 479	45, 000	176, 458	0	2, 190, 168	0
Minnesota.....	0	46, 266	34, 863	0	673, 036	0
Ohio.....	85, 160	73, 000	95, 825	676, 104	0	0
Wisconsin.....	25, 888	47, 500	94, 975	508, 125	0	0
Region VI—Dallas:						
Arkansas.....	0	40, 344	18, 694	70, 504	0	0
Louisiana.....	0	18, 121	43, 981	0	0	0
New Mexico.....	0	13, 401	23, 250	0	0	0
Oklahoma.....	0	16, 283	33, 004	0	0	0
Texas.....	0	31, 071	2, 640	0	0	0
Region VII—Kansas City:						
Iowa.....	0	0	42, 715	0	381, 455	141, 751
Kansas.....	0	9, 398	14, 511	0	0	0
Missouri.....	199, 886	0	59, 210	207, 291	0	0
Nebraska.....	0	0	27, 885	0	0	0
Region VIII—Denver:						
Colorado.....	46, 515	36, 000	26, 972	105, 349	535, 908	0
Montana.....	32, 598	27, 136	32, 366	0	191, 310	0
North Dakota.....	0	0	21, 651	0	25, 000	0
South Dakota.....	0	15, 499	11, 601	0	0	0
Utah.....	0	28, 780	32, 307	0	393, 817	0
Wyoming.....	129, 841	16, 122	16, 941	0	0	0
Region IX—San Francisco:						
Arizona.....	0	32, 000	33, 900	0	0	0
California.....	272, 496	69, 909	323, 134	0	5, 656, 104	0
Hawaii.....	79, 200	29, 098	1, 900	58, 034	0	0
Nevada.....	0	0	0	0	0	0
Guam.....	42, 239	14, 119	12, 563	12, 766	0	0
American Samoa.....	41, 500	10, 860	3, 400	0	0	0
Region X—Seattle:						
Alaska.....	74, 060	14, 400	35, 325	331, 884	520, 786	0
Idaho.....	170, 392	23, 914	50, 753	0	0	0
Oregon.....	44, 551	24, 151	41, 668	6, 019	1, 547, 509	0
Washington.....	44, 172	21, 000	33, 192	0	1, 881, 004	0
Total.....	2, 719, 551	1, 501, 095	2, 517, 554	2, 940, 204	25, 732, 882	141, 751

Chapter 8

LEGAL DEVELOPMENTS

The Occupational Safety and Health Act has been in effect since April 28, 1971. In the almost three years since that date, numerous decisions interpreting the Act have been handed down by both the Federal courts and the Occupational Safety and Health Review Commission.

This chapter summarizes the most important of these decisions.

THE REVIEW COMMISSION

The Review Commission, composed of three members appointed by the President, is independent of the Secretary of Labor.

The Act provides that an employer may contest to the Commission a citation or a proposed penalty issued by the Secretary; and that any employee or representatives of employees may contest the period of time fixed in a citation for abatement of a violation.

The notice of contest is filed with the Secretary and then transmitted to the Commission, which affords an opportunity for a hearing. The hearing takes place before an administrative law judge appointed by the Commission. The report of the judge becomes the final order of the Commission within 30 days after the report is issued unless review is directed by the Commission. A party aggrieved by an order of the Commission or a judge's decision which has become final by operation of law may seek review within 60 days in an appropriate court of appeals. Appeal from the circuit court is to the U.S. Supreme Court.

COURT ACTIONS

There was a significant increase in 1973 in the number of OSHA cases before the Federal courts. Many of these court cases were petitions to review

orders of the Review Commission, including both employer petitions filed pursuant to Section 11(a) of the Act, and petitions filed by the Solicitor's Office for OSHA under Section 11(b). There were also several petitions challenging occupational safety and health standards issued under Section 6. In addition, provisions of the Act pertaining to employee discrimination, imminent dangers, and criminal violations were also litigated.

Appellate Actions Under 11(a) and 11(b)

More than 40 actions were initiated in appellate courts in 1973 by petitions for review of Commission orders. A number of decisions were issued, although many cases were still pending. Some of the most significant decisions are discussed in the following section of this chapter.

In *National Realty Co. v. OSAHRC and Brennan*, 489 F. 2d 1257 (C.A. D.C. No. 72-1978, decided December 13, 1973), the Court of Appeals for the District of Columbia, while vacating the Commission's finding of a violation of the Act's General Duty Clause [5(a)(1)], on narrow procedural grounds, affirmed the Secretary's position on a broad range of OSHA enforcement issues. The unanimous decision held, among other things, that citations and complaints must be liberally construed in favor of the Secretary; that a recognized hazard is one which is objectively recognized by safety experts familiar with the relevant industry or activity, regardless of whether the employer or his industry as a whole is aware of it; that any realistic chance of serious mishap from the type of violation is sufficient to satisfy the "likely to cause death or serious physical harm" requirement; that employee-negligence defenses are not available to limit an employer's general duty liability unless he shows that he did everything rea-

sonably possible to prevent both the hazard and such negligence but was circumvented by a "demented, suicidal or willfully reckless employee;" that the test for "reasonably possible" is what informed safety experts would recommend, not what similar employers do; that employers have a basic duty to ensure safety compliance by their foremen, and that lack of such compliance is "strong evidence" that the company's safety policies are not adequate. The court dismissed the citation, however, ruling that OSHA in this particular case had failed to carry the burden of proving a violation by specifying "the particular steps a cited employer should have taken to avoid citation, and to demonstrate the feasibility and likely utility of these measures."

In *Texports Stevedore Co., Inc. v. Secretary of Labor*, 484 F. 2d 465 (C.A. 5, No. 73-1620 decided Sept. 9, 1973, reh. den. 486 F. 2d 1403), the court affirmed a Commission order enforcing a citation for a serious violation of a longshoring standard, ruling that the Commission's decision was supported by substantial evidence. The court held that an OSHA inspector's after-the-fact observations were proper evidence before the Commission, and that a cursory glance through an open hatch was not an acceptable precautionary inspection by the employer.

In *Brennan v. OSAHRC and Bill Echols Trucking Co.*, 487 F. 2d 230 (C.A. 5, No. 73-1670, decided Nov. 13, 1973), the court reversed the Commission and unanimously sustained the contention that contesting a proposed penalty did not put the citation itself in issue. The court also held that an employer could not be permitted to evade the Act's enforcement power merely by filing an ambiguous notice of contest, and that the Commission cannot dismiss a citation or proposed penalty for late transmittal of a notice of contest without evidence that the employer was harmed by the delay. The decision more generally stands for the proposition that the Commission cannot vacate citations or proposed penalties merely because the Secretary committed procedural errors, unless those errors directly and demonstrably prejudice the employer's defense.

Review of Standards

Section 6(f) of the Act permits affected parties to seek judicial review of occupational safety or

health standards in the circuit courts of appeal within 60 days after their promulgation.

In *Associated Industries v. Brennan*, 487 F. 2d 342 (C.A. 2, decided Oct. 14, 1973), the court vacated that part of a revised sanitation standard prescribing minimal numbers of washbasins in industrial facilities. The court stated that under Section 6(f), policy determinations as well as factual ones must be supported by substantial on-the-record evidence; that each aspect of a proposed standard challenged by substantial written objections during rulemaking must be affirmatively supported; and that adequate reasons for the responses to such objections must be stated in the preamble of each standard that is issued.

The emergency temporary standard regulating worker exposure to 14 carcinogenic substances was partly vacated in *Dry Color Manufacturers Association v. Brennan*, F. 2d (C.A. 3, No. 73-1361, decided Oct. 14, 1973). The industry petitioners challenged OSHA's determination that two of the substances caused cancer in man. The court ruled in favor of the petitioners, on the ground that these determinations were not supported by a sufficiently specific statement of reasons. However, the contention of employee petitioners that the Act required more stringent work practices than those prescribed by the emergency standard were rejected. The court also held that, because of the short time frame triggered by issuance of an emergency temporary standard, a final environmental impact statement was not required and a draft environmental impact statement issued within a reasonable time after the issuance of the emergency temporary standard would meet the requirements of the National Environmental Policy Act.

A subsequent suit to prevent issuance of a permanent carcinogen standard was dismissed as premature and improperly brought in the district court. In *Synthetic Organic Chemical Manufacturers Association v. Brennan* (D.D.C., No. 1934-74, decided Nov. 1973), the court ruled that any alleged procedural defects in the permanent rulemaking process were subject to judicial review in the court of appeals following issuance of a final standard, not to preliminary review in a district court.

Decision is still pending in *Industrial Union Department, AFL-CIO v. Hodgson*, (C.A.D.C., No. 72-1713, argued April 4, 1973), involving a challenge to the permanent standard regulating

employee exposure to airborne asbestos dust. At issue is the proper scope of judicial review of standards and the propriety of standards with a delayed effective date, which in this case gradually reduces the maximum exposure to a time-weighted average of two fibers of asbestos per cubic centimeter. Decision is also pending in *National Roofing Contractors Ass'n. v. Brennan* (C.A. 7, No. 73-1082, argued Oct. 29, 1973), involving the same legal issue and an industry challenge to OSHA's sloped-roof, roofing safety standard.

Criminal Cases

Section 17(e) authorizes criminal prosecution of an employer who willfully violates the Act and whose willful violation causes death to an employee.

In *United States v. Turcon* (D. Neb., No. 72-C-239), a construction company and its president were indicted for failing to shore a trench—resulting in the death of an employee—less than three weeks after an uncontested citation was issued for the same violation. The district court denied the defendants' motion to strike the indictment on constitutional grounds.

In *United States v. Dye Construction Co. and J. D. Dye*, (D. Colo., No. 73-Cr-417), both Dye and its president were charged with willful failure to properly shore a trench and willful failure to provide a ladder as a means of egress from the trench, which violations caused the death of one employee.

Imminent Danger

Section 13(a) authorizes OSHA to seek U.S. District Court injunctions to eliminate any conditions or practices which are likely to cause death or serious physical harm when the danger cannot be eliminated at once through usual enforcement procedures. Numerous actions have been filed for such relief.

In *Hodgson v. C. N. Flagg & Co.*, (D. Conn., Civ. No. 15268), the court granted an order September 14, enjoining the defendant from permitting employees to work in an improperly shored trench at a particular worksite, and subsequently granted a broad injunction against the use of improperly shored trenches at any of the company's worksites.

In *Secretary of Labor v. A. G. Pinkston Co.*, (D. Va., No. 566-72, decided April 6, 1973), an injunction was issued to prevent work in a trench that

was improperly shored and in imminent danger of collapse.

Discrimination

Section 11(c) prohibits employers from discharging or otherwise discriminating against an employee who exercises any right afforded by the Act. Although no court decisions have been reached, a number of cases were filed in 1973.

In *Brennan v. Packaging Corp. of America*, (D. Ohio, No. C-73-1115, filed Nov. 21, 1973), OSHA is seeking relief on behalf of an employee who, after informing his employer that he had made a complaint which led to an OSHA inspection, was given a 20-day disciplinary layoff for violating company rules that had previously never been enforced. The case also raises the question whether a resort to grievance arbitration precludes suit under the Act.

In *Brennan v. Magrath Industries*, (D. Kansas, No. W-5389, filed Oct. 23, 1973), reinstatement and back wages are being sought on behalf of an employee who was discharged after he helped form a worker safety committee, submitted suggestions to management, and subsequently filed a complaint with OSHA that led to an inspection. Trial is pending.

REVIEW COMMISSION DECISIONS

Responsibility of the Employer

Under Section 5(a) (1) and (2) of the Act, an employer is required to furnish a place of employment free from recognized hazards causing or likely to cause death or serious physical harm and to comply with standards issued under the Act. The limits of an employer's responsibility under both the general duty clause, Section 5(a) (1), and the standards, Section 5(a) (2), have been extensively litigated in a number of cases brought before the Review Commission in 1973.

The General Duty Clause

To establish a violation of the general duty clause, it must be shown that an employee has been exposed to a recognized hazard. A number of decisions reached by the Review Commission dealt with the definition of a recognized hazard.

In *Brennan v. Vy Lactos Laboratories, Inc.*, OSAHRC Docket No. 31, the Commission found

that decomposing fish slurries that released deadly hydrogen sulfide gas, killing two employees and injuring two others, was not a generally recognized hazard within the employer's industry or by the public at large, and, therefore, held that the employer had not violated the general duty clause. In a dissenting opinion, former commissioner Alan F. Burch argued that the Commission had ignored the employer's actual knowledge of the hazard. The case is being appealed *sub nom Brennan v. Vy Lactos Laboratories, Inc.* (C.A. 8, No. 73-1235).

In *Brennan v. American Smelting and Refining Co.*, OSAHRC Docket No. 10, the Review Commission held that a recognized hazard is not limited to hazards detectable by the human senses. The decision affirmed a violation of the general duty clause after an inspection revealed that employees were being exposed to excessive levels of airborne lead. After reviewing pertinent portions of the legislative history of the Act, the Commission concluded, Chairman Robert D. Moran dissenting, that the general duty clause covers non-obvious hazards of a serious nature for which a standard has not yet been issued, even when they can only be detected by the use of instruments. The case is being appealed by the employer *sub nom American Smelting and Refining Co. v. OSAHRC and Brennan* (C.A. 5, No. 73-1721).

In *Brennan v. Aro, Inc.* OSAHRC Docket No. 465, the Commission held that failure to take sufficient precautions to prevent an oxygen deficiency in a furnace where employees worked and failure to provide suitable rescue equipment nearby both constituted recognized hazards and, therefore, separate violations under the general duty clause.

In *Brennan v. Republic Creosoting Co., Division of Reilly Tar and Chemical Corp.*, OSAHRC Docket No. 22, the Review Commission held that there is no recognized hazard unless it is generally recognized within the industry of the employer. In addition, the Commission ruled that an employer who fails to instruct his employee in safe practices for a job to which he is temporarily assigned does not violate Section 5(a)(1), even though the job may be inherently hazardous. The Commission based its decision on the theory that an employee need not be trained for a job he is not specifically assigned. Former Commissioner Burch dissented, stating that an isolated and vague warning to an employee is not sufficient to discharge the employer of his responsibilities under Section 5(a)(1), and

that the degree of precautionary warning, the training, and the instruction given by the employer should be commensurate with the gravity and danger of the hazard. The case is being appealed *sub nom Brennan v. Republic Creosoting Co., Div. of Reilly Tar & Chemical Corp.* (C.A. 7, No. 73-1304).

In another decision relating to employer instructions to employees, *Brennan v. John B. Kelly Inc.*, OSAHRC Docket No. 154, the Commission affirmed an administrative law judge's decision that verbal warnings given to an employee by his employer were not sufficient to fulfill the employer's duty to provide a workplace free from hazards likely to cause death or serious physical harm in a situation where the employee had twice been observed by the employer working in a hazardous manner. The judge held that the employer's duty in such a situation was to remain at or periodically inspect the workplace, in order to ensure that the employee properly carried out instructions.

In an analogous case, *Brennan v. Lebanon Lumber Co.*, OSAHRC Docket No. 184, the Commission held, Chairman Moran dissenting, that oral warnings and instructions were insufficient to discharge an employer's duty to ensure, in accordance with the standards, that crawler cranes were operated at all times at least 10 feet away from overhead energized power lines. Although acknowledging that one-on-one supervision is not always required, the Commission, nevertheless, concluded that in this case the employer had failed to comply with the standard when he sent inexperienced employees to a hazardous worksite without providing proper supervision.

Application and Validity of Standards

An increasing volume of litigation before the Commission, in 1973, involved the application and validity of the standards.

In *Brennan v. Brisk Waterproofing Co., Inc.*, OSAHRC Docket No. 1046, the Commission held that where a specific standard covers a hazardous work situation, a citation under the general duty clause is wrong. However, the Commission indicated that in such situations the citation could be amended to cite the specific standard. In *Brennan v. Sun Shipbuilding and Drydock Co.*, OSAHRC Docket No. 161, Commissioner Timothy Cleary suggested that OSHA plead both the general duty clause and the specific standard when

there is any doubt that the specific standard covers the violation, in order to ensure that employee protection is not diminished because of a "wrong guess."

The application of some standards to unusual conditions also resulted in a number of appeals and decisions.

In *Brennan v. Harvey Wrecking Co., Inc.*, OSAHRC Docket No. 680, the Commission held that a standard requiring horizontal floor-by-floor demolition did not apply to ball and clam bucket demolition of a U-shaped building. The employer argued that this was recognized within the wrecking industry. OSHA maintained that the employer should have sought a variance. The Commission, however, ruled that this would have been impractical.

In several cases, employers have argued that the standard requiring perimeter guarding on open-sided floors of an incomplete building does not apply to operations carried out on a flat roof. OSHA has maintained that because employees can walk and work on a flat roof, it must be considered a floor, for purposes of the standard, and that guarding must be provided. The position was affirmed in *Brennan v. Diamond Roofing Co.*, OSAHRC Docket No. 459, and in *Brennan v. S. D. Mullins Co., Inc.*, OSAHRC Docket 364. Both cases have been appealed *sub nom Diamond Roofing et al v. Brennan* (C.A. 5, No. 73-37050).

On the other hand, several recent Commission decisions have vacated citations on the ground that a specific element of the alleged violation was not proved. Thus, in *Brennan v. Drake Willamette Joint Ventures*, OSAHRC Docket No. 117; *Brennan v. Southern Contractors Services*, OSAHRC Docket No. 1492 [appeal pending *sub nom Brennan v. Southern Contractors* (C.A. 5, No. 73-3134)]; and *Brennan v. Verne-Woodrow Co.*, OSAHRC Docket No. 1607 [appeal pending *sub nom Brennan v. The Verne-Woodrow Co.* (C.A. 5, No. 73-3134)], the Review Commission held that the burden of proof is on OSHA to show the impracticality of safety alternatives to safety nets where the standard requires that "safety nets shall be provided . . . where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical." The Commission vacated the citations, although it was shown that the employers had not used any safety devices.

Various standards have been challenged on the ground that they are vaguely written and, therefore, unenforceable because employers are not sure of their applicability or requirements.

In *Brennan v. Georgia Pacific Corp.*, OSAHRC Docket No. 1282, the Commission held that a standard written in broad terms is not unenforceably vague as long as employers of common intelligence are able to determine what it requires of them. The employer had argued that, in a standard requiring personal protective clothing and equipment, the phrase ". . . when the extent of the hazard is such as to warrant . . ." made the standard too vague to be enforced. The Commission found, however, that the employer knew that exposure of employees to 40 parts per million of chlorine and chlorine dioxide gases constituted a hazard—in other words, he knew that "the extent of the hazard (was) such as to warrant" protective clothing and equipment—and upheld the standard and the citation.

In *Brennan v. Ryder Truck Lines, Inc.*, OSAHRC Docket No. 391, the Commission, in a case in which employees were exposed to the dangers of falling freight, upheld a judge's decision, Chairman Moran dissenting, that the words—processes, environment, and hazard—in a standard covering protective equipment would be understood by a reasonable person to apply to the work situation at the employer's worksite, and that the standard was therefore not unenforceably vague. OSHA argued that the employer should have required the use of safety shoes. The employer contended that since there had been few injuries and few lost man-hours, the standard was inapplicable. The judge held, however, that the "aim and purpose of the standard is to eliminate such injuries rather than reduce them to any specific rate of incidence." The case has been appealed by the employer *sub nom Ryder Truck Lines Inc. v. Brennan* (C.A. 5, No. 73-3341).

In at least one instance, the Commission did find the language of a standard to be too vague to be enforced. In *Brennan v. Santa Fe Transport Co.*, OSAHRC Docket No. 331, the Commission ruled that a standard requiring employers to employ a person or persons trained in first aid when the workplace is not in "near proximity to a hospital, infirmary, or clinic" was so unspecific as to be unenforceable.

OSHA in this case alleged that 10 minutes driving time to the nearest medical facility did not

satisfy the "near proximity" requirement. The majority opinion noted, however, that the term "near proximity" is so subject to interpretation that even OSHA area directors disagree about its meaning, and, consequently, vacated the citation. In a dissenting opinion, Commissioner Cleary argued that the standard must have sufficient latitude to encompass peculiar locations and circumstances, and that the Commission had abdicated its responsibility to interpret the standard to render it uniform and more easily enforceable. The case is being appealed *sub nom Brennan v. Santa Fe Transportation Co.* (C.A. 10, No. 74-1049).

The constitutionality of a standard requiring catch platforms and other devices to protect employees working on sloped roofs was challenged in *Brennan v. Divesco Roofing and Insulation Co.*, OSAHRC Docket No. 345. Here the Commission upheld a judge's ruling that, although the standard was burdensome and costly, it bore a rational relationship to the safety of employees and, therefore, was not unconstitutional by being unreasonable, arbitrary, capricious, or by resulting in a denial of substantive due process.

In a concurring opinion, Commissioner Cleary stated that the Commission has no authority to rule on the constitutionality of the standards; however, the Commission could determine the applicability of a standard to a specific set of facts, decide the weight to be given OSHA's interpretation, and interpret a standard to resolve vagueness and ambiguity.

Serious Violations

The Commission on a number of occasions considered the definition of a serious violation under Section 17(k) of the Act. Section 17(k) states that a serious violation exists "if there is a substantial probability that death or serious physical harm could result from a condition which exists, or from one or more practices, means, methods, operations or processes . . ." At issue has been the definition of substantial probability. In *Brennan v. Natkin and Company*, OSAHRC Docket No. 342, the Commission reversed a judge's decision that reduced a citation from serious to nonserious. Finding that the judge misinterpreted Section 17(k) of the Act, the Commission held that "The occurrence of an accident because of an existing hazard in violation of the Act need not be substantially probable in order for a violation to be serious, within

the meaning of the Act." Rather, the distinction between serious and nonserious violations lies in the degree of probable injury should an accident occur, instead of the probability of an accident occurring (See also *Brennan v. Crescent Wharf and Warehouse Co.*, OSAHRC Docket No. 1).

Willful Violations

Under Section 17(a) of the Act, an employer who willfully violates the requirements of Section 5 of the Act may be assessed a civil penalty of not more than \$10,000 for each violation.

In *Brennan v. Frank Irey Jr.*, OSAHRC Docket No. 701, the Commission upheld, Chairman Moran dissenting, a judge's finding that the employer committed a willful serious violation of a standard which required the sides of a trench in unstable or soft material be shored or sloped. The Judge held that a

"willful" violation may exist under the Act where the evidence shows that the employer committed an intentional and knowing violation of the Act and the employer is conscious of the fact that what he is doing constitutes a violation of the Act, or even though the employer was not consciously violating the Act, he was aware that a hazardous condition existed and made no reasonable effort to eliminate the condition.

The case is being appeal *sub nom Frank Irey Jr., Inc. v. Brennan*, C.A. 3, No. 73-1765.

Similarly, in *Brennan v. Intercountry Construction Corp.*, OSAHRC Docket No. 919, the Commission sustained a willful violation of a standard requiring proper shoring and bracing of trenches dug in hard and compact soil. Chairman Moran defined a willful violation as "an act or omission which occurs consciously, intentionally, deliberately or voluntarily as distinguished from accidentally." He concluded that the violation was willful because the job foreman knew of the specific requirements of the standard, which he deliberately disregarded because of his subjective determination that compliance was unnecessary in this case.

Multiemployer Worksites/General Contractors and Subcontractors

Where there are several employers at a work-site, often with general contractor/subcontractor relationships, questions have arisen as to whether one employer may be cited for exposing another

employer's employees to a hazard. In *Brennan v. Gilles and Cotting*, OSAHRC Docket No. 504, Gilles and Cotting, a prime contractor, was cited for a violation of Section 5(a)(2) of the Act. The hazardous scaffold involved was constructed, tested and utilized under the supervision of a subcontractor whose employees were the exclusive users of the equipment. The subcontractor was also cited but did not contest the citation. The judge ruled that the prime contractor was properly cited, noting that he was responsible for overall safety at the worksite. The Review Commission, Commissioner Clearly dissenting, reversed the judge's decision, holding that there was no liability on the part of the general contractor in the absence of a showing that his employees were exposed to the hazard. In effect, the Commission majority refused to ascribe responsibility under OSHA to the prime contractor who has ultimate safety responsibility for the job. The case is being appealed *sub nom Brennan v. Gilles and Cotting*, C.A. 4, No. 73-2471.

Preclusion of OSHA Enforcement of a Standard as a Result of Action by Other Federal Agencies

Section 4(b)(1) of the Act provides that OSHA will be precluded from regulating working conditions over which other Federal agencies have "exercised statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health." In *Brennan v. Mushroom Transportation Co., Inc.*, OSAHRC Docket No. 1588, the Review Commission vacated a citation under a standard requiring the blocking and chocking of the wheels of a truck while it is being loaded or unloaded with powered industrial trucks. After examining the Motor Carrier Safety Regulations and the Interstate Commerce Commission's interpretation of those regulations, the Commission found that the Motor Carrier Safety Regulations applied, and that the Department of Transportation's standard precluded OSHA from enforcing its own.

Procedure Before the Commission

Many cases have dealt with practice and procedure before the Review Commission. This procedure is determined by requirements set forth in the Act, rules established by the Commission itself pursuant to Section 12(g) of the Act, and the Federal

Rules of Civil Procedure which, under Section 12(g) of the Act, apply to Commission proceedings, unless the Commission has adopted a different rule.

Rule 32 of the Commission Rules of Procedures requires the Secretary to transmit an employer's notice of contest, submitted pursuant to Section 10 of the Act, to the Commission within 7 days of receipt.

However, in *Brennan v. J. Dale Wilson Builder*, OSAHRC Docket No. 1625, the Commission reversed a judge's order vacating a citation because the notice of contest was not forwarded to the Commission within the prescribed time period. The Commission held that there must be a balancing of interest between the unavoidable administrative delays and the prejudice to the employer because of any such delay, bearing in mind that "the vacation of a citation might operate to prejudice the public's right to have abatement of occupational safety and health hazards." Thus, vacating citations in such situations depends on the failure of OSHA to justify the delay and the employer's demonstration that he has been prejudiced by the delay.

In a subsequent case, *Brennan v. ADM Grain Co.*, OSAHRC Docket No. 1767, the Commissioner reversed a judge's ruling vacating a citation, basing its decision on the *Wilson* grounds, and remanded the case to the judge to afford OSHA an opportunity to explain the delay and the employer an opportunity to demonstrate that he had been prejudiced by OSHA's failure to transmit the notice of contest to the Commission within the prescribed 7 days. In both cases, chairman Moran dissented.

OSHA's right to amend citations and complaints was considered by the Commission in *Brennan v. J. L. Mabry Grading Co., Inc.* OSAHRC Docket No. 285. Citing Rule 15 of the Federal Rules of Civil Procedure, the Commission liberally construed the right to amend citations, provided the underlying facts alleged remain the same. In *Mabry* the respondent had initially been cited for a serious violation for failing to provide back-up alarms or a signalman for dump trucks with obstructed rear vision. Subsequently, the citation was amended to citing a standard applying to any motor vehicle, rather than to dump trucks alone.

The Commission affirmed the right to make this amendment on the ground that it only "set forth a different section of the governing regulations . . . (which) prohibits essentially the same

practices as those regulated by the originally-cited but inapplicable regulation.”

Change of Degree of Violation

Another issue that has arisen involves the authority of the Commission, acting on its own initiative, to change the degree of a violation from that alleged in the citation. There is little question that the Commission has the authority to reduce the degree of the violation; however, the Commission’s authority to raise the degree of the violation has been challenged. In *Brennan v. Dundas Pallet Co.*, OSAHRC Docket No. 266, noting its decision in *Brennan v. Wetmore and Parman*, OSAHRC Docket No. 221, the Commission held that it has no authority to increase the degree of violation charged from nonserious to serious on the ground that the Commission is an adjudicatory body, and the issuance of a citation is a matter of enforcement. In *Brennan v. M. A. Swatek & Co.*, OSAHRC Docket No. 33, the Commission extended this line of reasoning to include the raising of serious to willful violations. Citing its decision, in *Wetmore and Parman*, the Commission ruled that it was without authority to change the Secretary’s charge from serious to willful for a trenching violation. However, the Commission underscored the employer’s lack of good faith, the high probability of a cave-in, and the potential for severe employee injury, in the event of a cave-in,

by assessing the employer the maximum penalty of \$1,000 for a serious violation.

Parties’ Burden of Proof Before the Commission

The extent of the Secretary’s burden of proof in establishing violations of the Act before the Commission was modified in the case of *Brennan v. Armor Elevator Co.*, OSAHRC Docket Nos. 425 and 426. Overruling the judge’s requirement of “clear and convincing evidence of record,” the Commission held that the Secretary’s burden of proof was “preponderance of evidence.” This ruling also reversed the Commission’s previous requirement set forth in its decision in *Brennan v. Ceco Corp.*, OSAHRC Docket No. 326, which held that findings of violations had to be supported by “substantial evidence.”

Employers have often asserted that alleged violations of the Act are the result of an isolated action of an employee after he had been instructed not to engage in the cited conduct. In *Brennan v. Mississippi Valley Erection Co.*, OSAHRC Docket No. 524, the Review Commission held that an isolated event is an affirmative defense to be pleaded and proven by an employer contesting an alleged violation of the Act. Therefore, the Secretary need not allege and prove the pattern which would negate the possibility of an isolated event.

Chapter 9

OTHER PROGRAM ACTIVITIES

LEGISLATIVE SUMMARY

Eighty bills that would affect OSHA were introduced in the 93rd Congress—eight in the Senate and 72 in the House of Representatives. No hearings or roll call votes on the measures were held, but oversight hearings were scheduled for 1974.

In the Senate, a bill requiring an economic impact statement with each new or revised standard was introduced by Senator Peter H. Dominick. The bill also would allow applications for variances to be made after a citation, eliminate mandatory penalties for serious violations, do away with penalties for nonserious violations, and authorize onsite consultation for employers with 100 or fewer employees.

A bill introduced by Senator Carl Curtis would, among other things, exempt employers of seven or fewer persons from all provisions of the Act, require OSHA to estimate maximum and average compliance costs for each existing and future standard, prohibit inspections without probable cause to believe that a violation exists, shift full responsibility for failure-to-abate action to the Attorney General, and authorize OSHA to enter into agreements with employers under which penalties would be withheld when compliance is promised.

A bill introduced by Senator Lawton Chiles would, among other provisions, require 24-hour advance notice of an inspection, extend from 15 to 30 days the period in which a citation or proposed penalty may be appealed, and prohibit standards that would require premature phasing out of equipment, except when a serious violation might result.

Senator Harrison A. Williams, Jr. introduced a bill to transfer mine safety authority from the

Department of the Interior to the Department of Labor.

In the House of Representatives, 21 bills were introduced containing provisions for onsite consultation for small businesses—the definition of small ranging from 25 to 250 employees, depending on the bill. Fifteen bills would require OSHA to distinguish between light and heavy construction in issuing standards. Thirteen bills would exempt small business entirely—the definition of small ranging from seven to 25 employees.

Seven bills were introduced that would eliminate first-instance sanctions for violations corrected within the abatement period. A number of bills were introduced in the House containing provisions similar to those in the Curtis and Dominick proposals in the Senate. And three bills were introduced in the House to repeal the Act.

INTERAGENCY AGREEMENTS

OSHA is not the only Federal agency concerned with employee safety and health. A number of departments and agencies of the Federal Government, such as the Atomic Energy Commission, the Department of Interior's Mining Enforcement and Safety Administration, agencies within the Department of Transportation, the Department of Defense, the National Aeronautics and Space Administration, and others, enforce statutes less comprehensive in scope than OSHA affecting occupational safety and health.

In order to ensure that there is no duplication of effort between OSHA and these agencies acting under specified statutory authority affecting work-related hazards, that employers are aware of which authority is applicable to working conditions in their establishments, and that there are no gaps in coverage, OSHA began to negotiate a number of

interagency agreements delineating respective areas of responsibility.

OSHA sought information on each agency which might have issued standards affecting occupational safety and health, conducted any type of inspection or investigation, provided training on safe and healthful work practices, or required maintenance of injury, illness, and fatality statistics. The role played by the States in such programs was also sought.

Questionnaires seeking to ascertain their specific responsibilities for job safety and health were sent to 40 Federal departments or agencies. Those contacted were asked to designate appropriate staff members to work with OSHA in determining the extent of job safety and health coverage they provide. From their responses, OSHA and the respective departments and agencies began drafting agreements to eliminate any gaps in coverage as well as unnecessary duplication. These understandings were to cover such areas as standards-setting responsibility, accident and complaint investigation, recordkeeping, and enforcement in borderline situations.

A previous understanding had been concluded with the Federal Railroad Administration to expedite handling of employee complaints of unsafe or unhealthful working conditions in the railroad industry. Agreements with 13 other Federal agencies were under consideration at year's end.

These accords were not to be regarded as one-shot attempts at defining interagency relations but as part of a long-range endeavor to coordinate Federal activities in this field. OSHA intends that a formula for future such efforts will be developed.

After completion of the remaining agreements, the results are to be evaluated. If administrative agreements are not sufficient for eliminating remaining duplications of effort or jurisdictional problems, additional legislation may be recommended to achieve comprehensive occupational safety and health coverage for the Nation's workforce. Pursuant to Section 4(b)(3) of the Act, a report to Congress on this subject is to be submitted in 1974.

FEDERAL AGENCY PROGRAMS

The Act requires the head of each Federal agency, civilian and military, to "establish and maintain an effective and comprehensive occupational safety and health program . . . consistent

with the standards . . ." promulgated under authority of the Act. Executive Order 11612, which implemented the Federal job safety and health program during 1973, assigned OSHA certain specific responsibilities: (1) provide guidance to Federal agencies, (2) evaluate their programs, (3) collect Federal job injury and illness statistics, and (4) submit, pursuant to Section 19(b) of the Act, a yearly report to the President on Federal occupational safety and health, including evaluations of each agency program and recommendations, if any, for its improvement. Section 19(b) of the Act also requires the President to annually transmit a report to the Congress on the safety and health activities of Federal agencies. This report will be forthcoming. What follows is a very brief summary of 1973 activities by OSHA in this area.

OSHA turned increased attention in 1973 to Federal agency programs. In March, a General Accounting Office report revealed serious deficiencies in Federal safety, and pointed out that while the burden for Federal safety and health programs rests with each agency head, OSHA's responsibility to provide guidance, evaluate programs, collect data, and prepare a report to the President creates an implicit responsibility to exercise leadership.

OSHA had long been aware that problems existed and was taking steps to correct them. Detailed guidelines for the establishment and operation of effective Federal agency safety and health programs, in preparation since mid-1972, were published for public and agency comment in the *Federal Register*, and discussions initiated as to the desirability of changes in the Executive Order under which the Federal safety and health program is operated.

OSHA also increased its evaluation of agency programs. Approximately 75 Federal agencies received technical services and consultation, 27 Federal agency programs were reviewed in detail at the headquarters level, and two agencies, at their requests, received workplace inspections and field office evaluations by OSHA.

In addition, OSHA took steps to continue to implement its responsibility for coordinating Federal safety promotional activities. *Zero In On Federal Safety*, a 3-year promotion that ended in 1973, will be succeeded by a more comprehensive campaign to begin in January 1974 and continue through the Bicentennial year 1976. This program, *Safety '76*, will be divided into six, 6-months segments: each segment focusing on a different safety

or health problem. The first segment is on motor vehicle safety.

Statistics collected under the Federal Accident Reporting System, developed by OSHA in 1971, indicate that in 1973 there were 252 fatalities and 121,044 job injuries among approximately 2.5 million Federal civilian employees. A breakdown on injuries shows that 36,731 involved lost workdays and 84,194 did not. The injury incidence rate among Federal civilian employees was 4.6 per 100 employee-years. This figure indicates a slight decline from 1972 when the incidence rate was 4.7, and a greater decline from the last six months of 1971 when the incidence rate was 5.1 (*See Chapter 7* for incidence rates for private industry). The cost in medical expenses, compensation, and leave due to Federal job related fatalities and injuries amounted to approximately \$168,400,000 in 1973

(*See Table 16* for a comparison of 1972-1973 Federal civilian injury data).

TABLE 16.—Federal employee injury and illness cases

	January-December 1972		January-December 1973	
	Number of injuries	Incidence rate	Number of injuries	Incidence rate
Total cases ¹	116, 542	4. 7	121, 044	4. 6
Lost workday cases.....	32, 840	1. 3	36, 731	1. 4
Nonlost workday cases.....	83, 702	3. 4	84, 194	3. 2

¹ Includes fatalities.

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The Department of Labor is the source of all data in the appendices.

A. Employment Coverage in 1973 under the Occupational Safety and Health Act of 1970—figures given in thousands¹

Region and State	Industry							
	Total	Agriculture	Construction	Manufacturing	Maritime	Trades	Service ²	Other ³
United States.....	64,548.8	1,858.3	3,986.5	19,863.0	122.1	16,350.0	13,036.9	9,332.0
Region I—Boston.....	4,066.0	36.2	236.4	1,376.5	3.9	998.2	918.6	496.2
Connecticut.....	1,072.5	13.0	58.3	416.2	0.3	238.0	208.9	137.8
Maine.....	282.6	6.2	20.0	101.0	0.3	70.3	53.6	31.2
Massachusetts.....	2,004.1	11.0	114.3	606.4	2.9	521.1	496.1	252.3
New Hampshire.....	261.6	1.9	16.7	93.4	0.0	60.3	63.2	26.1
Rhode Island.....	306.0	0.7	16.2	118.2	0.4	75.4	62.5	32.6
Vermont.....	139.2	3.4	10.9	41.3	0.0	33.1	34.3	16.2
Region II—New York.....	8,653.9	103.0	453.8	2,555.0	34.5	2,119.1	1,974.6	1,413.9
New Jersey.....	2,358.2	20.0	130.8	815.9	10.7	605.0	467.5	308.3
New York.....	5,884.8	43.0	272.9	1,604.9	19.2	1,427.1	1,451.4	1,066.3
Puerto Rico.....	410.9	40.0	50.1	134.2	4.6	87.0	55.7	39.3
Region III—Phila.....	7,361.1	103.0	504.0	2,347.4	16.4	1,774.1	1,553.1	1,063.1
Delaware.....	210.9	6.0	16.3	74.9	0.3	49.4	41.8	22.2
District of Columbia.....	324.1	0.0	20.0	17.3	0.0	74.5	150.0	62.2
Maryland.....	1,151.3	10.0	20.0	256.5	6.8	341.8	275.2	157.1
Pennsylvania.....	3,857.7	23.0	215.2	1,475.7	5.4	869.3	755.7	513.4
Virginia.....	1,366.9	58.0	114.8	396.4	3.9	335.6	258.4	199.8
West Virginia.....	450.2	6.0	33.8	126.6	0.0	103.5	71.9	108.4
Region IV—Atlanta.....	9,899.0	418.0	758.8	3,301.8	12.9	2,417.4	1,681.2	1,308.9
Alabama.....	989.3	15.0	62.7	339.5	2.5	212.9	149.5	116.2
Florida.....	2,147.4	63.0	227.3	346.1	4.0	662.8	489.4	354.8
Georgia.....	1,400.5	20.0	96.2	475.5	1.6	370.3	225.4	211.5
Kentucky.....	879.9	32.0	63.8	283.0	0.1	206.9	155.4	138.7
Mississippi.....	546.3	20.0	37.1	212.7	0.9	128.0	73.5	64.1
North Carolina.....	1,875.4	182.0	123.2	770.3	1.6	352.7	249.8	195.5
South Carolina.....	838.9	30.0	69.4	369.7	1.3	172.3	114.4	82.1
Tennessee.....	1,312.6	46.0	79.1	505.0	0.9	311.5	224.1	146.0
Region V—Chicago.....	4,260.7	180.0	711.1	5,474.6	2.6	3,480.5	2,610.8	1,801.1
Illinois.....	3,767.8	36.0	196.1	1,324.8	0.9	936.2	715.5	558.3
Indiana.....	1,708.4	17.0	93.8	752.5	0.0	398.6	250.3	196.2
Michigan.....	2,636.5	35.0	116.0	1,121.6	0.4	613.5	462.4	287.6
Minnesota.....	1,221.1	44.0	67.1	331.1	0.3	343.8	258.1	176.7
Ohio.....	3,527.1	21.0	170.8	1,416.1	0.9	832.0	659.1	427.2
Wisconsin.....	1,399.8	27.0	67.3	528.5	0.1	356.4	265.4	155.1
Region VI—Dallas.....	5,994.1	298.0	464.5	1,340.5	29.3	1,646.1	1,155.2	1,060.5
Arkansas.....	611.1	95.0	36.5	199.0	0.5	124.1	85.8	70.2
Louisiana.....	943.8	31.0	84.0	183.1	13.0	264.4	174.5	193.8
New Mexico.....	267.1	11.0	26.5	29.3	0.0	77.2	68.4	54.7
Oklahoma.....	679.3	32.0	46.4	147.5	0.0	184.6	130.8	138.0
Texas.....	3,492.8	129.0	271.1	781.6	15.8	995.8	695.7	603.8
Region VII—Kan. City.....	3,376.1	167.0	184.5	939.6	0.4	927.3	650.5	506.8
Iowa.....	849.7	59.0	44.8	238.2	0.0	235.0	166.0	106.7
Kansas.....	611.9	30.0	37.1	159.2	0.0	173.4	114.2	98.0
Missouri.....	1,457.2	46.0	69.6	449.9	0.4	387.8	274.9	228.6
Nebraska.....	457.3	32.0	33.0	92.3	0.0	131.1	95.4	73.5

See footnotes at end of table.

A. Employment Coverage in 1973 under the Occupational Safety and Health act of 1970—figures given in thousands¹—Continued

Region and State	Industry							
	Total	Agriculture	Construction	Manufacturing	Maritime	Trades	Service ²	Other ³
Region VIII—Denver.....	1, 632. 1	115. 0	130. 5	257. 5	0. 0	489. 8	357. 8	281. 5
Colorado.....	687. 1	38. 0	58. 0	127. 2	0. 0	200. 0	147. 3	116. 6
Montana.....	193. 6	25. 0	11. 7	26. 0	0. 0	56. 2	39. 8	34. 9
North Dakota.....	158. 8	22. 0	13. 3	11. 5	0. 0	53. 4	36. 4	22. 2
South Dakota.....	161. 5	15. 0	11. 6	19. 7	0. 0	52. 6	40. 4	22. 2
Utah.....	322. 1	7. 0	22. 7	65. 5	0. 0	98. 5	71. 2	57. 2
Wyoming.....	109. 0	8. 0	13. 2	7. 6	0. 0	29. 1	22. 7	28. 4
Region IX—San Fran.....	7, 352. 3	307. 1	429. 6	1, 768. 5	13. 9	1, 970. 5	1, 742. 7	1, 120. 0
Arizona.....	581. 9	29. 0	62. 7	107. 7	0. 0	162. 3	119. 4	100. 8
California.....	6, 298. 3	255. 0	325. 6	1, 620. 4	12. 3	1, 685. 7	1, 456. 4	942. 9
Hawaii.....	266. 2	20. 0	24. 8	29. 7	1. 6	76. 8	68. 2	45. 1
Nevada.....	205. 9	3. 1	16. 5	10. 7	0. 0	45. 7	98. 7	31. 2
Region X—Seattle.....	1, 953. 5	131. 0	113. 3	501. 6	8. 2	527. 0	392. 4	280. 0
Alaska.....	76. 9	1. 0	10. 1	13. 3	0. 3	18. 5	16. 3	17. 4
Idaho.....	207. 5	21. 0	13. 7	45. 2	0. 0	59. 2	39. 5	28. 9
Oregon.....	718. 8	55. 0	33. 7	200. 9	3. 0	191. 8	138. 0	96. 4
Washington.....	950. 3	54. 0	55. 8	242. 2	4. 9	257. 5	198. 6	137. 3

¹ These estimates include approximately 2.0 million employees in approximately 120,000 establishments where working conditions may be subject to safety and health standards or regulations of other Federal agencies. Under the Act, OSHA standards do not apply when other Federal agencies "exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health." OSHA standards, therefore, may not apply,

or may apply only to certain working conditions, in the mining and transportation industries and AEC contract establishments.

² Includes agricultural service workers previously included under Other.

³ Includes forestry, fisheries, mining, transportation, communication, utilities, finance, insurance, and real estate.

B. Establishment Coverage in 1973 under the Occupational Safety and Health Act of 1970—figures given in thousands¹

Region and State	Industry							
	Total	Agriculture	Contract construction	Manufacturing	Maritime ²	Trades	Services	Other ³
United States.....	4,942.6	400.2	1,011.2	285.8	0.66	1,470.9	1,113.5	660.3
Region I—Boston.....	282.3	4.9	66.7	21.1	0.03	87.4	68.6	33.6
Connecticut.....	69.5	0.7	16.0	5.2	0.01	21.7	17.5	8.4
Maine.....	27.2	1.6	6.8	1.8	-----	8.0	5.7	3.3
Massachusetts.....	127.0	0.9	28.5	9.6	0.02	40.6	32.3	15.1
New Hampshire.....	21.8	0.4	6.5	1.3	-----	6.1	4.8	2.7
Rhode Island.....	22.3	0.1	5.3	2.5	-----	6.8	5.1	2.5
Vermont.....	14.5	1.2	3.6	0.7	-----	4.2	3.2	1.6
Region II—New York.....	594.5	13.7	103.6	48.7	0.11	190.5	145.7	92.2
New Jersey.....	158.6	1.5	35.5	13.3	0.03	49.1	37.7	21.5
New York.....	406.9	8.3	64.7	33.4	0.06	131.4	102.7	66.3
Puerto Rico.....	29.0	3.9	3.4	2.0	0.02	10.0	5.3	4.4
Region III—Phila.....	488.3	24.9	109.0	26.9	0.05	144.4	115.6	67.4
Delaware.....	13.5	0.5	3.5	0.5	-----	4.0	3.0	2.0
District of Columbia.....	17.4	-----	2.0	0.6	-----	4.2	7.1	3.5
Maryland.....	75.2	2.8	19.4	3.3	0.02	21.6	18.2	9.9
Pennsylvania.....	237.8	9.1	49.1	16.6	0.02	74.8	56.4	31.8
Virginia.....	106.7	9.5	28.0	4.3	0.01	28.2	22.8	13.9
West Virginia.....	37.6	3.0	7.0	1.6	-----	11.6	8.1	6.3
Region IV—Atlanta.....	839.7	100.7	190.4	41.2	0.14	239.6	170.4	97.3
Alabama.....	76.0	10.1	15.1	4.3	0.01	22.8	14.8	8.9
Florida.....	195.7	4.8	50.8	8.5	0.05	54.9	49.4	27.2
Georgia.....	118.3	9.7	28.7	6.5	0.01	35.4	23.5	14.5
Kentucky.....	85.8	19.8	15.5	2.8	0.01	23.2	14.8	9.7
Mississippi.....	55.8	11.1	10.2	2.4	0.01	16.5	9.5	6.1
North Carolina.....	139.7	21.8	33.2	8.2	0.01	38.1	25.7	12.7
South Carolina.....	65.0	6.2	16.6	3.4	0.01	18.9	12.6	7.3
Tennessee.....	103.4	17.2	20.3	5.1	0.03	29.8	20.1	10.9
Region V—Chicago.....	976.8	85.9	190.5	62.9	0.09	295.6	213.0	128.8
Illinois.....	249.1	18.0	45.6	16.6	0.03	73.3	53.9	41.7
Indiana.....	118.9	12.8	24.0	6.6	-----	37.0	24.8	13.7
Michigan.....	173.8	9.6	36.8	12.9	0.01	54.7	40.7	19.1
Minnesota.....	100.3	16.6	17.1	5.1	0.01	28.5	19.4	13.6
Ohio.....	222.4	14.9	45.7	14.6	0.03	67.3	52.4	27.5
Wisconsin.....	112.2	14.0	21.3	7.1	0.01	34.8	21.8	13.2
Region VI—Dallas.....	532.5	50.0	113.9	21.9	0.10	157.6	110.3	78.7
Arkansas.....	52.9	7.6	10.7	2.6	0.01	16.0	9.6	6.4
Louisiana.....	77.6	6.0	15.6	3.2	0.04	24.0	16.5	12.3
New Mexico.....	28.6	2.0	6.2	0.8	-----	8.3	6.2	5.1
Oklahoma.....	72.9	9.4	14.8	2.6	-----	20.9	14.3	10.9
Texas.....	300.5	25.0	66.6	12.7	0.05	88.4	63.7	44.0
Region VII—Kansas City.....	342.5	64.4	58.1	13.1	0.02	98.9	63.5	44.5
Iowa.....	95.7	23.5	15.0	3.0	-----	26.9	16.4	10.9
Kansas.....	70.1	13.1	11.6	2.5	-----	20.3	12.8	9.8
Missouri.....	123.7	17.1	21.7	6.0	0.02	36.9	25.2	16.8
Nebraska.....	53.0	10.7	9.8	1.6	-----	14.8	9.1	7.0

See footnotes at end of table.

B. Establishment Coverage in 1973 under the Occupational Safety and Health Act of 1970—figures given in thousands¹—Continued

Region and State	Industry							
	Total	Agriculture	Contract construction	Manufacturing	Maritime ²	Trades	Services	Other ³
Region VIII—Denver.....	180.9	27.1	38.0	5.7	-----	49.4	35.6	25.1
Colorado.....	66.4	4.2	17.4	2.5	-----	17.9	14.9	9.5
Montana.....	24.4	4.3	3.9	0.8	-----	7.1	4.7	3.6
North Dakota.....	23.8	7.6	3.1	0.4	-----	6.7	3.3	2.7
South Dakota.....	23.9	7.1	3.1	0.5	-----	6.6	3.8	2.8
Utah.....	30.0	2.4	8.1	1.2	-----	7.7	6.4	4.2
Wyoming.....	12.4	1.5	2.4	0.3	-----	3.4	2.5	2.3
Region IX—San Fran.....	524.3	12.8	103.0	34.1	0.06	156.1	148.9	69.3
Arizona.....	46.3	1.1	11.9	1.8	-----	13.2	12.2	6.1
California.....	445.3	11.0	83.7	31.2	0.05	133.5	127.5	58.3
Hawaii.....	17.1	0.3	3.7	0.7	0.01	5.0	4.6	2.8
Nevada.....	15.6	0.4	3.7	0.4	-----	4.4	4.6	2.1
Region X—Seattle.....	180.8	15.8	38.0	10.2	0.06	51.4	41.9	23.4
Alaska.....	7.4	0.1	1.7	0.3	0.01	1.9	1.8	1.6
Idaho.....	24.4	4.6	4.4	1.1	-----	6.8	4.5	3.0
Oregon.....	62.8	4.8	13.7	4.1	0.02	17.9	14.4	7.9
Washington.....	86.1	6.3	18.2	4.7	0.03	24.8	21.2	10.9

¹ These estimates include approximately 2.0 million employees in approximately 120,000 establishments where working conditions may be subject to safety or health standards or regulations of other Federal agencies. Under Section 4(b)(1) of the Occupational Safety and Health Act of 1970, the standards of the Act do not apply to the extent other Federal agencies "exercise statutory authority to prescribe or enforce standards or regulations affecting

occupational safety and health." OSHA standards, therefore, may not apply or may apply only to certain working conditions in the mining and transportation industries and AEC contract establishments.

² Maritime includes only SIC 4463.

³ Other industries include mining, transportation, communication, utilities, finance, insurance, and real estate.

C. Recordable Occupational Injuries and Illnesses, and Lost Workdays, Private Nonfarm Sector, by Industry Division and Extent of Case—1972

Industry	Total Recordable Cases		Recordable occupational injuries and illnesses resulting in—								Lost workdays	
	Number (in thou- sands)	Per- cent	Deaths		Lost workday cases		Nonfatal cases without lost workdays					
			Number (in thou- sands)	Per- cent	Number (in thou- sands)	Per- cent	Number (in thou- sands)	Per- cent				
Private nonfarm sector ¹ -----	5, 656. 7	100. 0	5. 5	100. 0	1, 722. 8	100. 0	3, 928. 4	100. 0	24, 730. 9	100. 0		
Contract construction-----	566. 8	10. 0	1. 5	27. 3	177. 4	10. 3	387. 9	9. 0	2, 639. 7	10. 7		
Manufacturing-----	2, 859. 6	50. 6	1. 4	25. 5	774. 8	45. 0	2, 083. 4	53. 0	11, 481. 1	46. 4		
Transportation and public utilities-----	405. 1	7. 2	1. 1	20. 0	167. 6	9. 7	236. 4	6. 0	2, 663. 3	10. 8		
Wholesale and retail trade---	1, 140. 1	20. 2	. 7	12. 7	373. 7	21. 7	765. 7	19. 5	4, 706. 5	19. 0		
Finance, insurance and real estate-----	87. 0	1. 5	. 1	1. 8	28. 2	1. 6	58. 7	1. 5	349. 2	1. 4		
Services ² -----	564. 1	9. 9	. 5	9. 1	186. 3	10. 8	377. 3	9. 6	2, 572. 7	10. 4		

¹ Includes oil and gas extraction (SIC 13), which is not listed in the breakdown below, but not other mining or railroad activities.

² Includes agricultural services, forestry, and fisheries (SIC 07-09).

Source: Bureau of Labor Statistics, U.S. Department of Labor.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972.

Industry 1/ SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
		Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Private nonfarm sector 6/	58,519.2	10.9	3.3	7.6	14
Oil and gas extraction	13	261.9	12.9	5.6	7.2
Crude petroleum and natural gas	131	n.a.	5.7	2.0	3.7
Oil and gas field services	138	124.1	20.1	9.4	10.6
Contract construction	3,520.6	19.0	6.0	12.9	15
General building contractors	15	1,036.5	18.5	5.7	12.8
Heavy construction contractors	16	732.4	19.6	6.1	13.4
Highway and street construction	161	331.9	17.6	5.4	12.1
Heavy construction, n.e.c.	162	400.5	21.3	6.6	14.5
Special trade contractors	17	1,751.7	19.0	6.0	12.9
Plumbing, heating, and air conditioning	171	436.2	19.9	5.5	14.3
Painting, paper hanging, and decorating	172	126.2	11.2	4.3	6.9
Electrical work	173	318.5	17.1	4.4	12.7
Masonry, stonework, and plastering	174	208.5	17.5	6.6	10.9
Carpentering and flooring	175	n.a.	18.7	7.0	11.7
Roofing and sheet metal work	176	117.6	28.9	11.2	17.7
Concrete work	177	n.a.	16.6	5.7	10.8
Water well drilling	178	n.a.	19.1	8.5	10.5
Misc. special trade contractors	179	n.a.	20.5	6.7	13.7
Manufacturing	18,933.1	15.6	4.2	11.4	15
Durable goods	10,883.9	17.5	4.5	13.0	15
Ordnance and accessories	19	188.2	9.3	2.0	7.3
Ammunition, except for small arms	192	129.4	8.9	1.9	7.0
Complete guided missiles and space vehicles	1925	90.3	4.7	.5	4.2
Ammunition, exc. for small arms, n.e.c.	1929	39.1	18.9	5.2	13.7
Small arms	195	n.a.	10.5	3.7	6.8
Small arms ammunition	196	n.a.	9.8	2.2	7.6
Lumber and wood products	24	612.0	25.4	9.3	16.1
Logging camps and logging contractors	241	68.9	32.5	16.2	16.1
Sawmills and planing mills	242	216.7	24.9	9.6	15.3
Sawmills and planing mills, general	2421	184.0	25.0	9.6	15.3
Hardwood dimension and flooring mills	2426	n.a.	22.7	8.4	14.3
Millwork, plywood and related products	243	204.8	26.3	8.1	18.2
Millwork	2431	87.1	24.3	8.5	15.7
Veneer and plywood	2432	81.3	25.6	7.2	18.4
Prefabricated wood structures	2433	n.a.	32.7	9.1	23.6
Wooden containers	244	28.2	21.6	7.1	14.5
Nailed wooden boxes and shooks	2441	n.a.	22.0	6.8	15.2
Miscellaneous wood products	249	93.4	20.8	7.1	13.6
Wood preserving	2491	n.a.	21.6	7.0	14.5
Wood products, n.e.c.	2499	n.a.	20.6	7.1	13.5
Furniture and fixtures	25	492.7	19.4	5.2	14.2
Household furniture	251	355.9	18.5	5.0	13.5
Wood household furniture	2511	177.2	18.8	4.9	13.9
Upholstered wood household furniture	2512	101.0	16.8	4.3	12.5
Metal household furniture	2514	n.a.	20.5	5.6	14.9
Mattresses and bedsprings	2515	38.5	19.2	6.9	12.3
Office furniture	252	38.6	22.5	5.0	17.4
Wood office furniture	2521	n.a.	22.1	5.2	16.9
Metal office furniture	2522	n.a.	22.6	5.0	17.6
Public building furniture	253	n.a.	21.4	5.6	15.8
Partitions and fixtures	254	50.6	23.4	6.3	17.1
Wood partitions and fixtures	2541	n.a.	19.2	5.3	13.8
Metal partitions and fixtures	2542	n.a.	28.4	7.5	20.9
Miscellaneous furniture and fixtures	259	n.a.	16.9	4.7	12.2
Venetian blinds and shades	2591	n.a.	15.1	3.9	11.2
Stone, clay, and glass products	32	660.0	18.8	5.6	13.2
Flat glass	321	24.5	17.9	3.6	14.3
Glass and glassware, pressed or blown	322	133.7	18.3	4.3	13.9
Glass containers	3221	76.2	21.0	5.1	15.8
Pressed and blown glass, n.e.c.	3229	57.5	14.6	3.3	11.3
Products of purchased glass	323	n.a.	19.8	5.4	14.3
Cement, hydraulic	324	33.6	13.8	2.1	11.7

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Structural clay products	325	58.8	19.9	7.2	12.7	14
Brick and structural clay tile	3251	26.0	19.8	7.5	12.3	13
Ceramic wall and floor tile	3253	n.a.	18.0	5.9	12.1	13
Clay refractories	3255	n.a.	17.9	5.5	12.4	19
Structural clay products, n.e.c.	3259	n.a.	25.2	9.9	15.2	14
Pottery and related products	326	44.2	18.2	6.5	11.7	14
Vitreous plumbing fixtures	3261	n.a.	28.2	11.5	16.7	12
Porcelain electrical supplies	3264	n.a.	14.7	3.8	10.9	15
Pottery products, n.e.c.	3269	n.a.	17.4	4.6	12.8	14
Concrete, gypsum, and plaster products	327	198.7	20.2	7.0	13.1	17
Concrete block and brick	3271	n.a.	20.8	7.7	13.1	15
Concrete products, n.e.c.	3272	n.a.	26.4	9.6	16.7	15
Ready-mixed concrete	3273	n.a.	17.2	5.5	11.6	18
Gypsum products	3275	n.a.	8.3	1.6	6.6	39
Cut stone and stone products	328	n.a.	17.8	6.2	11.5	14
Miscellaneous nonmetallic mineral products	329	n.a.	18.3	5.1	13.2	17
Abrasive products	3291	26.4	20.4	6.4	14.0	14
Asbestos products	3292	n.a.	19.7	3.9	15.8	21
Gaskets and insulations	3293	n.a.	18.8	5.4	13.3	14
Mineral wool	3296	n.a.	16.2	3.8	12.4	20
Nonclay refractories	3297	n.a.	19.3	6.7	12.6	14
Nonmetallic mineral products, n.e.c.	3299	n.a.	12.5	4.2	8.2	15
Primary metal industries	33	1,234.8	21.1	5.7	15.3	18
Blast furnace and basic steel products	331	572.7	17.4	3.9	13.5	20
Blast furnaces and steel mills	3312	492.2	16.1	3.3	12.8	23
Electrometallurgical products	3313	n.a.	19.5	5.3	14.2	20
Steel wire and related products	3315	n.a.	20.1	8.7	11.4	13
Cold finishing of steel shapes	3316	n.a.	31.2	7.2	24.0	16
Steel pipe and tubes	3317	n.a.	26.1	8.2	17.9	12
Iron and steel foundries	332	220.2	32.2	9.2	22.9	15
Gray iron foundries	3321	139.2	35.7	10.6	25.1	15
Malleable iron foundries	3322	24.9	42.1	9.9	32.2	13
Steel foundries	3323	56.2	21.4	6.2	15.2	18
Primary nonferrous metals	333	n.a.	14.5	4.3	10.2	24
Primary copper	3331	n.a.	18.1	4.9	13.2	28
Primary aluminum	3334	29.0	10.4	3.1	7.3	26
Secondary nonferrous metals	334	n.a.	30.9	12.6	18.3	13
Nonferrous rolling and drawing	335	205.9	16.4	4.6	11.8	19
Copper rolling and drawing	3351	39.7	14.1	4.7	9.4	22
Aluminum rolling and drawing	3352	66.6	18.5	4.6	13.9	24
Nonferrous wire drawing and insulating	3357	79.2	14.7	4.6	10.1	15
Nonferrous foundries	336	83.7	26.4	8.6	17.7	13
Aluminum castings	3361	43.5	28.3	9.9	18.3	12
Brass, bronze, and copper castings	3362	n.a.	25.3	8.1	17.2	13
Nonferrous castings, n.e.c.	3369	n.a.	23.5	6.5	16.9	16
Miscellaneous primary metal products	339	68.7	24.2	7.7	16.5	20
Iron and steel forgings	3391	45.5	24.1	7.7	16.4	24
Primary metal products, n.e.c.	3399	n.a.	24.9	8.1	16.8	11
Fabricated metal products	34	1,371.1	22.8	5.9	16.9	14
Metal cans	341	68.2	19.6	4.6	15.0	19
Cutlery, hand tools, and hardware	342	155.5	19.3	4.6	14.7	14
Cutlery	3421	n.a.	16.3	4.4	11.9	13
Hand and edge tools, n.e.c.	3423	n.a.	23.6	6.0	17.6	12
Hardware, n.e.c.	3429	90.2	17.8	3.9	13.9	15
Plumbing and heating, except electric	343	80.7	22.9	5.2	17.6	13
Metal sanitary ware	3431	n.a.	25.3	6.9	18.4	11
Plumbing fittings and brass goods	3432	n.a.	20.7	5.1	15.5	13
Heating equipment, except electric	3433	41.6	23.3	4.8	18.5	14

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Fabricated structural metal products	344	429.4	25.9	7.1	18.7	14
Fabricated structural steel	3441	101.8	27.5	8.9	18.5	15
Metal doors, sash, and trim	3442	75.9	24.8	6.2	18.6	13
Fabricated plate work (boiler shops)	3443	111.9	23.2	6.3	16.9	14
Sheet metal work	3444	84.0	27.5	6.9	20.6	12
Architectural metal work	3446	n.a.	28.4	7.6	20.8	13
Miscellaneous metal work	3449	n.a.	25.9	7.3	18.6	13
Screw machine products, bolts, etc.	345	96.9	19.3	4.6	14.7	13
Screw machine products	3451	42.0	19.8	4.1	15.7	10
Bolts, nuts, rivets, and washers	3452	54.9	19.0	5.0	13.9	16
Metal stampings	346	234.0	24.4	5.5	18.9	14
Metal services, n.e.c.	347	85.7	22.1	6.8	15.2	12
Plating and polishing	3471	n.a.	21.9	6.9	15.0	11
Metal coating and allied services	3479	n.a.	22.7	6.7	16.0	14
Miscellaneous fabricated wire products	348	67.1	21.2	6.5	14.7	11
Miscellaneous fabricated metal products	349	153.7	19.5	5.1	14.4	14
Metal barrels, drums, and pails	3491	n.a.	29.6	7.5	22.0	15
Valves and pipe fittings	3494	n.a.	17.6	4.5	13.0	14
Fabricated pipe and fittings	3498	n.a.	22.3	6.2	16.1	13
Fabricated metal products, n.e.c.	3499	n.a.	19.5	4.8	14.7	14
Machinery, except electrical	35	1,864.2	17.1	3.8	13.2	14
Engines and turbines	351	110.3	17.2	3.3	13.9	14
Internal combustion engines, n.e.c.	3519	66.3	17.6	3.2	14.4	15
Farm machinery	352	132.4	21.4	6.6	14.8	11
Construction and related machinery	353	287.2	20.6	5.0	15.6	14
Construction machinery	3531	n.a.	21.7	4.6	17.1	13
Mining machinery	3532	n.a.	20.5	5.6	14.9	18
Oil field machinery	3533	45.4	17.9	5.2	12.7	16
Elevators and moving stairways	3534	n.a.	17.0	3.6	13.4	17
Conveyors and conveying equipment	3535	n.a.	21.6	6.8	14.8	12
Hoists, cranes, and monorails	3536	n.a.	18.9	4.6	14.2	16
Industrial trucks and tractors	3537	31.3	21.7	5.4	16.3	12
Metalworking machinery	354	288.2	15.7	2.8	12.9	14
Machine tools, metal cutting types	3541	57.5	12.8	2.7	10.0	18
Special dies, tools, jigs and fixtures	3544	112.8	18.6	3.0	15.6	11
Metalworking machinery, n.e.c.	3548	n.a.	14.9	3.7	11.2	13
Special industry machinery	355	178.1	19.0	4.1	14.9	14
Food products machinery	3551	37.7	19.9	4.8	15.1	12
Textile machinery	3552	36.9	20.1	3.4	16.6	16
Woodworking machinery	3553	n.a.	24.1	5.5	18.6	12
Paper industries machinery	3554	n.a.	17.4	4.4	13.0	16
Printing trades machinery	3555	26.7	16.2	3.1	13.1	13
Special industry machinery, n.e.c.	3559	n.a.	18.4	4.2	14.2	14
General industrial machinery	356	264.8	17.4	4.1	13.3	14
Pumps and compressors	3561	75.4	16.4	3.9	12.4	15
Ball and roller bearings	3562	51.5	11.5	2.4	9.0	16
Blowers and fans	3564	33.0	22.2	5.1	17.0	12
Power transmission equipment	3566	47.3	18.9	4.8	14.1	13
Industrial furnaces and ovens	3567	n.a.	19.5	4.4	15.1	10
General industrial machinery, n.e.c.	3569	n.a.	20.0	4.7	15.3	13
Office and computing machines	357	245.4	6.9	1.3	5.6	13
Electronic computing equipment	3573	172.0	5.1	1.2	3.9	12
Office machines, n.e.c.	3579	n.a.	8.2	1.9	6.3	14
Service industry machines	358	148.6	21.0	4.7	16.3	13
Automatic merchandising machines	3581	n.a.	17.0	3.4	13.6	16
Refrigeration machinery	3585	100.3	21.8	4.8	17.0	13
Service industry machines, n.e.c.	3589	n.a.	20.2	4.7	15.5	12
Miscellaneous machinery, except electrical	359	209.1	18.8	4.0	14.8	15

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Electrical equipment and supplies	36	1,833.0	10.7	2.4	8.3	15
Electric test and distributing equipment	361	192.8	9.4	2.2	7.2	16
Electric measuring instruments	3611	66.2	6.0	1.3	4.7	13
Transformers	3612	52.5	11.3	2.7	8.6	15
Switchgear and switchboard apparatus	3613	74.1	10.9	2.5	8.4	18
Electrical industrial apparatus	362	208.9	12.3	3.1	9.1	14
Motors and generators	3621	113.9	12.9	3.7	9.1	14
Industrial controls	3622	58.0	9.4	1.7	7.6	15
Welding apparatus	3623	n.a.	16.8	3.6	13.2	14
Carbon and graphite products	3624	12.2	15.2	4.9	10.3	18
Electrical industrial apparatus, n.e.c.	3629	n.a.	12.2	1.8	10.4	14
Household appliances	363	196.4	17.3	3.3	14.0	15
Household cooking equipment	3631	n.a.	19.6	4.4	15.2	14
Household laundry equipment	3633	28.1	14.4	2.6	11.8	15
Electric housewares and fans	3634	50.4	14.8	4.0	10.8	15
Household appliances, n.e.c.	3639	n.a.	27.4	5.6	21.8	14
Electric lighting and wiring equipment	364	201.7	14.7	3.6	11.1	15
Electric lamps	3641	36.3	7.9	1.8	6.1	13
Lighting fixtures	3642	67.5	18.0	4.2	13.8	14
Current-carrying wiring devices	3643	n.a.	12.8	2.9	9.9	16
Noncurrent-carrying wiring devices	3644	n.a.	22.2	6.2	16.0	17
Radio and TV receiving equipment	365	139.2	9.8	2.2	7.6	16
Phonograph records	3652	n.a.	7.9	2.3	5.6	15
Communication equipment	366	429.5	6.4	1.2	5.1	17
Telephone and telegraph apparatus	3661	148.5	8.2	1.4	6.8	20
Radio and TV communication equipment	3662	281.0	5.3	1.1	4.2	14
Electronic components and accessories	367	340.7	8.5	1.6	6.9	14
Electron tubes, transmitting	3673	n.a.	6.0	1.3	4.7	17
Semiconductors	3674	n.a.	7.2	1.4	5.8	12
Electronic components, n.e.c.	3679	n.a.	9.8	1.8	8.0	15
Misc. electrical equipment and supplies	369	123.8	14.7	4.0	10.7	13
Storage batteries	3691	n.a.	25.2	8.6	16.5	11
X-Ray apparatus and tubes	3693	n.a.	7.9	1.6	6.3	15
Electrical equipment, n.e.c.	3699	n.a.	15.2	3.7	11.5	12
Transportation equipment	37	1,746.8	18.8	4.2	14.6	14
Motor vehicles and equipment	371	860.9	20.1	4.4	15.7	13
Motor vehicles	3711	381.3	19.9	4.1	15.8	11
Truck and bus bodies	3713	39.2	32.4	8.1	24.3	11
Motor vehicle parts and accessories	3714	369.4	19.2	4.4	14.8	14
Truck trailers	3715	25.3	33.5	7.7	25.8	14
Aircraft and parts	372	501.1	8.0	1.5	6.5	17
Aircraft	3721	272.2	6.2	1.0	5.2	19
Aircraft engines and engine parts	3722	138.5	9.0	1.7	7.3	16
Aircraft equipment, n.e.c.	3729	n.a.	12.0	2.8	9.2	16
Ship and boat building and repairing	373	178.0	28.6	6.7	21.9	21
Ship building and repairing	3731	134.5	30.4	6.5	23.9	24
Boat building and repairing	3732	43.4	22.9	7.1	15.8	12
Railroad equipment	374	51.6	22.3	4.3	18.0	19
Locomotives and parts	3741	n.a.	15.1	1.9	13.2	14
Railroad and street cars	3742	n.a.	27.2	6.1	21.1	21
Motorcycles, bicycles, and parts	375	n.a.	20.9	5.2	15.7	12
Miscellaneous transportation equipment	379	n.a.	36.5	10.1	26.4	11
Trailer coaches	3791	n.a.	37.1	10.1	27.0	11
Transportation equipment, n.e.c.	3799	n.a.	30.4	9.6	20.8	9
Instruments and related products	38	455.9	8.7	1.8	6.8	14
Engineering and scientific instruments	381	64.2	7.9	1.7	6.1	14
Mechanical measuring and control devices	382	103.7	8.4	1.8	6.6	14
Mechanical measuring devices	3821	65.6	8.3	1.7	6.5	12
Automatic temperature controls	3822	38.1	8.9	1.9	7.0	17

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Optical instruments and lenses	383	n.a.	6.6	1.6	4.9	15
Medical instruments and supplies	384	90.4	8.8	1.9	6.9	12
Surgical and medical instruments	3841	n.a.	9.0	1.8	7.2	14
Surgical appliances and supplies	3842	n.a.	8.5	1.9	6.6	11
Dental equipment and supplies	3843	n.a.	9.8	2.0	7.8	11
Ophthalmic goods	385	38.5	6.9	1.7	5.2	14
Photographic equipment and supplies	386	112.8	10.2	1.9	8.3	13
Watches, clocks, and watchcases	387	30.4	7.0	1.5	5.5	19
Watches and clocks	3871	n.a.	6.4	1.3	5.1	21
Miscellaneous manufacturing industries	39	425.2	13.5	3.5	10.0	14
Jewelry, silverware, and plated ware	391	53.0	7.2	2.2	5.0	13
Musical instruments and parts	393	23.7	16.7	3.8	12.9	13
Toys and sporting goods	394	119.9	16.0	4.1	11.8	13
Games and toys	3941	n.a.	15.3	4.3	11.0	13
Sporting and athletic goods, n.e.c.	3949	54.8	17.8	4.1	13.6	13
Pens, pencils, office and art supplies	395	33.4	10.2	3.1	7.1	15
Pens and mechanical pencils	3951	n.a.	9.1	2.4	6.7	14
Costume jewelry and notions	396	54.5	9.3	2.7	6.6	15
Costume jewelry	3961	n.a.	6.8	2.1	4.6	17
Needles, pins and fasteners	3964	n.a.	10.9	2.8	8.1	14
Miscellaneous manufactures	399	n.a.	15.7	3.8	11.9	14
Brooms and brushes	3991	n.a.	14.7	4.1	10.6	15
Signs and advertising displays	3993	n.a.	18.5	4.6	13.9	13
Morticians' goods	3994	n.a.	17.9	4.2	13.7	13
Hard surface floor coverings	3996	n.a.	15.8	3.1	12.7	23
Manufactures, n.e.c.	3999	n.a.	13.1	3.0	10.1	14
Nondurable goods		8,049.2	12.9	3.9	9.0	15
Food and kindred products	20	1,751.1	19.4	6.8	12.6	14
Meat products	201	344.5	28.2	10.5	17.7	12
Meat packing plants	2011	179.4	31.5	12.2	19.2	12
Sausages and other prepared meats	2013	61.6	21.8	8.2	13.6	12
Poultry dressing plants	2015	103.5	26.3	8.8	17.5	12
Dairy products	202	224.6	15.6	6.1	9.5	14
Cheese, natural and processed	2022	n.a.	13.8	5.6	8.2	13
Condensed and evaporated milk	2023	n.a.	12.0	4.5	7.4	11
Ice cream and frozen desserts	2024	23.6	15.3	5.8	9.5	14
Fluid milk	2026	155.5	16.3	6.3	10.0	14
Canned, cured, and frozen foods	203	282.4	19.3	6.2	13.1	15
Canned and cured sea foods	2031	n.a.	23.3	10.1	13.1	13
Canned specialties	2032	n.a.	14.2	4.2	9.9	15
Canned fruits and vegetables	2033	n.a.	20.9	6.0	14.9	15
Dehydrated food products	2034	n.a.	16.2	3.9	12.3	14
Pickles, sauces, and salad dressings	2035	n.a.	17.1	5.7	11.4	12
Fresh or frozen packaged fish	2036	n.a.	19.8	8.0	11.8	12
Frozen fruits and vegetables	2037	67.3	19.2	6.5	12.7	16
Grain mill products	204	133.7	15.6	5.2	10.4	16
Flour and other grain mill products	2041	27.5	16.6	5.7	10.8	17
Prepared feeds for animals and fowls	2042	66.8	16.7	5.8	10.8	14
Cereal preparations	2043	n.a.	12.5	2.0	10.5	21
Blended and prepared flour	2045	n.a.	14.9	4.6	10.3	17
Wet corn milling	2046	n.a.	11.3	4.0	7.3	25
Bakery products	205	271.1	12.9	4.7	8.2	15
Bread, cake, and related products	2051	226.8	12.6	4.8	7.8	15
Cookies and crackers	2052	44.3	14.6	4.2	10.4	20
Sugar	206	39.3	21.9	7.9	14.0	14
Raw cane sugar	2061	n.a.	22.7	7.3	15.3	15
Cane sugar refining	2062	n.a.	13.3	5.4	7.9	20
Confectionery and related products	207	78.6	13.9	4.3	9.6	14
Confectionery products	2071	60.9	14.5	4.6	9.9	14
Chocolate and cocoa products	2072	n.a.	10.6	3.5	7.1	14

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Beverages	208	230.1	22.7	6.8	15.9	12
Malt liquors	2082	55.0	21.5	5.1	16.4	18
Wines, brandy, and brandy spirits	2084	n.a.	21.8	8.3	13.5	11
Distilled liquor, except brandy	2085	n.a.	15.9	4.7	11.2	14
Bottled and canned soft drinks	2086	127.8	25.4	8.0	17.4	11
Flavoring extracts and sirups, n.e.c.	2087	n.a.	11.3	3.1	8.2	12
Miscellaneous foods and kindred products	209	146.7	18.1	6.3	11.8	15
Soybean oil mills	2092	n.a.	16.0	5.2	10.8	17
Animal and marine fats and oils	2094	n.a.	27.2	12.1	15.1	15
Roasted coffee	2095	n.a.	15.0	3.8	11.1	16
Shortening and cooking oils	2096	n.a.	19.6	5.0	14.6	16
Food preparations, n.e.c.	2099	n.a.	16.7	5.6	11.0	15
Tobacco manufactures	21	72.0	8.5	2.4	6.0	15
Cigarettes	211	42.2	7.2	2.0	5.1	16
Cigars	212	13.8	5.9	1.9	3.9	12
Tobacco stemming and redrying	214	n.a.	15.7	4.4	11.3	15
Textile mill products	22	991.0	11.6	2.8	8.8	17
Weaving mills, cotton	221	201.5	10.8	1.4	9.4	29
Weaving mills, synthetics	222	105.1	9.7	2.0	7.6	17
Weaving and finishing mills, wool	223	27.8	14.0	4.4	9.5	12
Narrow fabric mills	224	29.8	11.1	3.2	7.9	15
Knitting mills	225	266.4	8.5	2.4	6.1	13
Women's hosiery, except socks	2251	55.2	5.5	1.8	3.7	13
Hosiery, n.e.c.	2252	35.2	5.6	2.0	3.6	12
Knit outerwear mills	2253	77.2	7.9	2.1	5.8	12
Knit underwear mills	2254	35.7	6.6	2.5	4.1	13
Knit fabric mills	2256	n.a.	14.1	3.3	10.8	14
Textile finishing, except wool	226	83.5	14.9	4.8	10.1	15
Finishing plants, cotton	2261	n.a.	14.3	4.2	10.1	16
Finishing plants, synthetics	2262	n.a.	16.2	5.7	10.5	13
Finishing plants, n.e.c.	2269	n.a.	14.1	4.6	9.5	14
Floor covering mills	227	61.5	14.6	3.4	11.1	16
Woven carpets and rugs	2271	n.a.	14.1	3.0	11.1	21
Tufted carpets and rugs	2272	n.a.	14.8	3.6	11.1	16
Yarn and thread mills	228	142.4	13.7	3.0	10.7	17
Yarn mill, except wool	2281	n.a.	13.9	2.9	11.0	17
Throwing and winding mills	2282	n.a.	14.5	3.3	11.2	15
Wool yarn mills	2283	n.a.	12.8	3.2	9.6	19
Thread mills	2284	n.a.	11.0	2.4	8.6	18
Miscellaneous textile goods	229	73.1	16.5	5.1	11.4	16
Coated fabrics, not rubberized	2295	n.a.	18.4	6.3	12.1	15
Tire cord and fabric	2296	n.a.	13.1	2.5	10.6	22
Cordage and twine	2298	n.a.	17.2	5.7	11.5	14
Textile goods, n.e.c.	2299	n.a.	13.1	3.3	9.8	15
Apparel and other textile products	23	1,335.3	7.5	1.8	5.7	12
Men's and boys' suits and coats	231	106.9	6.7	2.1	4.6	13
Men's and boys' furnishings	232	385.0	8.8	2.3	6.5	13
Men's and boys' shirts and nightwear	2321	118.5	7.2	1.6	5.6	17
Men's and boys' underwear	2322	n.a.	7.6	3.0	4.6	7
Men's and boys' neckwear	2323	n.a.	3.9	1.1	2.8	14
Men's and boys' separate trousers	2327	85.2	11.1	2.5	8.5	13
Men's and boys' work clothing	2328	85.8	9.9	2.9	7.0	11
Men's and boys' clothing, n.e.c.	2329	n.a.	8.9	2.3	6.6	11
Women's and misses' outerwear	233	396.0	5.4	1.1	4.3	11
Women's and misses' blouses and waists	2331	42.0	5.6	.7	4.8	14
Women's and children's undergarments	234	114.1	6.7	1.4	5.3	11
Women's and children's underwear	2341	81.7	6.7	1.3	5.4	11
Corsets and allied garments	2342	32.5	6.8	1.6	5.2	11
Hats, caps, and millinery	235	16.3	7.7	1.8	5.9	15
Hats and caps, except millinery	2352	n.a.	8.8	2.0	6.8	15
Children's outerwear	236	75.8	6.8	1.7	5.0	10
Children's outerwear, n.e.c.	2369	n.a.	7.1	2.0	5.1	11

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Miscellaneous apparel and accessories	238	n.a.	7.2	2.0	5.2	11
Fabric dress and work gloves	2381	n.a.	4.4	1.8	2.6	13
Robes and dressing gowns	2384	n.a.	8.4	1.0	7.3	14
Miscellaneous fabricated textile products	239	170.6	10.3	2.6	7.7	14
Curtains and draperies	2391	n.a.	9.5	2.4	7.1	17
Housefurnishings, n.e.c.	2392	n.a.	10.9	2.5	8.4	15
Canvas products	2394	n.a.	13.5	4.0	9.4	19
Fabricated textile products, n.e.c.	2399	n.a.	12.2	3.0	9.2	13
Paper and allied products	26	697.0	16.0	4.1	11.9	19
Pulp mills	261	n.a.	13.5	2.2	11.3	27
Pulp mills, except building paper	262	n.a.	12.2	3.0	9.2	23
Paperboard mills	263	70.9	16.8	3.9	12.9	25
Miscellaneous converted paper products	264	196.6	16.0	4.5	11.5	16
Envelopes	2642	n.a.	17.1	4.6	12.5	14
Bags, except textile bags	2643	44.3	15.8	5.1	10.7	15
Die cut paper and board	2645	n.a.	13.3	4.5	8.8	11
Sanitary paper products	2647	n.a.	17.5	4.6	12.9	16
Converted paper products, n.e.c.	2649	n.a.	21.2	5.7	15.5	14
Paperboard containers and boxes	265	222.2	19.1	4.9	14.1	16
Folding paperboard boxes	2651	n.a.	17.2	4.5	12.6	16
Set-up paperboard boxes	2652	n.a.	16.0	5.3	10.7	13
Corrugated and solid fiber boxes	2653	109.4	20.5	5.4	15.1	17
Sanitary food containers	2654	30.8	16.3	4.0	12.2	17
Fiber cans, drums, and related material	2655	n.a.	22.2	4.3	17.9	16
Building paper and board mills	266	n.a.	17.1	3.5	13.6	29
Printing and publishing	27	1,079.6	7.6	2.5	5.1	13
Newspapers	271	376.5	6.9	2.5	4.4	13
Periodicals	272	68.1	3.9	1.3	2.6	11
Books	273	99.1	6.7	1.9	4.7	13
Book publishing	2731	n.a.	4.6	1.5	3.1	10
Book printing	2732	n.a.	11.8	3.1	8.7	16
Miscellaneous publishing	274	n.a.	5.1	1.9	3.2	13
Commercial printing	275	344.2	9.0	2.9	6.1	13
Commercial printing, except lithographic	2751	202.1	9.0	3.1	5.9	12
Commercial printing, lithographic	2752	131.3	9.0	2.8	6.2	13
Engraving and plate printing	2753	n.a.	6.9	1.9	5.0	11
Manifold business forms	276	n.a.	11.5	3.5	7.9	14
Greeting card publishing	277	n.a.	6.7	2.0	4.7	12
Blankbooks and bookbinding	278	55.4	11.5	3.6	7.9	11
Blankbooks and looseleaf binders	2782	n.a.	10.5	3.2	7.3	13
Bookbinding and related work	2789	n.a.	12.4	3.9	8.5	10
Print trade services	279	n.a.	3.9	1.3	2.6	12
Chemicals and allied products	28	1,002.2	10.0	2.8	7.2	15
Industrial chemicals	281	302.3	9.8	2.4	7.3	19
Alkalies and chlorine	2812	21.4	12.6	2.4	10.2	22
Industrial gases	2813	n.a.	7.2	2.1	5.1	18
Cyclic intermediates and crudes	2815	n.a.	12.3	2.9	9.4	18
Inorganic pigments	2816	n.a.	15.2	4.0	11.2	19
Industrial inorganic chemicals, n.e.c.	2819	96.5	10.6	2.9	7.7	20
Plastics materials and synthetics	282	217.3	7.4	2.2	5.2	18
Plastics materials and resins	2821	89.7	10.9	3.1	7.7	17
Synthetic rubber	2822	n.a.	10.8	4.1	6.7	20
Cellulosic man-made fibers	2823	n.a.	4.6	1.2	3.4	25
Drugs	283	147.1	8.3	2.6	5.7	12
Medicinals and botanicals	2833	n.a.	9.2	3.1	6.1	15
Pharmaceutical preparations	2834	118.1	7.8	2.5	5.2	11
Soap, cleaners, and toilet goods	284	122.4	11.6	3.9	7.7	13
Soap and other detergents	2841	39.6	11.8	4.3	7.5	15
Polishes and sanitation goods	2842	n.a.	13.5	4.4	9.0	10
Toilet preparations	2844	50.4	10.0	3.2	6.8	12

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Paints and allied products	285	69.2	14.4	4.2	10.2	9
Gum and wood chemicals	286	n.a.	15.9	5.7	10.2	15
Agricultural chemicals	287	52.0	13.8	3.5	10.2	15
Fertilizers	2871	n.a.	13.4	3.0	10.4	23
Agricultural chemicals, n.e.c.	2879	n.a.	13.0	4.2	8.8	10
Miscellaneous chemical products	289	n.a.	12.5	3.6	8.8	14
Adhesives and gelatin	2891	n.a.	18.1	4.8	13.3	12
Explosives	2892	23.8	6.1	1.4	4.6	29
Printing ink	2893	n.a.	14.8	4.2	10.6	10
Chemical preparations, n.e.c.	2899	n.a.	14.3	4.3	9.9	12
Petroleum and coal products	29	189.6	10.3	2.6	7.7	20
Petroleum and refining	291	150.8	7.9	1.8	6.1	23
Paving and roofing materials	295	n.a.	19.0	4.5	14.5	17
Paving mixtures and blocks	2951	n.a.	13.4	4.2	9.1	14
Asphalt felts and coatings	2952	n.a.	21.8	4.6	17.2	19
Misc. petroleum and coal products	299	n.a.	19.6	8.7	10.9	11
Rubber and plastics products, n.e.c.	30	627.0	18.4	6.1	12.3	14
Tires and inner tubes	301	128.2	18.3	8.8	9.5	15
Fabricated rubber products, n.e.c.	306	n.a.	18.5	6.2	12.3	15
Miscellaneous plastics products	307	320.4	18.7	5.1	13.6	14
Leather and leather products	31	304.4	12.6	3.7	8.8	15
Leather tanning and finishing	311	25.4	24.9	10.3	14.6	16
Footwear cut stock	313	n.a.	16.0	5.5	10.4	13
Footwear, except rubber	314	201.6	11.5	3.2	8.3	15
Shoes, except rubber	3141	n.a.	11.6	3.1	8.4	15
Luggage	316	16.6	15.2	4.1	11.1	11
Handbags and personal leather goods	317	34.9	8.9	2.6	6.3	14
Women's handbags and purses	3171	n.a.	9.6	2.4	7.1	14
Personal leather goods	3172	n.a.	7.9	2.7	5.2	15
Transportation and public utilities		3,920.8	10.8	4.5	6.3	16
Local and interurban passenger transit	41	267.6	8.3	4.2	4.1	17
Local and suburban transportation	411	69.8	9.6	5.1	4.5	19
Taxicabs	412	100.0	7.6	4.0	3.5	17
Intercity highway transportation	413	41.3	10.0	4.8	5.2	16
School busses	415	n.a.	5.0	2.0	3.0	17
Trucking and warehousing	42	1,101.8	16.8	7.3	9.4	16
Trucking, local and long distance	421	n.a.	16.6	7.3	9.2	16
Public warehousing	422	85.0	19.2	6.9	12.3	13
Water transportation	44	216.8	17.5	7.5	10.0	28
Water transportation services	446	n.a.	26.9	11.3	15.5	29
Transportation by air	45	345.0	13.7	6.8	6.8	10
Certificated air transportation	451	n.a.	13.4	6.9	6.5	10
Pipeline transportation	46	18.1	6.5	2.0	4.5	20
Transportation services	47	106.0	6.7	2.5	4.2	12
Freight forwarding	471	n.a.	9.1	3.9	5.2	12
Miscellaneous transportation services	478	n.a.	18.8	5.8	12.9	12
Communication	48	1,146.0	3.2	1.3	1.9	16
Telephone communication	481	961.0	3.1	1.3	1.8	16
Radio and television broadcasting	483	133.7	2.4	.5	1.9	13
Communication services, n.e.c.	489	n.a.	8.8	3.3	5.5	13
Electric, gas, and sanitary services	49	719.5	11.6	3.5	8.1	15
Electric companies and systems	491	307.8	11.2	2.7	8.5	19
Gas companies and systems	492	163.1	9.0	2.7	6.3	13
Combination companies and systems	493	191.5	11.2	3.6	7.6	14
Water supply	494	n.a.	14.5	5.2	9.3	10
Sanitary services	495	n.a.	27.8	12.7	15.0	11

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
<u>Wholesale and retail trade</u>		<u>15,683.1</u>	<u>8.4</u>	<u>2.8</u>	<u>5.6</u>	<u>13</u>
Wholesale trade	50	3,918.0	9.8	3.4	6.4	13
Drugs, chemicals, and allied products	502	226.8	6.6	2.4	4.2	11
Groceries and related products	504	568.7	14.0	5.7	8.3	13
Hardware, plumbing, and heating equipment	507	178.3	10.1	2.9	7.2	10
Machinery, equipment, and supplies	508	746.9	8.1	2.4	5.7	10
Miscellaneous wholesalers	509	1,260.9	11.0	3.8	7.1	13
<u>Building materials and farm equipment</u>	<u>52</u>	<u>584.4</u>	<u>12.3</u>	<u>4.0</u>	<u>8.2</u>	<u>15</u>
Lumber and other building materials	521	n.a.	14.3	4.9	9.4	15
Plumbing and heating equipment dealers	522	n.a.	15.7	4.6	11.1	16
Hardware and farm equipment	525	n.a.	9.9	3.2	6.7	15
<u>Retail general merchandise</u>	<u>53</u>	<u>2,426.3</u>	<u>8.3</u>	<u>2.5</u>	<u>5.8</u>	<u>11</u>
Department stores	531	1,594.1	9.2	2.9	6.3	11
Mail order houses	532	127.6	11.3	2.3	9.0	10
Variety stores	533	329.7	6.9	2.0	4.9	13
<u>Food stores</u>	<u>54</u>	<u>1,825.9</u>	<u>12.1</u>	<u>4.0</u>	<u>8.1</u>	<u>12</u>
Grocery stores	541	n.a.	13.0	4.3	8.7	11
Meat and fish (sea food) markets	542	n.a.	9.4	3.2	6.1	14
Dairy products stores	545	n.a.	8.1	2.6	5.5	13
Retail bakeries	546	n.a.	3.0	1.1	1.8	16
Miscellaneous food stores	549	n.a.	8.1	3.2	4.9	12
<u>Automotive dealers and service stations</u>	<u>55</u>	<u>1,693.3</u>	<u>9.1</u>	<u>2.7</u>	<u>6.4</u>	<u>13</u>
New and used car dealers	551	n.a.	11.5	3.0	8.5	11
Used car dealers	552	n.a.	8.3	2.3	6.0	13
Tire, battery, and accessory dealers	553	n.a.	10.7	3.5	7.2	11
Gasoline service stations	554	634.3	5.3	2.0	3.3	19
Miscellaneous automotive dealers	559	n.a.	8.8	2.5	6.3	16
<u>Apparel and accessory stores</u>	<u>56</u>	<u>751.7</u>	<u>2.1</u>	<u>.8</u>	<u>1.3</u>	<u>16</u>
Women's ready-to-wear stores	562	287.2	2.4	1.0	1.4	15
Family clothing stores	565	105.1	3.1	.8	2.2	14
<u>Furniture and home furnishings stores</u>	<u>57</u>	<u>472.8</u>	<u>5.5</u>	<u>2.1</u>	<u>3.4</u>	<u>15</u>
Furniture and home furnishings	571	297.3	6.0	2.4	3.6	15
Radio, television, and music stores	573	n.a.	3.3	1.1	2.2	17
<u>Eating and drinking places</u>	<u>58</u>	<u>2,684.1</u>	<u>6.7</u>	<u>2.2</u>	<u>4.5</u>	<u>12</u>
<u>Miscellaneous retail stores</u>	<u>59</u>	<u>1,326.6</u>	<u>4.3</u>	<u>1.5</u>	<u>2.8</u>	<u>14</u>
Book and stationary stores	594	65.8	2.9	.8	2.1	11
Farm and garden supply stores	596	116.5	10.1	4.0	6.1	13
Fuel and ice dealers	598	104.2	9.7	4.0	5.6	15
<u>Finance, insurance, and real estate</u>		<u>3,926.4</u>	<u>2.5</u>	<u>.8</u>	<u>1.7</u>	<u>12</u>
<u>Banking</u>	<u>60</u>	<u>1,105.2</u>	<u>1.4</u>	<u>.4</u>	<u>1.0</u>	<u>8</u>
Commercial and stock savings banks	602	n.a.	1.3	.4	.9	8
Mutual savings banks	603	n.a.	1.4	.6	.8	13
Functions closely related to banking	605	n.a.	1.2	.3	.8	13
<u>Security, commodity brokers, and services</u>	<u>62</u>	<u>197.8</u>	<u>1.1</u>	<u>.4</u>	<u>.6</u>	<u>7</u>
Security brokers and dealers	621	n.a.	.9	.4	.5	7
<u>Insurance carriers</u>	<u>63</u>	<u>1,104.1</u>	<u>1.8</u>	<u>.6</u>	<u>1.2</u>	<u>11</u>
Life insurance	631	567.7	1.6	.6	1.0	13
Accident and health insurance	632	99.4	2.2	.7	1.5	9
Fire, marine, and casualty insurance	633	382.8	2.0	.5	1.4	10
<u>Real estate</u>	<u>65</u>	<u>746.2</u>	<u>7.1</u>	<u>2.3</u>	<u>4.7</u>	<u>15</u>
Operative builders	656	59.4	14.7	4.4	10.3	13
<u>Services</u>		<u>12,273.3</u>	<u>6.1</u>	<u>2.0</u>	<u>4.1</u>	<u>14</u>
<u>Agricultural services and hunting</u>	<u>07</u>	<u>n.a.</u>	<u>13.7</u>	<u>5.1</u>	<u>8.6</u>	<u>15</u>
Miscellaneous agricultural services	071	n.a.	15.7	6.0	9.6	14
Animal husbandry services	072	n.a.	9.7	2.6	7.1	17
Horticultural services	073	n.a.	15.9	6.5	9.4	14
<u>Forestry</u>	<u>08</u>	<u>n.a.</u>	<u>18.7</u>	<u>7.1</u>	<u>11.6</u>	<u>17</u>
<u>Hotels and other lodging places</u>	<u>70</u>	<u>849.0</u>	<u>7.9</u>	<u>2.9</u>	<u>5.0</u>	<u>12</u>
Hotels, tourist courts, and motels	701	708.0	7.4	2.7	4.7	13
<u>Personal services</u>	<u>72</u>	<u>913.0</u>	<u>3.5</u>	<u>1.3</u>	<u>2.2</u>	<u>13</u>
Laundries and dry cleaning plants	721	438.3	5.9	2.1	3.8	12

See footnotes at end of table.

D. Recordable Occupational Injury and Illness Incidence Rates and Average Lost Workdays per Lost Workday Case by Industry, 1972-Continued.

Industry 1/	SIC code 2/	1972 annual average employment (in thousands) 3/	Incidence rates 4/			Average lost workdays per lost workday case
			Total recordable cases 5/	Lost workday cases	Nonfatal cases without lost workdays	
Miscellaneous business services	73	1,662.7	5.8	2.3	3.5	12
Credit reporting and collection	732	79.9	1.1	.3	.8	9
Duplicating, mailing, and stenographic	733	n.a.	5.3	1.6	3.7	12
Services to buildings	734	321.2	8.3	3.0	5.3	14
Auto repair, services, and garages	75	n.a.	9.6	3.1	6.4	13
Automobile repair shops	753	n.a.	12.0	3.8	8.1	12
Miscellaneous repair services	76	187.4	14.5	4.6	9.9	14
Miscellaneous repair shops	769	n.a.	20.1	6.1	14.0	14
Motion pictures	78	191.1	3.3	.8	2.5	--
Motion picture filming and distributing	781	51.4	3.7	.9	2.8	--
Motion picture production services	782	n.a.	7.2	1.6	5.6	--
Amusement and recreation services, n.e.c.	79	n.a.	8.5	2.7	5.8	15
Misc. amusement, recreation services	794	n.a.	10.2	3.2	6.9	15
Medical and other health services	80	3,441.5	7.5	2.1	5.4	15
Hospitals	806	2,017.5	9.7	2.4	7.3	15
Medical and dental laboratories	807	n.a.	2.8	.8	2.0	15
Educational services	82	1,166.8	3.8	1.4	2.4	11
Colleges and universities	822	638.3	4.9	1.8	3.1	11
Nonprofit membership organizations	86	n.a.	3.5	1.2	2.3	18
Professional organizations	862	n.a.	1.4	.4	1.0	14
Civic and social associations	864	n.a.	4.7	1.5	3.1	18
Miscellaneous services	89	704.1	2.3	.8	1.5	10

Footnotes to Table 3

1/ Industry totals (Division, 2- and 3-digit SIC codes) include data for industries not shown separately.

2/ Standard Industrial Classification Manual, 1967 Edition.

3/ U.S. Department of Labor, Bureau of Labor Statistics Employment and Earnings Survey.

4/ The incidence rates represent the number of injuries and illnesses per 100 full-time employees, and were calculated as: $N/EH \times 200,000$, where

N = number of injuries and/or illnesses

EH = total hours worked by all employees during calendar 1972

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year)

5/ Includes fatalities. Because of rounding, the difference between the total and the sum of the rates for lost workday cases and nonfatal cases without lost workdays may not reflect the fatality rate.

6/ Does not include railroad and mine activities other than oil and gas extraction (SIC 13).

NOTES: Dashes indicate data do not meet publication criteria.

n.a. = employment estimates are not available.

n.e.c. = not elsewhere classified.

Source: Bureau of Labor Statistics, U.S. Department of Labor.

E. Number of Recordable Occupational Injuries and Illnesses, and Lost Workdays in the Private Sector, Excluding Railroad and Mine Activities, by Extent of Case and Industry Division, United States—1973—figures given in thousands

Industry	Total recordable cases	Fatalities	Lost workday cases	Nonfatal cases without lost workdays	Lost workdays
Private sector ¹	5, 991. 3	5. 2	1, 872. 3	4, 113. 8	28, 392. 7
Agriculture, forestry, and fisheries.....	91. 1	. 2	35. 9	55. 0	534. 9
Contract construction.....	626. 5	1. 0	194. 3	431. 2	3, 103. 3
Manufacturing.....	2, 960. 2	1. 4	859. 9	2, 098. 8	13, 165. 9
Transportation and public utilities.....	403. 5	1. 0	175. 8	226. 7	3, 026. 2
Wholesale and retail trade.....	1, 190. 1	. 9	376. 7	812. 5	5, 182. 5
Finance, insurance, and real estate.....	89. 0	. 1	28. 4	60. 5	371. 1
Services.....	596. 0	. 4	185. 5	410. 1	2, 657. 0

¹ Excludes railroads (SIC 401) and mine activities except oil and gas extraction (SIC 13).

Source: Bureau of Labor Statistics, U.S. Department of Labor.

NOTES: Data may not add due to rounding. Differences between the totals and the sums for the component industries may not reflect the estimates for oil and gas extraction (SIC 13).

F. Recordable Occupational Injury and Illness Incidence Rates in the Private Sector, Excluding Railroad and Mine Activities, by Industry, United States—1973

Industry ¹	SIC code ²	1973 annual average employment (in thousands) ³	Incidence rates per 100 full-time workers ⁴			
			Total recordable cases ⁵	Lost workday cases	Nonfatal cases without lost workdays	Lost workdays
Private sector ⁶		63,290.3	11.0	3.4	7.6	52.1
Agriculture, forestry, and fisheries.....		1,418.0	11.6	4.6	7.0	68.0
Agricultural production.....	01	n.a.	10.9	4.3	6.6	63.6
Agricultural services, forestry and fisheries.....	07-09	n.a.	13.7	5.5	8.2	82.5
Oil and gas extraction.....	13	274.3	12.8	5.8	7.0	129.2
Contract construction.....		4,028.0	19.8	6.1	13.6	98.1
General building contractors.....	15	1,271.8	20.7	6.1	14.6	94.1
Heavy construction contractors.....	16	762.4	19.3	6.1	13.1	107.6
Special trade contractors.....	17	1,994.2	19.4	6.2	13.2	96.3
Manufacturing.....		20,054.0	15.3	4.5	10.8	68.2
Durable goods.....		11,814.0	17.1	4.8	12.3	72.4
Ordnance and accessories.....	19	183.9	7.6	1.8	5.8	33.8
Lumber and wood products.....	24	639.7	24.1	9.2	14.8	150.7
Furniture and fixtures.....	25	539.2	19.6	5.5	14.1	75.2
Stone, clay, and glass products.....	32	691.1	18.2	5.9	12.3	96.2
Primary metal industries.....	33	1,320.9	20.8	6.3	14.5	107.1
Fabricated metal products.....	34	1,493.5	22.7	6.4	16.3	92.0
Machinery, except electrical.....	35	2,086.5	17.7	4.3	13.4	60.5
Electrical equipment and supplies.....	36	2,017.2	10.8	2.7	8.1	37.3
Transportation equipment.....	37	1,891.4	16.7	4.6	12.1	67.3
Instruments and related products.....	38	499.4	8.6	2.0	6.6	26.6
Miscellaneous manufacturing industries.....	39	450.6	13.5	3.7	9.8	54.3
Nondurable goods.....		8,240.0	12.8	3.9	8.8	62.2
Food and kindred products.....	20	1,721.0	19.2	6.8	12.3	98.6
Tobacco manufactures.....	21	78.3	8.4	2.5	5.9	33.0
Textile mill products.....	22	1,030.5	11.7	2.6	9.1	47.2
Apparel and other textile products.....	23	1,402.4	7.7	1.9	5.8	26.1
Paper and allied products.....	26	703.0	15.8	4.3	11.5	87.1
Printing and publishing.....	27	1,104.8	7.4	2.3	5.1	31.9
Chemicals and allied products.....	28	1,035.5	9.7	3.0	6.7	48.6
Petroleum and coal products.....	29	193.4	9.7	2.7	7.0	57.1
Rubber and plastics products, n.e.c.....	30	678.3	17.8	6.5	11.3	103.1
Leather and leather products.....	31	293.1	12.4	3.6	8.8	50.9
Transportation and public utilities.....		4,086.0	10.5	4.6	5.9	78.7
Local and interurban passenger transit.....	41	273.3	8.1	4.1	3.9	73.5
Trucking and warehousing.....	42	1,188.2	17.2	7.9	9.2	139.8
Water transportation.....	44	203.6	16.2	8.0	8.2	205.5
Transportation by air.....	45	364.6	11.7	6.0	5.7	67.3
Pipeline transportation.....	46	16.2	5.9	1.7	4.1	30.6
Transportation services.....	47	123.6	6.6	2.6	4.0	33.3
Communication.....	48	1,174.4	2.9	1.3	1.6	23.8
Electric, gas, and sanitary services.....	49	729.8	11.1	3.4	7.7	52.1

See footnotes at end of table.

F. Recordable Occupational Injury and Illness Incidence Rates in the Private Sector, Excluding Railroad and Mine Activities, by Industry, United States—1973—Continued

Industry ¹	SIC code ²	1973 annual average employment (in thousands) ³	Incidence rates per 100 full-time workers ⁴			
			Total recordable cases ⁵	Lost workday cases	Nonfatal cases without lost workdays	Lost workdays
Wholesale and retail trade.....		16,665.0	8.6	2.7	5.9	37.6
Wholesale trade.....	50	4,118.0	9.8	3.3	6.4	45.5
Building materials and farm equipment..	52	617.7	12.3	4.0	8.3	61.4
Retail general merchandise.....	53	2,558.8	8.6	2.6	6.0	32.3
Food stores.....	54	1,856.3	12.0	3.9	8.0	51.3
Automotive dealers and service stations..	55	1,809.2	9.2	2.6	6.6	36.9
Apparel and accessory stores.....	56	770.6	2.2	.6	1.6	11.7
Furniture and home furnishing stores...	57	527.4	6.4	2.2	4.2	32.6
Eating and drinking places.....	58	3,035.3	7.2	2.0	5.2	27.5
Miscellaneous retail stores.....	59	1,371.5	4.2	1.4	2.8	22.9
Finance, insurance, and real estate.....		4,075.0	2.4	.8	1.6	10.2
Banking.....	60	1,178.7	1.5	.5	1.0	5.1
Security, commodity brokers, and services.....	62	193.8	.8	.3	.5	6.4
Insurance carriers.....	63	1,081.1	1.8	.6	1.2	7.2
Real estate.....	65	796.5	7.1	2.2	4.9	31.2
Services.....		12,690.0	6.2	1.9	4.2	27.5
Hotels, and other lodging places.....	70	904.9	8.7	2.8	5.9	42.8
Personal services.....	72	892.1	4.1	1.5	2.6	26.3
Miscellaneous business services.....	73	1,880.0	5.6	1.9	3.7	25.6
Auto repair, services and garages.....	75	434.3	9.8	3.0	6.8	48.2
Miscellaneous repair services.....	76	212.5	13.1	3.9	9.2	51.1
Motion pictures.....	78	208.1	3.9	1.1	2.8	21.2
Amusement and recreation services, n.e.c..	79	539.1	8.7	2.8	5.9	53.7
Medical and other health services.....	80	3,656.9	7.5	2.2	5.3	31.4
Educational services.....	82	1,178.7	4.8	1.3	3.5	15.0
Nonprofit membership organizations....	86	1,685.5	4.5	1.5	3.0	17.8
Miscellaneous services.....	89	783.4	2.2	.7	1.5	7.4

¹ Industry division totals include data for industries not shown separately.

² *Standard Industrial Classification Manual*, 1967 Edition.

³ Annual average employment for nonagricultural industries are based on the establishment survey conducted by the U.S. Department of Labor's Bureau of Labor Statistics, in cooperation with State agencies. Annual average employment for the agriculture, forestry, and fisheries division is a composite of estimates from the BLS survey and estimates provided by the Statistical Reporting Service, U.S. Department of Agriculture.

⁴ The incidence rates represent the number of injuries and illnesses per 100 full-time workers, and were calculated as: $(N/EH) \times 200,000$, where N = number of injuries and illnesses; EH = total hours worked by all employees

during calendar year; 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

⁵ Includes fatalities. Because of rounding, the difference between the total and the sum of the rates for lost workday cases and nonfatal cases without lost workdays may not reflect the fatality rate.

⁶ Excludes railroads (SIC 401) and mine activities except oil and gas extraction (SIC 13).

NOTES: n.a. = employment estimates are not available
n.e.c. = not elsewhere classified.

Source: Bureau of Labor Statistics, U.S. Department of Labor.

G. Chronology of Standards Activity During 1973

Date	Federal Register	Section affected	Action
January 16....	38 FR 1593.....	1910.68(c)(1)(i).....	Proposed revision of standards for manlifts.
		1910.217(b)(2).....	Proposed revision of standard for mechanical power presses.
		1910.263(h)(2).....	Proposed revision of standard for bakery equipment.
January 31....	38 FR 2968.....	1915.3.....	Deletion of penalty section.
		1915.6.....	Deletion of section dealing with notification of accidents resulting in fatalities or serious injuries.
February 8....	38 FR 3598.....	1910.111(a)(2)(i).....	Revision of definition of approved appurtenances for anhydrous ammonia.
		1910.111(b)(1).....	Revision of standard for approval of anhydrous ammonia equipment and systems.
		1910.116.....	Addition of Fertilizer Institute to the list of standards organizations.
February 23...	38 FR 4979.....	1910.158(b)(3), (4).....	Proposed revision of standard for standpipe and hose systems.
March 1.....	38 FR 546.....	1916.3.....	Deletion of penalty section.
		1916.6.....	Deletion of section dealing with notification of accidents resulting in fatalities or serious injuries.
		1917.3.....	Deletion of penalty section.
		1917.6.....	Deletion of section dealing with notification of accidents resulting in fatalities or serious injuries.
		1918.4.....	Deletion of penalty section.
		1918.7.....	Deletion of section dealing with notification of accidents resulting in fatalities or serious injuries.
April 10.....	38 FR 9078.....	1910.141(f).....	Revocation of standard for retiring rooms for women.
May 1.....	38 FR 10715....	1910.267a.....	Promulgation of an emergency temporary standard on pesticides.
		1910.267.....	Revision of standard for use of pesticides in agricultural operations.
May 3.....	38 FR 10929....	1910.93c.....	Promulgation of an emergency temporary standard on carcinogens.
	38 FR 10930....	1910.141.....	Revision of standard for sanitation.
May 11.....	38 FR 12405....	1910.211(f)(9).....	Proposed revision of the definitions of "prime mover" and "mechanical power transmission apparatus" as used in Section 1910.219.
		1910.212(a)(1).....	Proposed revision of standard to recognize location as an acceptable method of machine guarding.
		1910.212(a)(5).....	Proposed revision of standard to raise the maximum opening of blade guards on fans from one-half inch to 1 inch and to add a table relating distance between guard and blade to the size of the hole opening in the guard.
		1910.212(b).....	Proposed amendment to provide further guidelines for the anchoring and securing of machinery.
		1910.213(a)(11).....	Proposed amendment to refer to Subpart S for electrical requirements for woodworking machinery.
		1910.213(a)(16).....	Proposed amendment to allow other materials and designs for guards other than those specified in the section, if they provide equal or greater protection.
		1910.213(h)(5).....	Proposed amendment to prevent the placement of caution labels at the wrong end of radial saws.
		1910.213(o)(4).....	Proposed amendment to prevent work pieces from being thrown out of woodworking machinery by establishing a performance standard.
		1910.215(b)(10).....	Proposed amendment to align the text of paragraph (b)(10) with the referenced tables, and to incorporate the performance standards referred to in Table O-9.

G. Chronology of Standards Activity During 1973—Continued

Date	Federal Register	Section affected	Action
May 11	37 FR 12405	1910.218(k)	Proposed amendment to add a new paragraph (k) (scope) to section on forging machines.
		1910.219(a) (5)	Proposed amendment to add a new subparagraph (5) to allow use of other materials and designs for guarding power transmission apparatus other than those specified in the section if they provide equal or greater protection.
		1910.219(c) (5) (iii)	Proposed amendment to specify minimum intensity of illumination required for power transmission apparatus located in basements.
		1910.219(g)	Proposed amendment to add a new paragraph (g) to clarify the applicability of Section 1910.219.
June 1	38 FR 14371	1910.177	Revocation of standard on indoor general storage.
		1910.178(a) (1)	Revision to the general requirements for powered industrial trucks.
		1910.178(a) (7)	Redefinition of "approved truck" and "approved industrial truck".
		1910.178(m) (5)	Revision of the distance which determines whether a truck is attended or unattended.
		1910.178(m) (13)	Revocation of subparagraph (13) of the standard on powered industrial trucks.
		1910.179(b) (8)	Revision of the term "designated personnel" as it applies to crane operation.
		1910.179 (e) (2), (3)	Revision of standard for bridge and trolley bumpers.
		1910.180(b) (3)	Revision of the term "designated personnel" as it applies to crane operation.
		1910.181(b) (3)	Revision of the term "designated personnel" as it applies to derrick operation.
		1910.243(a) (1), (2), (5)	Revision of standard on operation of portable powered tools.
		1910.243(b)	Revision of standard for pneumatic powered tools.
		1910.243(c)	Revision of standard on portable abrasive wheels to clarify exceptions.
		1910.243(e) (2) (ii)	Revocation of this subparagraph dealing with wheel drive disengaging controls for power lawnmowers.
		1910.243(e) (3) (iii), (vii)	Revision to standard for walk-behind rotary mowers.
		1910.243(e) (4) (vi)	Revision to standard for riding rotary mowers.
June 13	38 FR 15522	1915.6	Proposed amendment to add a new section to provide for the reporting of accidents resulting in death or hospitalization for ship repairing.
		1916.6	Proposed amendment to add a new section to provide for the reporting of accidents resulting in death or hospitalization for shipbuilding.
		1917.6	Proposed amendment to add a new section to provide for the reporting of accidents resulting in death or hospitalization for ship-breaking.
		1918.7	Proposed amendment to add a new section to provide for the reporting of accidents resulting in death or hospitalization for longshoring.
June 15	38 FR 15729	1910.267a	Suspension of the effective date for the emergency temporary standard for pesticides.
June 21	38 FR 16223	1910.68(c) (1) (i)	Revision of standard for manlifts.
		1910.217(b) (2)	Revision of standard for mechanical power presses.
		1910.263(h) (2)	Revision of standard for bakery equipment.
June 27	38 FR 16856	1926.602(a) (8)	Redesignation of subparagraph (a) (8) as (a) (8) (i) and the addition of a new subparagraph (a) (8) (ii) which suspends the effective date for fenders on earthmoving equipment from 6/30/73 to 1/2/74.
June 29	38 FR 17214	1910.267a	Revision of the emergency temporary standard for pesticides.

G. Chronology of Standards Activity During 1973—Continued

Date	Federal Register	Section affected	Action
	38 FR 17245	1910.267a	Proposed permanent standard for pesticides.
July 16	38 FR 18900	1910.93c	Proposal to adopt the 5/3/73 emergency temporary standard on carcinogens as a permanent standard.
July 17	38 FR 19030	1910.157(b)(1)	Revision of standard for portable fire extinguishers.
		1910.160(b)(1)	Revision of standard for fixed dry chemical extinguishing systems.
		1910.160(c)(1)(iv)	Revision of standard for fixed dry chemical extinguishing systems.
July 19	38 FR 19225	1910.157(d)(4)(iii)	Proposed revision of standard on portable fire extinguishers by revising the hydrostatic test interval for extinguishers (Table L-3).
July 27	38 FR 20074	1910.93c	Revision of the emergency temporary standard for carcinogens.
August 16	38 FR 22141	1910.93c	Proposal to use the 7/27/73 revised emergency temporary standard on carcinogens as the proposed rule for a permanent standard (This revised the 7/16/73 proposal).
August 23	38 FR 22632	1915.43	Proposed revision of standard for guarding of deck openings and edges.
		1915.47	Proposed revision of standard for working surfaces.
		1916.43	Proposed revision of standard for guarding of deck openings and edges.
		1916.47	Proposed revision of standard for work surfaces.
		1916.84	Proposed revision of standard on lifesaving equipment.
		1917.47	Proposed revision of standard on working surfaces.
		1917.84	Proposed revision of standard on lifesaving equipment.
		1918.106	Proposed revision of standard for protection of drowning.
August 28	38 FR 23039	1910.67(b)	Proposed revision of standard for vehicle-mounted elevating and rotating platforms.
		1910.67(c)	Proposed new paragraph (c) to standard for vehicle-mounted elevating and rotating platforms.
		1910.185	Proposed new standard on helicopters.
	38 FR 23040	1910.330-.348	Proposed new Subpart T—Telecommunications.
August 30	38 FR 23503	1910.179(j)(2)(iv)	Proposed amendment of standard on overhead and gantry cranes.
		1910.179(j)(2)(v)	Proposed revocation of subparagraph (v) of this section.
		1910.182-.184	Proposed redesignation of Sections 1910.182, .183, .184 to Sections 1910.208, .209, and .210 respectively.
		1910.190	Proposed new standard on slings.
September 6	38 FR 24300	1910.21-.30	Proposed revision of Subpart D—Walking-Working Surfaces.
September 7	38 FR 24375	1910.93c	Proposed standard for certain carcinogens as recommended by the standards advisory committee on carcinogens.
September 21	38 FR 26459	1910.267(a)(3)	Proposed amendment to the standard for use of anhydrous ammonia in agricultural operations.
September 28	38 FR 27047	1910.106(a)(14), (18), (19), (37) and (38).	Redefinitions of the terms "flashpoint," "combustible liquids," "flammable liquids," "SUS" and "viscous."
		1910.106	Revision to Tables H-12, H-14, H-15, H-16, and H-17.
		1910.106(d)(1)(ii), (3)(i), (5)(iv)(b), (7).	Revision to standard on flammable and combustible liquids.
		1910.108(h)(4)(i)	Revision to standard on dip tanks containing flammable and combustible liquids.
October 5	38 FR 27594	1926.602(a)(8)(ii)	Revision to standard for installation of fenders on earth-moving equipment.
December 4	38 FR 33397	1910.309(c)	Deferral of effective date for standard on ground-fault circuit protection.
December 4	38 FR 33397	1926.400(h)	Deferral of effective date for standard on ground-fault circuit protection.

H. Occupational Safety and Health Publications, U.S. Department of Labor

Copies of the following publications are available free of charge, in limited quantities from all OSHA offices unless otherwise indicated.

Certain publications are available for purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Prices of Government publications are subject to change. Occasionally, increases in costs make it necessary for the Superintendent of Documents to increase the selling prices of many publications offered. As it is not feasible for the Superintendent of Documents to correct the prices manually in all the publications stocked, the prices charged on an order may differ from the prices printed in the publications.

Occupational Safety and Health Act of 1970. PL 91-596 (OSHA 2001). The full text of the Act. This document is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at 20¢ each.

Ley de Seguridad y Salud Ocupacionales de 1970. PL 91-596 (OSHA 2069). The full text of the Occupational Safety and Health Act of 1970 in Spanish.

All About OSHA (OSHA 2056). A booklet explaining the provisions of the Act and OSHA's role in implementing those provisions.

Safety and Health Protection on the Job (OSHA 2003). An official OSHA poster required by law to be prominently displayed in the workplace (revised November 1973).

Questions & Answers to Part 1910—The OSHA General Industry Standards (OSHA 2095). A booklet of answers to questions most often asked about the OSHA General Industry Standards.

Fact Sheet for Small Businesses on Obtaining Compliance Loans (OSHA 2005). A flyer outlining small businesses procedures in obtaining OSHA help in applying for Small Business Administration (SBA) loans to aid in meeting OSHA standards.

Asbestos: Airborne Danger (OSHA 2075). A pamphlet pointing out the dangers of inhaled asbestos fibers.

The Safe Use of Anhydrous Ammonia (OSHA 2011). A folder describing the injury potential of anhydrous ammonia fertilizer. A section is devoted to accident prevention.

Scientific Equipment Aids OSHA Compliance Efforts (OSHA 2049). A pamphlet on the OSHA compliance officer's special equipment used to measure potentially dangerous gases, fumes, vapors, dusts, and noises.

How States Plan for Job Safety and Health (OSHA 2050). A booklet briefly commenting on the criteria and standards for State plans for job safety and health.

Target Health Hazards (OSHA 2051). A booklet containing facts about five hazardous workplace substances (asbestos, carbon monoxide, cotton dust, lead, and silica) which make up OSHA's Target Health Hazards Program.

Noise (OSHA 2067). A pamphlet dealing with noise as a danger to physical and psychological health and explaining OSHA's noise regulations and standards.

Guidelines for Setting Up Job Safety and Health Programs (OSHA 2070). A booklet establishing guidelines to help employers develop and implement safety and health programs.

Don't Dig Your Own Grave (OSHA SPECIAL EMPHASIS POSTER). A special emphasis poster encouraging safer on-the-job practices in excavating, trenching, and backfilling operations.

Employer-Employee Safe Practices for Excavation & Trenching Operations (OSHA 2085). A booklet describing OSHA standards for excavation and trenching operations. A reprint of Subpart P; 1926.650, 1926.651, 1926.652, and 1926.653 from the *Federal Register* is included.

Contractor Planning for Job Safety & Health in Excavation, Trenching & Backfilling (OSHA 2086). A pamphlet serving as a guide to contractors responsible for developing and maintaining an accident prevention program for excavating, trenching, and backfilling operations.

H. Occupational Safety and Health Publications, U.S. Department of Labor—Continued

15 Questions: Know the Answers . . . Help Prevent Cave-ins (OSHA 2087). A pamphlet containing answers to 15 questions on excavation and trenching operations that need to be considered in preventing cave-ins.

Job Safety & Health (magazine). OSHA's official monthly magazine reporting on the agency's programs, policies, and standards and on developments and research in safety and health. Also included are news from the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Review Commission, and a listing of the latest *Federal Register* insertions. This publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Single copies are \$1.15 each. Annual subscriptions are \$18.60.

Occupational Safety and Health Subscription Service. A subscription service supplementing the safety and health standards and regulations as published in the *Federal Register* and the *Code of Federal Regulations* (29 CFR). The service provides all of the standards, interpretations, regulations, and procedures in an easy-to-use, looseleaf form, punched for a three-ring binder. Notices of changes and additions are sent to subscribers to keep the subscription service current. Individual volumes are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at the following rates:

I. General Industry Standards and Interpretations.....	\$21.00
II. Maritime Standards and Interpretations.....	6.00
III. Construction Standards and Interpretations.....	8.00
IV. Other Regulations and Procedures.....	5.50
V. Field Operations Manual (formerly "Compliance Operations Manual").....	8.00

The Principles and Techniques of Mechanical Guarding (OSHA 2057). A bulletin outlining the principles of mechanical guarding and containing illustrations showing the techniques as applied to specific machines. This bulletin is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at 90¢ each.

A Handy Reference Guide (OSHA 2004). A pocket-sized booklet describing the Act, its coverage, purpose, penalties, and other items of interest to employers. It is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at 20¢ each.

General Industry Guide for Applying Safety and Health Standards (OSHA 2072). A booklet presenting OSHA standards broken down into six major categories—workplace standards, machines and equipment standards, materials standards, employee standards, power source standards, and process standards—and contains a section on administrative regulations of the Act. The guide is designed to help users locate the standards that apply to their operations. This booklet is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at 55¢ each.

What Every Employer Needs to Know about OSHA Recordkeeping (BLS). A booklet that answers more than 160 frequently asked questions regarding OSHA recordkeeping.

An Audio Aid to OSHA Recordkeeping (BLS). A cassette tape package which provides an explanation of how OSHA recordkeeping forms are to be completed.

The Accident Bug (BLS). A film explaining the complete procedure for OSHA recordkeeping developed for groups training and seminars.

I. Summary of Contract Activity During 1973

Title and contract number	Contractor and purpose	Amount	Date
1. Environmental/Economic Impact of Carcinogens Standard L-73-4.	National Bureau of Standards, Washington, D.C. To estimate the environmental and economic impacts of a proposed standard to control exposure to carcinogens.	\$35,000	Mar. 19, 1973 to Oct. 1, 1973.
2. Economic/Environmental Impact of Heat Standard L-73-103.	Bendix Corp., Ann Arbor, Mich. To estimate the economic and environmental impacts of a proposed standard to control exposure to hot environments.	70,576	Mar. 19, 1973 to Dec. 31, 1973.
3. Enhancement to Microestablishment, L-73-111.	Boeing Computer Services, Washington D.C. To enhance the capability of the present system.	53,300	June 27, 1973.
4. Economic/Environmental Impact of Noise Standard L-73-112.	Bolt, Beranek, & Newman. To estimate the economic and environmental impacts of a proposed standard on occupational exposure to noise.	74,999	June 29, 1973 to Oct. 31, 1973.
5. Indian Safety and Health Training L-73-124.	National Indian Safety Council, Albuquerque, N. Mex. To provide occupational safety and health training to employers and employees on approximately 90 Indian Reservations.	105,000	
6. Feasibility of Translating Standards into Spanish L-73-125.	OMNI Research, Inc., Mayaguez, P.R. To determine the feasibility of translating OSH standards into Spanish and establishing procedures for the management of a complete translation.	13,914	June 28, 1973 to Oct. 21, 1973.
7. Variance systems L-73-137----	Control Data Corp., South Arlington, Va. To determine the nature and extent of variances issued for Federal and State standards; the feasibility of collecting variance data and presenting a manual or computerized system design for collection and retrieval of such data.	54,650	June 29, 1973 to Apr. 13, 1974.
8. Nationwide Training Program L-73-139.	National Safety Council, Chicago, Ill. To develop, promote, and implement through the NSC's co-operating local safety councils a massive training and education program to disseminate safety and health information to a nationwide audience of employers and their representatives.	3,000,000	June 30, 1973 to June 30, 1975.
9. Guidelines for Training Requirement in the OSHA Standards L-73-142.	Bendix Corp., Kennedy Space Center, Fla. To develop guidelines to assist employers in complying with the specific training requirements spelled out in the standards. These guidelines will also aid the CSHO in determining employer compliance with the training requirements.	34,461	June 29, 1973 to Jan. 29, 1974.
10. Wisconsin School for Workers Training of Employees L-73-143.	University of Wisconsin School for Workers, Madison, Wis. To develop, conduct, and evaluate occupational safety and health training for employees and their representatives.	305,173	June 30, 1973 to June 30, 1976.
11. Engineering Feasibility and Economic/Environmental Impact of ROPS Standard L-73-158.	Woodward-Carson, Minden, Nev. To determine the engineering feasibility of retrofitting rollover protective structures (ROPS) for construction equipment; estimate the economic and environmental impacts of retrofitting ROPS.	87,451	June 29, 1973 to Mar. 31, 1974.
12. Breakdown of Standards for Specific Industries L-73-158.	Federated Analysis, Reston, Va. To provide in handy reference booklets (digests) the key occupational safety and health standards for 39 industries.	61,230	June 30, 1973 to Jan. 31, 1974.
13. Integrated MIS Feasibility Study L-73-167.	Auerbach Associates, Philadelphia, Pa. To review existing MIS systems to determine feasibility of integrating several systems into one unified data system.	184,228	June 30, 1973 to Aug. 15, 1974.

J. Members of the Advisory Committees

NACOSH—Standing Committee—12 members

Scope.—To advise, consult with and make recommendations to the Secretaries of Labor and HEW on matters regarding the administration of the Act.

Public:	Howard Pyle, <i>Chr.</i> , Pres. Emer., National Safety Council Barry Brown, Dir., Michigan Department of Labor Leif Thorne-Thomsen,* Public Health Admin., Alaska Roger H. Wingate,* V.P., Liberty Mutual Insurance Co.
Management:	Frank R. Barnako, Ind. Rel., Bethlehem Steel Willis A. Noel, Retired Pers. Mgr., Reynolds Metals
Labor:	John J. Sheehan, Leg. Dir., U.S. Steelworkers George H. R. Taylor, AFL-CIO Committee on OSHA
Safety:	Dr. John Grimaldi, Dir. NYU Center for Safety Charles S. Morgan, Pres., Natl. Fire Protection Assn.
Health:	Paul D. Halley,* Dir., Environmental Health, Standard Oil Dr. Richard Sutter,* Med. Dir., Sutter Clinic

*Appointed by HEW

ADVISORY COMMITTEE ON CONSTRUCTION SAFETY AND HEALTH—Standing Committee

Scope.—Established under Construction Safety Provisions of Public Law 91-54 to advise the Secretary of Labor on the formulation of construction safety and health standards and other regulations, and with respect to policy matters arising in the administration of the law.

Employee:	Melvin J. Boyle, Intl. Brotherhood of Electrical Workers Paul H. Connelley, Saf. Dir., United Brotherhood of Carpenters Robert E. P. Cooney, V.P., Bridge, Structural and Orn. Ironworkers Robert M. Farrell, Saf. Dir., Operating Engineers W. Vernie Reed, V.P., Laborers' Intl. Union of N. America
Employer:	George E. Aro, Saf. Mgr., Unit. Engr. & Constructors Richard L. Daley, Saf. Dir., Morrison-Knudsen Company Fred M. Livingston, Saf. Dir., Turner Construction Company Donald E. Ruff, Opr. Mgr., American Electric Power Service Corp. Arthur C. Schwotzer, Pres., Crossgates, Inc.
State:	Barry Brown, Dir., Michigan Department of Labor (Heyman, ex-N.J. Comm. of Labor, just resigned)
Federal:	Thomas L. Anania, Chief, Ind. Hyg. Serv., NIOSH, HEW
Public:	G. Edwin Burks Herman J. Spoerer, <i>Chr.</i>

J. Members of the Advisory Committees—Continued

STANDARDS ADVISORY COMMITTEE ON AGRICULTURE—Standing Committee

Scope.—To recommend occupational safety and health standards for the use of pesticides, temporary labor camps, roll-over protective structures on farm tractors, and other hazardous areas in the agriculture industry.

Employee:	Ruben Contreras Robert H. Discoe John C. Ramirez Peter Andrade, Western Conference of Teamsters
Employer:	Will Gill, Jr., Will Gill & Sons Jos. H. Price, V.P., Texas Cotton Ginners' Assoc. Richard V. Thornton, V.P., Grower, Shipper Vegetable Assoc. Alice VanWert
State:	Glenn J. Hertzler, Comm. of Agriculture, Wyoming James Wiles, Accident Prev., Workmen's Comp., Oregon
Federal:	Dr. Jon R. May, Env. Toxicologist, NIOSH, HEW Robert O. Gilden, Extension Service, Dept. of Agriculture
Public:	Rollin Schnieder, <i>Chr.</i> , Agric. Eng. Ext. Dept., U. of Nebraska Dr. John G. Erisman, Ind. Tech. Dept., Illinois State U. Dr. Wayland J. Hayes, Biochemistry Dept., Vanderbilt U.

STANDARDS ADVISORY COMMITTEE ON CARCINOGENS—Ad Hoc Committee

Scope.—To recommend a standard for the control of certain carcinogens in the workplace. This committee submitted its final recommendations August 27, 1973. However, support activity is continuing on a limited scale.

Employee:	Louis S. Beliczky, M.P.H., United Rubber, Cork, Linoleum, Plastic Workers George Perkel, Res. Dir., Textile Workers Union of America Jerry L. Hall, United Steelworkers of America William F. Martin, Ed. & Res. Dir., Intl. Printing Pressmen
Employer:	Clifford A. Johnson, M.D., Health Dir., Goodyear Tire & Rubber John A. Zapp, Jr., Ph. D., Tox. Lab. Dir., duPont Verald K. Rowe, Tox. & I. H. Dir., Dow Chemical Ellington Beavers, Ph. D., V.P., Rohm & Haas Co.
State:	Jack Shapiro, M.D., I. H. Physician, N.Y. State Labor Dept. William W. Steffan, Sr. I. H. Engr., California Dept. of I. R.
Federal:	David P. Rall, M.D., Dir., Natl. Institute for Env. Health Serv., HEW James A. Peters, D.V.M., Act. Dir., Cancer Cause & Prev., Natl. Can. Inst.
Public:	Dr. Samuel S. Epstein, Env. Health Dept., Case School of Medicine Eula Mattheis, Ph. D., Env. Health Dept., Cincinnati U. Coll. of Med. Jos. F. Borzelleca, Ph. D., <i>Chr.</i> , Pharmacology Dept., Med. College of Virginia

J. Members of the Advisory Committees—Continued

STANDARDS ADVISORY COMMITTEE ON NOISE—Ad Hoc Committee

Scope.—To recommend a standard on noise in industrial workplaces. This committee submitted its final recommendations December 20, 1973. However, support activity is continuing on a fairly active basis.

Employee :	David A. Padden, I.H., United Auto, Aerospace, Agricul. Workers Angelo J. Cefalo, Saf. Dir., Intl. Assoc. of Machinists, Aerospace Michael Wood, Boilermakers, Iron Ship Builders, etc. Jos. H. Hafkenschiel, Res. Assoc., Communications Workers of America
Employer :	James H. Botsford, Contrib. Editor, Sound & Vibration Magazine George E. Fratcher, Engr. Asst., A. O. Smith Corporation Vaughn H. Hill, Acoustics Engr., duPont Carleton A. Wold, Noise Cont. Cons., Boise Cascade Corp.
State :	James C. Barrett, Occ. Health Div., Michigan Dept. of Pub. Serv. Frank W. Marcaccio, Chief, Div. of Ind. Inspection, Rhode Island
Federal :	Alexander Cohen, Ph. D., NIOSH, HEW Sherrill G. Laney, Bioenvironmental Engr., Surgeon Gen., USAF
Public :	Joseph Sataloff, M.D., Otologist Paul D. Emerson, Head, Mach. Design and Dev., N. Car. State U. Victor Hildyard, M.D., <i>Chr.</i> , Private Practice

STANDARDS ADVISORY COMMITTEE ON HEAT STRESS—Ad Hoc Committee

Scope.—To recommend a standard on heat stress in the industrial workplace. This committee will submit its final recommendations in January 1974. However, support activity is expected to continue on a fairly active basis.

Employee :	Vaughn D. Ball, Res. Dir., Bakery & Confectionery Workers Louis A. Beliczky, M.P.H., I. H. Dir., United Rubber, Cork, Linoleum Workers Louis H. Simpson, Saf. Coord., United Steelworkers of America Carl Studenroth, V. P., Molders and Allied Workers Union
Employer :	John A. Janous, Saf. Dir., Amer. Iron & Steel Institute Wm. E. McCormick, Dir., American Ind. Hygiene Assoc. Ralph W. Niles, Saf. Dir., Volpe Construction Company Carl Zenz, M.D., Med. Dir., Allis-Chalmers Corporation
State :	Carl A. Merritt, Training Dir., Occ. Safety/Health, Kentucky DOL Dr. Shiro Tanaka, Actg. Chief, Training, Env. Resources Dept., Pa.
Federal :	Clark M. Humphreys, NIOSH, HEW Wm. E. Mabson, Maj., Environmental Quality, USAF
Public :	Anna M. Baetjer, Sc. D., Env. Med. Dept., Johns Hopkins University Theodore F. Hatch, Retired Prof., University of Pittsburgh

J. Members of the Advisory Committees—Continued

STANDARDS ADVISORY COMMITTEE FOR MARINE TERMINAL FACILITIES—Ad Hoc Committee

Scope.—To recommend a safety standard applicable to longshoring and related activity carried out in association with the operation and functions of marine terminal facilities. This committee is in the process of being formed and the list of prospective committee members and the specific scope of the committee have not yet been approved nor have prospective members been notified.

Employee :	John S. Brzek, Sec. Treas., AFL-CIO, Intl. Longshoremen's Assoc. Wm. T. Ward, Intl. Longshoremen's & Warehousemen's Union Joseph Leonard, AFL-CIO, Saf. Dir., ILA (New York) W. C. Wells, AFL-CIO, ILA (Houston)
Employer :	Chris Morton, V.P., Cleveland Stevedore Company Norman A. Viner, Gen. Mgr., Cooper Terminal Company Emmit Pierce, V.P., Marine Terminals Corporation Samuel A. Clauss, Asst. Dir., Steamship Trade Association
State :	Clarence Hooks, Asst. Admin., Ind. Saf., State of Florida Vern Painter, Marine & Dock Inspector, State of Washington
Federal :	Daniel W. Ziegfeld, U.S. Coast Guard, DOT Vincent Grey, Maritime Administration Dr. Wm. S. Lainhart, Med. Dir., NIOSH, HEW
Public :	Charles G. Visconti, Pres., Intl. Cargo Gear Bureau Lt. Cmdr. Chas. Remoll, U.S. Naval Academy

STANDARDS ADVISORY COMMITTEE ON HAZARDOUS MATERIALS LABELING—Ad Hoc Committee

Scope.—To recommend a standard on hazardous materials labeling in the industrial workplace. This committee is in the process of being formed and the list of prospective committees represents a first draft and has not left the Office of Standards for further approvals yet.

Employee :	Conrad Fedoronko, I. H., United Auto Workers Soc. Sec. Dept. Michael Markowitz, Eastern Conference of Teamsters Louis S. Beliczky, Dir., Inc. Hygiene, United Rubber Workers Lawrence J. Ahern, Dir., Coll. Bargain., Intl. Chem. Workers Union
Employer :	Richard B. Berman, Mgr. Labor Rel., US Chamber of Commerce Dennis P. Bridge, Mgr., Env., Cont., PPG Industries Mordaunt P. Redford, Saf. Dir., Norfolk Shipbuilding & Drydock C. Boyd Shaffer, Dir. of Toxicology, American Cyanamid
State :	James C. Robertson, Maryland State Fire Marshal
Federal :	Al Roberts, Dept. of Transportation Dr. William Wells, Environmental Protection Agency Dr. Donald Mackay, Consumer Product Safety Council Bobby F. Craft, Ph. D., NIOSH, HEW
Public :	Howard H. Fawcett, Nat. Res. Council on Hazardous Materials Miles E. Woodworth, National Fire Protection Assoc.

K. National Safety Advisory Council Members—1973

Vice Chairman:

James H. Rademacher, President, National Association of Letter Carriers, AFL-CIO, 100 Indiana Ave. NW., Washington, D.C. 20001

Telephone: 393-4695

Term in office: (3) years, January 1, 1972 to December 31, 1974

Robert L. Crum, International Representative, International Brotherhood of Electrical Workers, AFL-CIO, 1125 15th St. NW., Washington, D.C. 20005

Telephone: 833-7000

Term in office: (3) years, January 1, 1973 to December 31, 1975

Francis S. Filbey, President, American Postal Workers Union, AFL-CIO, 817 14th St. N.W., Washington, D.C. 20005

Telephone: 638-2304

Term in office: (3) years, January 1, 1972 to December 31, 1974

Okey L. Gallagher, Manager, Accident Prevention Division, U.S. Postal Service Headquarters, 475 L'Enfant Plaza West, Washington, D.C. 20260

Telephone: 245-4675

Term in office: (3) years, January 1, 1972 to December 31, 1974

John M. Kanak, Director of Safety, Department of Health, Education, and Welfare, Room 3460, North Bldg., 330 Independence Ave. SW., Washington, D.C. 20201

Telephone: 962-5227 Code 13-25227

Term in office: (3) years, January 1, 1973 to December 31, 1975

William C. Pope, Director of Safety, Department of the Interior, 18th and C St. NW., Washington, D.C. 20240

Telephone: 343-6723 Code 183-6723

Term in office: (2) years, January 1, 1972 to December 31, 1973

Howard T. Scott, Chief, Safety and Fire Protection Division, Veterans Administration, Vermont Ave. and I St. NW., Washington, D.C. 20420

Telephone: DU9-2761 Code 148-2761

Term in office: (3) years, January 1, 1973 to December 31, 1975

Morris A. Simms, Deputy Director of Personnel, Department of Agriculture, 14th and Independence Ave. SW., Washington, D.C. 20250

Telephone: 447-3546 Code 151-73547

Term in office: (3) years, January 1, 1973 to December 31, 1975

Rolf E. Hamstrom, Chief, Accident Prevention Branch, Public Building Service, General Services Administration, Washington, D.C. 20405

Telephone: Code 13-26271

Term in office: (3) years, January 1, 1972 to December 31, 1974

William Heffelfinger, Assistant Secretary for Administration, Department of Transportation, 400 7th St. SW., Washington, D.C. 20590

Telephone: 426-2332 Code 118-62332

Term in office: (2) years, January 1, 1972 to December 31, 1973

Anthony F. Ingrassia, Director, Office of Labor Management Relations, U.S. Civil Service Commission, 19th and E Sts. NW., Washington, D.C. 20415

Telephone: 632-4468 Code 101-24468

Term in office: (2) years, January 1, 1972 to December 31, 1973

Theodore Vanderzyde, Grand Lodge Representative, International Association of Machinists and Aerospace Workers, 1300 Connecticut Ave. NW., Washington, D.C. 20036

Telephone: 785-2525

Term in office: (3) years, January 1, 1973 to December 31, 1975

K. National Safety Advisory Council Members—1973—Continued

Clyde M. Webber, President, American Federation of Government Employees, AFL-CIO, 1325 Massachusetts Ave. NW., Washington, D.C. 20005

Telephone: 737-8700

Term in office: (2) years, January 1, 1972 to December 31, 1973

George C. White, Director of Safety and Reliability and Quality Assurance, National Aeronautics and Space Administration, Washington, D.C. 20546

Telephone: 755-2285 Code 138-52285

Term in office: (2) years, January 1, 1972 to December 31, 1973

Alternate:

Alan Turnbull, Acting Director of Safety Policy, Office of the Assistant Secretary for Manpower and Reserve Affairs, U.S. Department of Defense, the Pentagon, Washington, D.C. 20301

Telephone: OX7-3387

Term in office: (3) years, January 1, 1972 to December 31, 1974

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration

Region I:

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, Fifth Floor, 18 Oliver St., Boston, Mass. 02110. FTS & Comm: Phone: 617-223-6712/3.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Custom House Bldg., State St., Boston, Mass. 02109. FTS & Comm. Phone: 617-223-4511/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 617, 450 Main St., Hartford, Conn. 06103. FTS & Comm. Phone: 203-244-2294.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 425, 55 Pleasant St., Concord, N.H. 02301. FTS & Comm. Phone: 603-224-7725.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, U.S. Post Office and Courthouse Bldg., 436 Dwight St., Room 501, Springfield, Mass. 01103. FTS Phone: 413-781-2522/2523. Comm. 413-781-2420 x312.

District Office

U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., U.S. Courthouse, Room 503-A, Providence, R.I. 02903. FTS & Comm. Phone: 401-528-4466.

Region II:

(New York, New Jersey, Puerto Rico, Virgin Islands, Canal Zone)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health,

Administration, 1515 Broadway (1 Astor Plaza), New York, N.Y. 10036. FTS & Comm. Phone: 212-971-5941/2.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 90 Church St., Room 1405, New York, N.Y. 10007. FTS & Comm. Phone: 212-264-9840/1/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 203, Midtown Plaza, 700 East Water St., Syracuse, N.Y. 13210. FTS & Comm. Phone: 315-473-2700/1.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 370 Old Country Rd., Garden City, L.I., N.Y. 11530. FTS & Comm. Phone: 516-294-0400/1/2/3.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Office Bldg., Room 1435C, 970 Broad St., Newark, N.J. 07102. FTS & Comm. Phone: 201-645-5930/1/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Condominium San Alberto Bldg., 605 Condado Ave., Room 328, Santurce, P.R. 00907. FTS & Comm. Phone: 809-724-1050/1065.

Region III:

(Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, 15220 Gateway Center, 3535 Market St., Philadelphia, Pa. 19104. FTS & Comm. Phone: 215-597-1201.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administra-

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration—Continued

tion, William J. Green, Jr. Federal Bldg., 600 Arch St., Philadelphia, Pa. 19106. FTS & Comm. Phone: 215-597-4955.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Charleston National Plaza, Suite 1726, 700 Virginia St., Charleston, W. Va. 25301. FTS & Comm. Phone: 304-343-1420.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 8081, 400 North Eighth St., Post Office Box 10186, Richmond, Va. 23240. FTS & Comm. Phone: 804-782-2241/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 1110-A, 31 Hopkins Plaza, Charles Center, Baltimore, Md. 21201. FTS & Comm. Phone: 301-962-2840.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 802, Jonnet Bldg., 4099 William Penn Highway, Monroeville, Pa. 15146. FTS & Comm. Phone: 412-644-2905/6.

District Office

U.S. Department of Labor, Occupational Safety and Health Administration, 3661 Virginia Beach Blvd., Stanwick Bldg., Room 111, Norfolk, Va. 23502. FTS & Comm. Phone: 804-441-6381/2.

Region IV:

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health, Administration, 1375 Peachtree St. NE., Suite 587, Atlanta, Ga. 30309. FTS & Comm. Phone: 404-526-3573/4 or 2281/2.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Building 10, Suite 33, La Vista Perimeter Park, Tucker, Ga. 30384. FTS Phone: 404-526-4767. Comm: 404-939-8987.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 204, Bridge Bldg., 3200 East Oakland Park Blvd., Fort Lauderdale, Fla. 33308. FTS Phone: 305-735-6331. Comm: 305-525-0611 x331.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 2809 Art Museum Dr., Suite 4, Art Museum Plaza, Jacksonville, Fla. 32207. FTS & Comm. Phone: 904-791-2895.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Suite 554-E, 600 Federal Pl., Louisville, Ky. 40202. FTS & Comm. Phone: 502-582-6111/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Office Bldg., Room 613A, 310 New Bern Ave., Raleigh, N.C. 27601. FTS & Comm. Phone: 919-755-4770.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 1600 Hayes St., Suite 302, Nashville, Tenn. 37203. FTS & Comm. Phone: 615-749-5313.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Todd Mall, 2047 Canyon Rd., Birmingham, Ala. 35216. FTS Phone: 205-325-6081. Comm: 205-822-7100.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Enterprise Bldg., Suite 201, 6605 Abercorn St., Savannah, Ga., 31405. FTS Phone: 912-232-4393. Comm: 912-354-0733.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Commerce Bldg., Room 600, 118 North Royal

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration—Continued

St., Mobile, Ala. 36602. FTS & Comm. Phone: 205-690-2131.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 1710 Gervais St., Room 205, Columbia, S.C. 29211. FTS & Comm. Phone: 803-765-5904.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Riverside Plaza Shopping Center, 2720 Riverside Drive, Macon, Georgia 31204. FTS Phone: 912-743-2264. Comm: 912-746-5153.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 5760 I-55 North Frontage Rd. East, Jackson, Miss. 39200. FTS & Comm. Phone: 601-948-2771.

Region V:

(Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, 300 South Wacker Dr.—Room 1201, Chicago, Ill. 60606. FTS & Comm. Phone: 312-353-4716/7.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 300 South Wacker Dr., Chicago, Ill. 60606. FTS & Comm. Phone: 312-353-1390.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 109, 360 South Third St., Columbus, Ohio 43215. FTS & Comm. 614-469-5582.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Clark Bldg.—Room 400, 633 West Wisconsin Ave., Milwaukee, Wis. 53203. FTS & Comm. Phone: 414-224-3315/6.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, U.S. Post Office and Courthouse, Room 423, 46 East Ohio St., Indianapolis, Ind. 46204. FTS & Comm. Phone: 317-633-7384.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 847 Federal Office Bldg., 1240 East Ninth St., Cleveland, Ohio 44199. FTS & Comm. Phone: 216-522-3818.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Michigan Theatre Bldg., Room 626, 220 Bagley Ave., Detroit, Mich. 48226. FTS & Comm. Phone: 313-226-6720.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 110 South Fourth St., Room 437, Minneapolis, Minn. 55401. FTS & Comm. Phone: 612-725-2571.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Office Bldg., Room 5522, 550 Main St., Cincinnati, Ohio 45202. FTS & Comm. Phone: 513-684-2355.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 734, Federal Office Bldg., 234 North Summit St., Toledo, Ohio 43604. FTS & Comm. Phone: 419-259-7542.

Region VI:

(Arkansas, Louisiana, New Mexico, Oklahoma, Texas)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, Seventh Floor, Texaco Bldg., 1512 Commerce St., Dallas, Tex. 75201. FTS & Comm. Phone: 214-749-2477/8/9 or 2567.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Adolpus Tower, Suite 1820, 1412 Main St.,

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration—Continued

Dallas, Tex. 75202. FTS & Comm. Phone: 214-749-1786/7/8.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 421, Federal Bldg., 1205 Texas Ave., Lubbock, Tex. 79401. FTS Phone: 806-747-3681. Comm: 806-747-3711 x3681.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 512, Petroleum Bldg., 420 South Boulder, Tulsa, Okla. 74103. FTS & Comm. Phone: 918-581-7676.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 215, 1015 Jackson Keller Rd., San Antonio, Tex. 78213. FTS & Comm. Phone: 512-225-4569.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 307 Central National Bank Bldg., 2100 Travis St., Houston, Tex. 77002. FTS & Comm. Phone: 713-226-5431.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 546 Carondelet St., Room 202, New Orleans, La. 70130. FTS & Comm. Phone: 504-527-2451/2.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 303, Donaghey Bldg., 103 East Seventh St., Little Rock, Ark. 72201. FTS & Comm. Phone: 501-378-6192.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 302, Federal Bldg., 421 Gold Ave. SW., Post Office Box 1428, Albuquerque, N. Mex. 87103. FTS & Comm. Phone: 505-766-3411.

District Office

U.S. Department of Labor, Occupational Safety and Health Administration, 600 Leopard St., Suite 1322, Corpus Christi, Tex. 78401. FTS & Comm. Phone: 512-883-5416.

Region VII:

(Iowa, Kansas, Missouri, Nebraska)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, 911 Walnut St., Room 3000, Kansas City, Mo. 64106. FTS & Comm. Phone: 816-374-5861.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 1627 Main St., Room 1100, Kansas City, Mo. 64108. FTS & Comm. Phone: 816-374-2756.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 210 North 12th Blvd., Room 554, St. Louis, Mo. 63101. FTS & Comm. Phone: 314-622-5461.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, City National Bank Bldg., Room 803, Omaha, Nebr. 68102. FTS & Comm. Phone: 402-221-3276/7.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Petroleum Bldg., Suite 312, 221 South Broadway St., Wichita, Kans. 67202. FTS Phone: 316-267-6644. Comm: 316-267-6311 x644.

Region VIII:

(Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 15010, 1961 Stout St., Denver, Colo. 80202. FTS & Comm. Phone: 303-837-3383.

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration—Continued

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Squire Plaza Bldg., 8527 West Colfax Ave., Lakewood, Colo. 80215. FTS & Comm. Phone: 303-234-4471.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Suite 309, Executive Bldg., 455 East Fourth South, Salt Lake City, Utah 84111. FTS & Comm. Phone: 801-524-5080.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Suite 525, Petroleum Bldg., 2812 First Ave. North, Billings, Mont. 59101. FTS Phone: 406-245-6640/6649. Comm: 406-245-6711 x6640 or 6649.

Region IX:

(California, Arizona, Nevada, Hawaii)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, 9470 Federal Bldg., 450 Golden Gate Ave., Post Office Box 36017, San Francisco, Calif. 94102. FTS & Comm. Phone: 415-856-0586 or 4427.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 100 McAllister St., Room 1706, San Francisco, Calif. 94102. FTS & Comm. Phone: 415-556-0536.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Suite 318, Amerco Towers, 2721 North Central Ave., Phoenix, Ariz. 85004. FTS & Comm. Phone: 602-261-4857/8.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Suite 505, 333 Queen St., Honolulu, Hawaii 96813. FTS & Comm. Phone: 808-546-3157.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Hartwell Bldg., Room 401, 19 Pine Ave., Long Beach, Calif. 90802. FTS Phone: 213-831-9281, then ask Long Beach FTS Operator for 432-3434.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 1203 South Carson St., Carson City, Nev. 89701. FTS & Comm. Phone: 702-883-1226.

Region X:

(Alaska, Idaho, Oregon, Washington)

Assistant Regional Director, U.S. Department of Labor, Occupational Safety and Health Administration, 1808 Smith Tower Bldg., 506 Second Ave., Seattle, Wash. 98104. FTS & Comm. Phone: 206-442-5930.

Area Offices

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 121 107th Street NE., Bellevue, Wash. 98004. FTS & Comm. Phone: 206-442-7520.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Federal Bldg., Room 227, 605 West Fourth Ave., Anchorage, Alaska 99501. FTS Phone: Dial Local FTS Operator and ask for 907-265-4851. Comm. Phone: 907-272-5561, x851.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, Room 526, Pittock Block, 921 Southwest Washington St., Portland, Oreg. 97205. FTS & Comm. Phone: 503-221-2251.

Area Director, U.S. Department of Labor, Occupational Safety and Health Administration, 8411 Crestwood Dr., Boise, Idaho 83704. FTS & Comm. Phone: 208-376-4892.

L. Directory of Regional and Field Offices of the Occupational Safety and Health Administration—Continued

Training Institute

Robert McKeand, Manager, U.S. Department of Labor, Occupational Safety and Health Administration, Training Institute, 10600 West Higgins Rd., Rosemont, Ill. 60018. FTS
Phone: 312-353-1146. Comm.: 312-297-4813.

Area Offices Opened During 1973

Boston Regional Office
Springfield, Mass., opened 12/1/73

Philadelphia Regional Office
Charleston, W. Va., opened 5/23/73

Atlanta Regional Office

Macon, Ga., opened 9/17/73
Raleigh, N.C., opened 10/1/73
Columbia, S.C., opened 7/30/73
Jackson, Miss., opened 9/4/73

Dallas Regional Office

San Antonio, Tex., opened 10/29/73
Little Rock, Ark., opened 10/29/73
Albuquerque, N.M., opened 10/29/73

San Francisco Regional Office

Carson City, Nevada, opened 7/20/73

Seattle Regional Office

Boise, Idaho, opened 11/19/73

REPORT ON OCCUPATIONAL SAFETY AND HEALTH

**By the Occupational Safety and
Health Review Commission**

Robert D. Moran, Chairman

THE OCCUPATIONAL SAFETY AND HEALTH REVIEW COMMISSION—1974

The Occupational Safety and Health Review Commission (OSAHRC) exists solely to provide employers and affected employees or their representatives with their day in court whenever they disagree with one or more aspects of an enforcement action taken by the Secretary of Labor under the Occupational Safety and Health Act of 1970 (29 U.S.C. Secs. 651-678). It is an independent adjudicatory agency of the United States, which came into being on April 28, 1971, pursuant to Section 12 of the Act (29 U.S.C. Sec. 661).

The Review Commission has only one purpose. It is stated in 29 U.S.C. Sec. 651(b) (3) in these words: "for carrying out adjudicatory functions under the Act." All cases are heard and decided by a Review Commission Administrative Law Judge (ALJ) (except those settled, withdrawn, or dismissed prior to trial). All ALJ decisions are subject to review by the three-member Commission, but only about 10 percent of them are actually directed for review. The remainder automatically become final decisions of the Commission 30 days after issuance, pursuant to 29 U.S.C. Sec. 661(i).

All hearings conducted by Review Commission judges are adversary proceedings with the Secretary of Labor prosecuting and the cited employer defending. They are conducted pursuant to the same rules and procedures observed in all Federal courts.

Whether a judge's decision becomes final without direction for review, or the Commission members substitute their decision for his after review, it can be appealed to the appropriate United States Court of Appeals by any party adversely affected or aggrieved by it. This includes the Secretary of Labor who is a party to all OSAHRC cases. Fifty decisions had been appealed as 1973 drew to a close.

Although the Review Commission ended 1973 with three fewer judges than it had a year earlier, it was able to issue final orders for more than 2.5 times as many cases: 2,692 decisions were issued

in 1973, and 1,071 in 1972. Case intake also showed an enormous jump over previous years. In 1973, 3,901 new cases were filed as compared with 1,610 in 1972, and 358 during the 8 months of 1971 the Commission existed.

At the end of 1973, 64.2 percent of all cases filed had been resolved. The median time between filing and final disposition was slightly over 3 months (90.5 days) for all cases. This elapsed time figure was 5 months in those cases where it was necessary to hold a hearing.

COMMISSION JUDGES

Although there was budgetary authority for 60 administrative law judges during 1973, the maximum number on duty at any one time was 41. The year ended with 38 on board. Their offices are located in nine cities: Atlanta, Chicago, Dallas, Denver, Los Angeles, New York, Seattle, St. Louis, and Washington, D.C. As a general practice, each judge will handle those cases arising in the region where he is physically located.

The judges travel to the community where the alleged violation occurred to conduct their hearings. This is done in order to make such proceedings as convenient as possible for the employers and employees involved.

In 1973, OSAHRC judges held a total of 734 hearings in 174 different localities. The most frequent hearing sites were New York City, 88 hearings; Portland, Oregon, 23; Philadelphia, 21; San Francisco, 20; and Denver, 19.

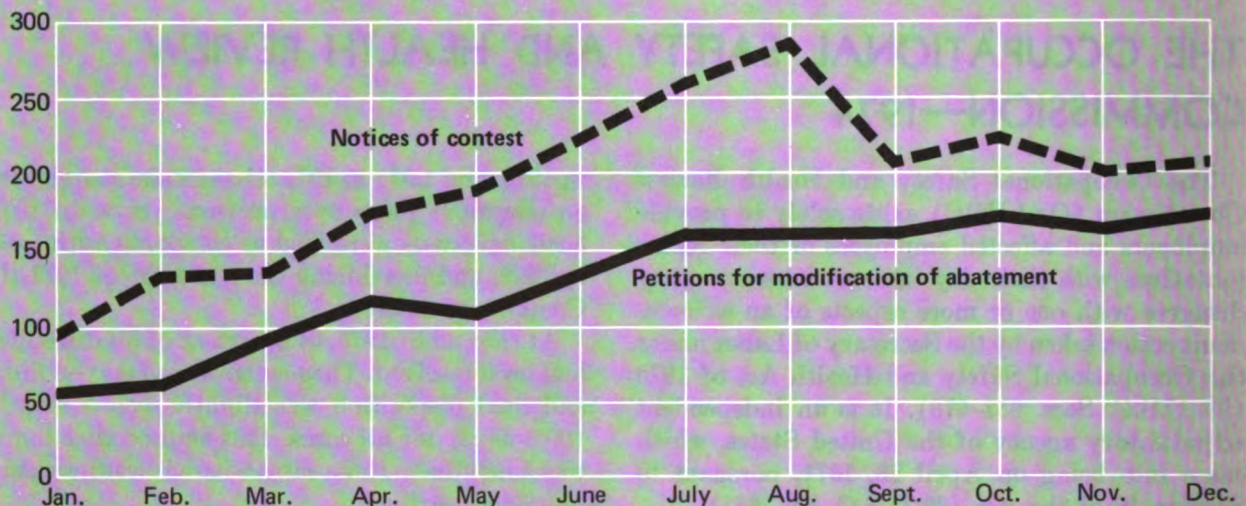
ORGANIZATION AND MANAGEMENT

The Members

There are three members of the Review Commission, each appointed by the President, by and with the advice and consent of the Senate, for staggered terms of 6 years each. The members read

Chart I

CASES RECEIVED PER MONTH, 1973



Source: Occupational Safety and Health Review Commission

each judge's decision, and any single member can order a judge's decision reviewed by the 3-member tribunal. A majority of the members can substitute its decision for that of the judge provided a direction for review has been filed within 30 days of the judge's decision.

On April 27, 1973, the term of Alan F. Burch, one of the three original members, expired. Timothy F. Cleary of Maryland was appointed to fill the vacancy. His term will expire on April 27, 1979.

The other two members, Robert D. Moran of Massachusetts and James F. Van Namee of Pennsylvania, were both sworn in on April 28, 1971. Mr. Moran, who was designated Commission Chairman by the President, was appointed for a term expiring April 27, 1977. Mr. Van Namee's term expires on April 27, 1975.

Each member has a chief legal counsel and a legal staff to assist him in studying the judge's decisions in order to determine whether review should be directed and to assist in legal research and the preparation of Commission decisions in those cases previously directed for review. During 1973, there were 27 lawyers engaged in such activities, nine per Commission member.

The Staff

The Chairman is responsible for the administrative operations of the Commission. The principal staff officials are Executive Director, Director of Judicial Administration, Executive Secretary, Director of Administration, Director of Management Information Systems, and Director of Information and Publications.

Location

The Review Commission's principal office is at 1825 K Street, N.W., Washington, D.C. All members and officials of the Commission are located in this office except judges and their administrative and clerical support who, as noted above, have offices in nine different cities throughout the country.

1973 CASE HIGHLIGHTS

Review Commission decisions are made on a case-by-case basis. Their outcome depends upon the specific facts admitted into evidence during the hearing. Nevertheless, the decisions are of wide interest because they interpret and apply to the

Chart II

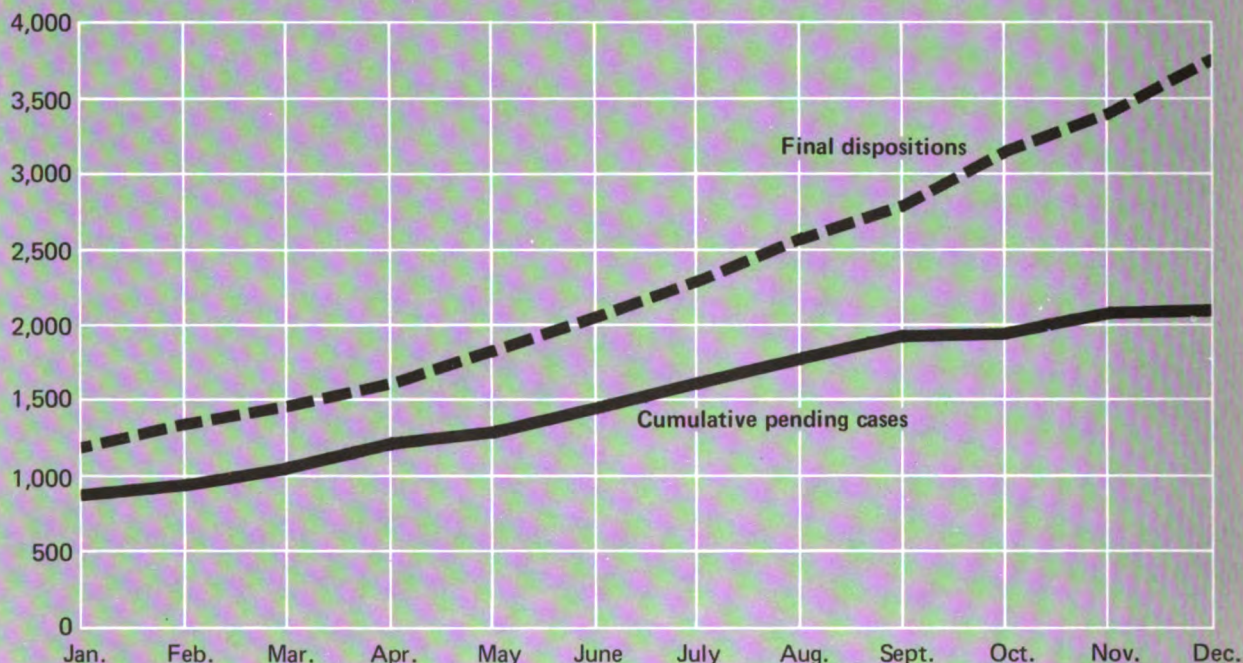
TOTAL OSHA INSPECTIONS AND OSAHRC CONTESTS BY REGION

MONTH	Total Inspections Contests	Region 1 Inspections Contests	Region 2 Inspections Contests	Region 3 Inspections Contests	Region 4 Inspections Contests	Region 5 Inspections Contests	Region 6 Inspections Contests	Region 7 Inspections Contests	Region 8 Inspections Contests	Region 9 Inspections Contests	Region 10 Inspections Contests
January 73	2568 151	193 5	477 38	211 16	488 27	366 15	271 4	125 12	155 9	152 6	130 14
February	3668 192	275 10	591 30	338 17	1089 33	440 52	323 6	137 13	139 7	220 14	116 10
March	5444 226	346 8	776 28	538 22	1589 53	567 39	433 13	323 11	400 25	239 20	233 10
April	4754 289	334 9	725 39	755 38	1134 55	410 46	315 22	328 29	387 14	202 25	164 12
May	6114 295	410 12	710 40	977 40	1513 59	785 44	480 14	415 28	231 30	246 9	347 19
June	8291 386	580 28	1063 56	1200 44	1712 99	1368 71	748 41	516 32	461 36	345 6	298 20
July	5038 420	389 20	691 39	371 53	901 72	880 90	619 32	299 24	330 33	342 26	216 31
August	6335 444	542 37	795 44	415 42	1088 85	1217 74	838 34	289 35	562 36	358 31	231 26
September	6048 365	382 28	711 45	399 23	1018 60	1378 71	771 41	345 34	444 27	328 20	272 19
October	5777 392	465 25	639 52	405 35	830 51	1283 96	779 33	362 31	474 31	229 17	311 21
November	7776 361	577 39	784 28	718 34	1175 49	1911 85	947 29	456 34	621 31	380 16	207 18
December	5340 380	336 19	569 44	408 23	857 48	1451 104	554 38	279 30	409 37	303 17	174 10
Total	67153 3901	4829 240	8531 483	6735 387	13394 689	12056 772	7078 284	3874 313	4613 316	3344 207	2699 210
% of Total	100% 100%	7.2% 6.0%	12.7% 12.0%	10.0% 10.0%	19.9% 17.0%	18.0% 19.0%	10.5% 8.0%	5.8% 9.0%	6.9% 9.0%	5.0% 5.0%	4.0% 5.0%

Source: Occupational Safety and Health Review Commission

Chart III

CUMULATIVE PENDING CASES AND FINAL DISPOSITIONS, 1973



Source: Occupational Safety and Health Review Commission

Act itself, the safety standards, and other regulations promulgated thereunder.

Some of the principal areas in which such decisions were rendered during 1973 were:

- Interpretation of various job safety and health standards
- Contractual relationships and job safety responsibility
- General duty clause interpretation
- Jurisdiction of the Commission
- Employer liability for acts of noncompliance by employees
- Penalties
- Procedural questions

Interpretation of Job Safety and Health Standards

The principal method relied upon in the Act for achieving safe and healthful working conditions is the promulgation and enforcement of occupational safety and health standards, which tell employers

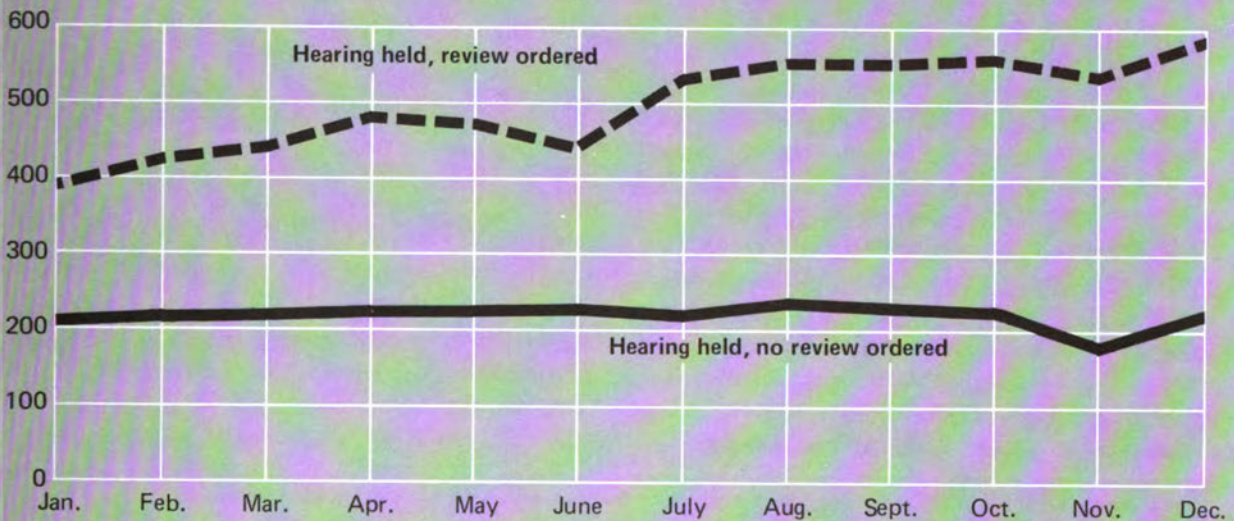
what they must do so that their employees can avoid hazards which would otherwise be associated with their work. Fundamental to this effort are clear and understandable occupational safety and health standards. Realizing this, OSAHRC increasingly turned its attention to scrutinizing these standards in 1973.

The first decision of the year, *Secretary of Labor v. Mountain States Telephone and Telegraph Co.*, OSAHRC Docket No. 355, overturned a Labor Department attempt to enforce a standard declaring "employers shall be responsible for the safe conditions of tools used by employees." The evidence showed that the cited company had taken every reasonable precaution to assure the safety of the tool which electrocuted an employee because of an unknown defect. The Commission rejected the notion that a standard so broadly written could establish an "absolute responsibility" for the safety of equipment. Stated the decision:

Congress did not enact the Occupational Safety and Health Act to create guaran-

Chart IV

ELAPSED DAYS FROM FILING OF NOTICE OF CONTEST TO FINAL DISPOSITION



Source: Occupational Safety and Health Review Commission

tors upon whom to fasten responsibility for illnesses or injuries or deaths. Their purpose was remedial. The Act is a broad-scale effort to prevent "personal injuries and illnesses arising out of work situations." The first-stated purpose of the Act is to encourage and stimulate "programs for providing safe and healthful working conditions." (emphasis added)

The standard in question in *Mountain States* did not tell the employer what he was obligated to do in order to prevent the hazard in the case.

In *Secretary of Labor v. Drake-Willamette Joint Ventures*, OSAHRC Docket No. 117, the Commission ruled that employers were entitled to rely upon the clear and unambiguous meaning of the language of safety standards. The standard required the use of safety nets only when other means of fall protection were "impractical." Thus, the absence of such nets would not establish a violation against the employer if other means would provide the necessary protection.

In *Secretary of Labor v. Tile Co.*, OSAHRC Docket No. 211, the Commission found that a standard is unenforceably vague if it does not list the conditions in which use of a certain safety device (in this case roofing brackets) is required. However, in the same case, it was held that the vagueness of one subsection of a standard does not

invalidate a separate subsection which is not vague, and all subsections must be regarded as separate requirements in the absence of clear indications to the contrary.

The meaning and proper promulgation of "national consensus standards" adopted by OSHA under the provisions of Section 6(a) of the Act was at issue in two cases. The first of these, *Secretary of Labor v. Oberhelman-Ritter Foundry*, OSAHRC Docket No. 1572, involved an overhead crane standard which required the installation of bridge and trolley bumpers. Ostensibly this standard was promulgated as a national consensus standard; however, the American National Standard from which it was taken only recommended the bumpers. Since this change represented a substantial modification of the consensus standard and it had been promulgated by the Secretary of Labor without opportunity for public comment, the Commission held that the standard had not been validly issued and could not be enforced.

In the second such case, *Secretary of Labor v. Buckeye Cellulose Corporation*, OSAHRC Docket No. 1919, OSAHRC determined that an industry-developed cotton dust standard, adopted by OSHA as a national consensus standard, could not be ap-

Chart V

PERCENTAGE OF CONTESTS TO INSPECTIONS

	Total Establishments	Establishments Inspected	Total OSHA Inspections	% of Inspections To Total Establishments	Total OSAHRC Contests	% of Contests To Inspections
Agriculture	408,300	235	291	0.07%	9	3.09%
Contract Construction	874,100	17,928	22,100	2.53%	986	4.46%
Manufacturing	289,700	20,137	29,109	10.05%	832	2.86%
Maritime ²	800	1,346 ²	6,968 ²	871.00% ²	85	1.22%
Trades	1,450,600	3,766	4,463	0.31%	89	1.99%
Services	1,066,500	1,345	1,657	0.16%	42	2.53%
Other	856,300	2,011	2,779	0.032%	115	4.14%
Totals	4,946,300	46,768	67,367 ¹	1.36%	2,158 ³	3.20% ⁴

1 Adjusted total of 67,153 has been provided but without accompanying adjustments of industry sub-totals.

2 Each of the firms or establishments in this category has a number of ships, all subject to frequent reinspection. OSHA has no way of telling how many firms were inspected. OSHA can't estimate the total universe of ships wither since inspections refer to ships, the percentage is meaningless for this category.

3 Department of Labor data is used for this column. OSAHRC data shows 2,343 notices of contests but industry statistics are not maintained. OSAHRC also had 1,559 petitions to modify the abatement period.

4 Using OSAHRC statistics, the % of contest to inspection overall is 5.79%; 2.31% for PMA's; 3.48% for NOC's.

Source: Occupational Safety and Health Review Commission

plied to cotton linters (fuzz adhering to seeds after the cotton has been ginned) because the linter industry and the cotton industry are separate. The cotton industry, this decision found, had intended the standard to be applied only to long-fibered staple cotton, and, therefore, it could not be broadened to include the linters industry unless it was promulgated under the safeguards, provided in the Act, which require the opportunity for advance public comment on all safety standards except established Federal standards and those adopted by industry consensus. These consensus standards, however, cannot apply outside the industry which agreed to them.

In other cases, however, the Commission upheld the application of various safety standards to conditions not specifically listed in the regulations. In *Secretary of Labor v. Ryder Truck Lines, Inc.*, OSAHRC Docket No. 391, for example, the employer disputed a charge that by not requiring loading dock employees to wear safety shoes he had violated a generally-worded personal protective equipment standard requiring such equipment

"whenever it is necessary by reason of hazards of processes or environment . . ." The judge who tried the case noted that while the word "hazard" was subject to many interpretations, a reasonable person would have recognized a potential for foot injuries in the loading dock operations. The Commission upheld his ruling.

In *Secretary of Labor v. S. D. Mullins Co. and Diamond Roofing Co.*, OSAHRC Docket Nos. 354 and 480, (consolidated), the Commission held that, although a job safety standard requiring protective railings around open-sided floors did not mention roofs, flat roofs came within the ambit of the regulation and must also be surrounded by safety railings when men must work on them.

Evidence in the case of *Secretary of Labor v. Masonry, Inc.*, OSAHRC Docket No. 2693, demonstrated that adherence to the requirements of a safety standard would cause work to be impossible. The Commission refused to hold the employer in violation on such facts.

In *Secretary of Labor v. Santa Fe Trail Transportation Co.*, OSAHRC Docket No. 331, the Com-

mission ruled that a standard requiring that "a person shall be adequately trained to render first aid" when no medical treatment facility is "in near proximity to the workplace" was so open to a multiplicity of interpretations that it was too vague to enforce. Stated the decision, ". . . standards which are unlimited in spectrum, unlimited in scope and application and which can be applied according to the whim of an [enforcement official] must fall."

Contractual Relationships and Job Safety Responsibility

Liability for workers' safety is often complicated by the contractual relationship existing between prime and subcontractor. Thus, although private agreements between a prime contractor and his subcontractors may allocate to the prime contractor the responsibility for providing overall worksite safety, in most situations involving violation of safety and health standards, the subcontractor remains legally responsible for the safety of his own employees and the contractor for his own workers. This is so because the duty to maintain a safe workplace under the Act runs from each employer to his own employees—and to no one else. During 1973, a number of basic issues involving this relationship were decided by the Commission.

In a 1972 precedent, *Secretary of Labor v. Ellison Electric*, OSAHRC Docket No. 412, the Commission held that a subcontractor was not in violation of standards when he neither created the hazardous conditions nor exposed his employees to the hazard.

Subsequently, in *Secretary of Labor v. Ray Lien Masonry and Dale Roberts Masonry*, OSAHRC Docket Nos. 1627 & 1627 (consolidated), the Commission held that different contractors at a single worksite can commit the same violation of standards if evidence indicates that both employers exposed their employees to the same unsafe work condition. In this case both employers had employees working side-by-side on an unsafe scaffold.

In *Secretary of Labor v. Gilles and Cotting Corp.*, OSAHRC Docket No. 504, it was held that the prime contractor could not be found in violation of the Act because of a hazardous situation on the jobsite that the subcontractor had created and to which the prime contractor's employees had not been exposed. The Commission ruled that the Act

did not "create an employment relationship when one does not exist in fact."

Although a prime contractor may assume overall responsibility for worksite safety, the principle that the subcontractor remains legally responsible for the safety of his own employees has been upheld in numerous cases, including, *Secretary of Labor v. Jaffee Contracting Co., Inc. and Fireproof Products, Inc.*, OSAHRC Docket Nos. 610 & 674 (consolidated); *Secretary of Labor v. Skil-Craft Builders, Inc.*, OSAHRC Docket No. 1375; *Secretary of Labor v. Star Circle Wall Systems*, OSAHRC Docket No. 1991; and *Secretary of Labor v. New Interiors/I.C.S.*, OSAHRC Docket No. 1973. In *Jaffee*, the Commission ruled that it was incumbent upon the subcontractor either to prevent his employees from working until the prime contractor corrected the unsafe condition or to eliminate the hazard himself, which, in this case, would have entailed the subcontractor's providing guard rails on open-sided floors and stairs.

Again, in *Secretary of Labor v. Delta Erection Corp., Grodsky Plumbing Co., Inc., and Valente Contracting Corp.*, OSAHRC Docket Nos. 1717, 1727 & 1757 (consolidated), three subcontractors were liable for not providing safety guard railings on open-sided floors and stairs. The decision noted the dilemma of the subcontractor who is caught between conflicting union or contractual restrictions on the one hand and job safety requirements on the other, and was critical of the inflexible approach to such situations taken by OSHA when issuing citations and proposing penalties.

General Duty Clause Interpretation

Although the Act's prime reliance for ensuring safe workplaces is upon the observance of the safety standards, employers are also bound to comply with the so-called General Duty Clause which obligates each employer to:

furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees.

Although enforcement proceedings under this requirement are infrequent, a central concern in applying this obligation is the definition of the term "recognized hazard."

The Commission has ruled that for a condition to constitute a recognized hazard it must be generally known as such in the employer's industry.

The application of this principle freed some employers from Labor Department charges under this clause during 1973 [*Secretary of Labor v. Vy Lactos Laboratories*, OSAHRC Docket No. 31; *Secretary of Labor v. The Furry Grain Company*, OSAHRC Docket No. 1700; *Secretary of Labor v. Alabama Power Company*, OSAHRC Docket No. 788; and *Secretary of Labor v. Manual Maes Construction Company, Inc.*, OSAHRC Docket No. 1363].

However, the Commission also held that a hazard is "recognized" even though "non-obvious." The recognition of this type of hazard requires detection through instrumentation. The Commission affirmed a General Duty Clause violation in two such cases decided in 1973. In one, the airborne concentrations of lead had to be measured; and in the second, an ohmmeter had to be used to measure circuit continuity in an electrical plug [*Secretary of Labor v. American Smelting and Refining Company*, OSAHRC Docket No. 10; and *Secretary of Labor v. Somerset Tire Service Inc.*, OSAHRC Docket No. 44].

A number of "general duty" cases are initiated following the investigation of accidents in which employees are injured or killed. Several such cases ended with rulings that the Secretary of Labor had merely proved that an accident had occurred, not a violation of the employer's obligation under the Act. It has been held that a violation is not proven if the cause of the accident is shown as merely conjecture [*Secretary of Labor v. Miller and Long*, OSAHRC Docket No. 1367; and *Secretary of Labor v. R.J.H. Contractors*, OSAHRC Docket No. 969].

Other Commission rulings in 1973 have laid out the principle that the general duty requirement of the Act cannot be used to cite employers if there exists a specific occupational safety or health standard covering the condition at issue [*Secretary of Labor v. Sun Shipbuilding and Drydock Co.*, OSAHRC Docket No. 161; and *Secretary of Labor v. Brisk Waterproofing Company, Inc.*, OSAHRC Docket No. 1046].

Another 1973 decision held that more than one violation of the General Duty Clause can be found in a single place of employment at any one time. In *Secretary of Labor v. Aro, Inc.*, OSAHRC Docket No. 465), two simultaneous charges of general duty violation at a single workplace were upheld by the Commission.

Jurisdiction of the Commission

Occasionally a case develops a jurisdictional issue. For instance, in *Secretary of Labor v. City Wide Tuckpointing Service Company*, OSAHRC Docket No. 247, the Commission decision ruled that the Act's protections are designed for employees only, and not the general public. The case involved a job safety standard requiring a screen on the base of a scaffold, in order to protect people walking by or under it. The Commission ruled that the absence of such a screen would not constitute a violation unless workers were thereby exposed to a hazard. Since the evidence showed only possible exposure of the general public—not employees of the cited employer—the charge against the employer was vacated.

In another case, *Secretary of Labor v. Ruan Transportation Corporation*, OSAHRC Docket No. 1873, the Commission ruled that the firm did not have to report an on-the-job death of a truck driver to the Labor Department because the firm had already reported the same to the Department of Transportation. The Commission ruled that Section 4(b)(1) of the Act, 29 U.S.C. Sec. 653(b)(1), specifically provides that the Act shall not "apply to working conditions of employees with respect to which other Federal agencies . . . exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety or health."

Similarly, in *Secretary of Labor v. Consolidated Freightways Corporation of Delaware*, OSAHRC Docket No. 2546; and *Secretary of Labor v. Mushroom Transportation Company*, OSAHRC Docket No. 1588, the Commission ruled that, under the Act, OSHA standards could not duplicate the safety and health enforcement efforts of other Federal agencies such as the Coast Guard. In *Mushroom*, the safety of workers unloading freight from a truck by use of a powered fork lift was provided for under DOT regulations.

Not all State or Federal agency safety and health rules take precedence over the Act, however. The Commission upheld a charge against a construction firm for violation of an OSHA safety standard despite the firm's defense that, since it was under contract to the Federal Aviation Administration, it was governed by the FAA handbook on construction safety. In this case, *Secretary of Labor v. Fortec Constructors*, OSAHRC Docket No. 2524, the Commission ruled that the legisla-

tion establishing the FAA contained no authority for FAA to either enforce safety and health regulations or to seek sanctions for noncompliance of its rules; therefore, the OSHA safety standards applied.

Employer Liability for Acts of Noncompliance by Employees

The Commission has ruled that an employer's responsibility to ensure safe and healthful workplaces is "non-delegable." A cited employer cannot defend against the charge by showing that the violation occurred because an employee did not follow the employer's instructions [*Secretary of Labor v. Maher Distribution Center*, OSAHRC Docket No. 981; and *Secretary of Labor v. Ecology Constructors, Inc.*, OSAHRC Docket No. 2842].

However, the Commission also reiterated its position that an employer is not liable if the violation resulted from isolated, unauthorized actions by employees [*Secretary of Labor v. Garden State Farms*, OSAHRC Docket No. 274], or if the employee who created the violation was highly experienced and his action was unexpected and unauthorized [*Secretary of Labor v. Solomon Construction Company*, OSAHRC Docket No. 2576], or if there was no way the employer could have known in advance how to avoid the condition which produced the violation [*Secretary of Labor v. Mountain States Telephone and Telegraph*, OSAHRC Docket No. 355].

Penalties

The authority to assess penalties under the Act is vested in the Review Commission. The Department of Labor can only propose penalties. This distinction has led to some confusion. Several 1973 decisions were based upon this difference in authority.

The Department of Labor proposes a penalty for each citation it issues. It automatically becomes the assessed penalty if the employer does not contest it. However, when an employer disputes a proposed penalty, the Review Commission has the authority to determine what penalty, if any, is appropriate. Appropriateness of the penalty in each case must be based upon four criteria: the size of the employer's business, the gravity of the violation, the employer's good faith, and the employer's history of violations.

The principal 1973 case on penalties was *Secretary of Labor v. Patelos Industries, Inc.*, OSAHRC Docket No. 1698, in which the Commission found both "arbitrary and inappropriate" the Secretary's use of a predetermined amount of \$100 per day as the minimum daily penalty to be proposed for the failure to abate a violation. The Commission ruled that penalty proposals based on set or fixed amounts were contrary to Section 17(j) of the Act, 29 U.S.C. Sec. 666(i), requiring that the four penalty-determining criteria be individually considered in each penalty assessment.

Of the 2,692 Commission decisions rendered in 1973, a large number involved the downward adjustment of a proposed penalty. For instance, in *Secretary of Labor v. Pullman Brick Company, Inc.*, OSAHRC Docket No. 1593, a proposed \$1,200 penalty was reduced to \$200. The Commission found that the absence of an overhead guard on a forklift truck and a protective guard on a power saw were not likely to cause injury to employees. The gravity of the violations being low, the Commission deemed the lower penalty to be appropriate.

And in *Secretary of Labor v. Ark Wrecking Company, Inc.*, OSAHRC Docket No. 388, the firm's failure to reduce a predemolition building survey to writing was a "violation so minimal and of such low gravity" that the Commission dismissed the proposed \$100 penalty.

In *Secretary of Labor v. Forrest Lumber Company*, OSAHRC Docket No. 2343, the Commission vacated an additional penalty for a failure-to-abate charge because conditions beyond the firm's control prevented its correction of a previously cited hazard: cold weather had rendered the setting of a concrete base for exterior stair railings an impossibility. This was ample ground, the Commission determined, for dismissal of the \$150 additional penalty which the Department of Labor had proposed.

Some other penalty rulings included vacation of a proposed penalty because the firm was no longer in business [*Secretary of Labor v. Custom Painting Company*, OSAHRC Docket No. 1225] and the refusal to allow any "discounting" of a Federal job safety penalty proposal simply because the employer had paid a State fine for the same violation [*Secretary of Labor v. Valley Erection Co., Inc.*, OSAHRC Docket No. 2014].

Finally, in *Secretary of Labor v. American Airlines, Inc.*, OSAHRC Docket Nos. 2487 & 2808

(consolidated), the Commission refused to assess a proposed \$35 penalty for non-use of safety shoes by workers when loading cargo because the penalty was deemed unnecessary to impress *American* with safety requirements and the need for compliance therewith. The Commission stated that the purposes of the Act were better served by encouraging abatement of unhealthful and unsafe work practices and conditions than by imposing small, inappropriate penalties.

Procedural Questions

In January 1973, the Commission dismissed two cases because the Department of Labor had failed to forward employers' notices of contest to the Review Commission "immediately" as required by Section 10(c) of the Act, 29 U.S.C. Sec. 659(c) [*Secretary of Labor v. Bill Echols Trucking Company*, OSAHRC Docket No. 1589; and *Secretary of Labor v. Pleasant Valley Packing Company*, OSAHRC Docket No. 464]. The next month, however, the Commission refined this ruling by allowing the Department of Labor an opportunity to explain why the delay had occurred and the employer the right to show if he had been prejudiced by the delay [*Secretary of Labor v. ADM Grain Company*, OSAHRC Docket No. 1767; and *Secretary of Labor v. J. Dale Wilson Company*, OSAHRC Docket No. 1625].

The Commission also held an OSHA citation to be invalid where the inspector did not present his credentials to the employer before beginning the inspection [*Secretary of Labor v. Alsea Lumber Co.*, OSAHRC Docket No. 1228]. In *Secretary of Labor v. Reynolds Metals Co.*, OSAHRC Docket No. 1936, it was held that the citation must specify the employer's offenses in writing and "with particularity" so that they will know precisely what they are being charged with.

Further, the Commission ruled that, when OSHA fails to provide an employer with a mandatory poster listing employee rights under the Act, the employer cannot be charged with a failure to post it [*Secretary of Labor v. Oak Lane Diner*, OSAHRC Docket No. 398].

In other 1973 cases, the Commission put forward the principle that, as an adjudicatory body, it was without the authority to find a more severe violation of the Act than charged by the Labor Department; that is, the Commission could not find an employer to have willfully violated the Act if

he is charged with a nonwillful violation, even if there exists considerable evidence of willful non-compliance [*Secretary of Labor v. Wetmore and Parman*, OSAHRC Docket No. 221]. Similarly, the Commission determined it could not find a serious violation, regardless of what the facts indicated, if the Secretary has charged only a non-serious offense [*Secretary of Labor v. Dundas Pallet Co.*, OSAHRC Docket No. 266]. The Commission's thesis in these cases was that fairness and due process require that the tribunal act as though it were a traditional court, and consequently it cannot supervise what charges are brought before it by the Secretary of Labor in his role as prosecutor of alleged job safety violators.

The question of whether an employer was "engaged in a business affecting commerce" was also discussed in some 1973 cases. In two cases the Department of Labor failed to prove this, and the citations were dismissed. The businesses in these cases were a cooperative apartment corporation and a painting contractor [*Secretary of Labor v. Wilshire Terrace*, OSAHRC Docket No. 1605 & 1654 (consolidated); and *Secretary of Labor v. John J. Gordon, Inc.*, OSAHRC Docket No. 25].

The Commission also dismissed a case because of the Department's failure to disclose information from an inspector's notes, which a respondent had requested in order to assist him in his defense. Counsel for the Secretary refused to permit the judge to review the material *in camera* to determine whether it ought or ought not be made available to the employer. The Commission ruled that this denial of material was improper because it prevented the employer from receiving a fair and impartial hearing [*Secretary of Labor v. Frazee Construction Co.*, OSAHRC Docket No. 1343].

COURT OF APPEALS DECISIONS

Section 11(a) of the Act, 29 U.S.C. Sec. 660(a), provides that any person adversely affected or aggrieved by an order of the Review Commission may, within 60 days of the issuance of the Commission's order, seek review of it in an appropriate circuit court of appeals. Section 11(b) affords the same right to the Secretary of Labor, 29 U.S.C. Sec. 660(b).

In 1973, 45 Commission decisions were appealed to the circuit courts: 17 by employers and 28 by the Secretary. Added to the five appeals during

1972 (two by employers, three by the Secretary), a total of 50 decisions have been appealed.

The courts handed down dispositions in 11 of these cases during the year. Three petitions filed by employers and two filed by the Secretary were dismissed, and opinions were issued in six cases. The Review Commission's decision was upheld in three, and reversed or vacated in three: one of these last being remanded to OSAHRC for further proceedings. Thirty-nine appeals of OSAHRC decisions were still pending as the year ended.

Two of the appeals taken by the Secretary involved an OSAHRC rule of procedure setting a deadline to be met by the Secretary for forwarding notices of contest after receipt. In *Brennan v. OSAHRC & Brent Towing Co., Inc.*, 481 F. 2d 619 (5th Cir, 1973), the Commission had vacated a citation and proposed penalty for failure of the Secretary to forward the employer's notice of contest within 3 days of its receipt (OSAHRC's rules were later changed to provide 7 days for forwarding these notices). The court overruled the Commission's order and left intact the citation and proposed penalty because the employer had subsequently expressed willingness to withdraw from the case, comply with the citation, and pay the proposed penalty. Thus the court determined that no controversy continued to exist, with the exception of a "procedural dog-fight in which the Secretary and the Commission have become ensnared," and on which the court declined to render an advisory opinion. The court's reference was to a dispute as to whether the Commission could be represented by counsel in the appellate proceeding.

In *Brennan v. OSAHRC & Bill Echols Trucking Co.*, 487 F. 2d 230 (5th Cir, 1973), the court vacated a similar OSAHRC order and returned the case to the Commission for further action. The court stated that, although it was important for purposes of hastening abatement of hazards that notices of contest be promptly forwarded, the Commission should not have applied the "most extreme sanction" without providing a hearing to

determine if *Echols* had, in fact, been injured by the 43-day delay in the forwarding of its notice of contest.

Commission decisions were upheld in *Texports Stevedore Company, Inc. v. Secretary of Labor & OSAHRC*, 484 F. 2d 465 (5th Cir, 1973), rehearing denied 486 F. 2d 1403; and *Brennan v. OSAHRC & J. W. Bounds d/b/a Pearl Steel Erection Company*, 488 F. 2d 337 (5th Cir, 1973). In *Texports*, the court found that the Commission's decision that the firm was in violation of a maritime cargo unloading standard was based on substantial evidence in the record and denied the employer's petition. In *J. S. Bounds*, an OSAHRC order vacating a citation against the employer who had been charged with violating an "imprecise" fall protection standard was affirmed.

The Commission's authority to reduce or eliminate proposed penalties was sustained in *Brennan v. OSAHRC & Interstate Glass Co.*, 487 F. 2d. 438 (8th Cir, 1973). The court ruled that Congressional intent was plainly manifested that the Commission was the final arbiter of penalties. When the Secretary's proposed assessments are contested, the decision stated, they thereby become merely advisory and the Commission's penalty review is de novo.

A number of restrictions in the application of the Act's so-called General Duty Clause [29 U.S.C. Sec. 654(a)(1)] were set out by the court in *National Realty and Construction Company, Inc. v. OSAHRC and Secretary of Labor*, — F. 2d. —, (D.C. Cir, 1973). In order for a hazard to be "recognized," the court said, it must also be preventable since unpreventable occurrences cannot be totally eliminated, and the duty prescribed in the Act must be an achievable one. Secondly, the opinion stated, in actions brought under this section, the record must indicate that demonstrably feasible measures would have materially reduced the hazard; that is, that the Secretary must "specify the particular steps a cited employer should have taken to avoid citation. . . ."

APPENDIX
OSAHRC
Administrative Law Judges
1973*

Atlanta, Georgia

Paul L. Brady
James D. Burroughs
J. Marker Dern
John J. Larkin
John S. Patton

New York, New York

Joseph Chodes
Jerome C. Ditore
James P. O'Connell
David G. Oringer
Robert P. Weill

Chicago, Illinois

Sidney J. Goldstein
George W. Otto
Louis J. Rubin

St. Louis, Missouri

Paul E. Dixon
Vernon G. Riehl
Alan M. Wienman

Dallas, Texas

Judd P. Brenton
Henry F. Martin, Jr.
William J. Risteau

Seattle, Washington

Thomas J. Donegan
Jerry W. Mitchell
Garl J. Watkins
Henry C. Winters

Denver, Colorado

John A. Carlson
John J. Morris

Washington, D.C.

William E. Brennan
Joseph L. Chalk
Charles K. Chaplin
Donald K. Duvall
Abraham M. Gold
David H. Harris
David J. Knight
Henry K. Osterman
Ben D. Worcester

Lawndale, California

Robert N. Burchmore
James A. Cronin, Jr.
Harold A. Kennedy
Erwin L. Stuller

*As of December 31, 1973

REPORT ON OCCUPATIONAL SAFETY AND HEALTH

**By the U. S. Department of
Health, Education, and Welfare
Casper P. Weinberger, Secretary**

SUMMARY

In 1973, the Department of Health, Education, and Welfare, through the National Institute for Occupational Safety and Health (NIOSH), within the Center for Disease Control, continued to carry out its major responsibilities under the Occupational Safety and Health Act of 1970: research, standards development, technical assistance, and manpower development. As required by the Act, this report describes NIOSH's activities during the calendar year of 1973.

During 1973, most research activities within NIOSH were directed toward developing or reviewing criteria for recommending occupational safety and health standards to the Secretary of Labor. The areas of research included toxicology, physical and chemical analysis, physiology and ergonomics, engineering, behavioral and motivational factors, physical agents, and epidemiology (industrywide studies). A limited amount of other research was devoted to the support of NIOSH's technical assistance activities or is carried out to fulfill NIOSH's responsibilities under the Federal Coal Mine Health and Safety Act of 1969.

NIOSH continued to conduct hazard surveillance programs to develop basic descriptive information on the working environment in all nonfarm places of employment covered by the Occupational Safety and Health Act of 1970. When completed, these studies will provide major input into the setting of NIOSH priorities for research and criteria development.

The annual revision of the list of toxic substances was published in *Toxic Substances List—1973 Edition* as required by Section 20(a)(6) of the Act. More than 25,000 entries were included in the 1973 list, of which more than 11,000 were different substances.

During 1973, six criteria documents with their recommended standards for the control of occupa-

tional exposure were completed by NIOSH and forwarded to the Secretary of Labor. These were for chromic acid, coke oven emissions, inorganic mercury, toluene, toluene diisocyanate, and trichloroethylene.

A chapter of this report has been devoted to a comprehensive, detailed description of NIOSH industrywide studies as required by the Act. Among the groups studied are sheet metal workers, machine tool operators, steel workers, aluminum refinery workers, potash miners and millers, hard rock miners, copper smelter workers, mattress industry workers, cotton gin workers, bis (chloromethyl) ether workers, dye manufacturing workers, cosmetologists, motor vehicle inspectors, munition workers, cadmium smelter workers, talc workers, chrome plating workers, clothing workers, and other workers exposed to a variety of hazards.

NIOSH continued in 1973 to provide technical assistance to Federal, State, and local governmental agencies, and to individual employers and groups of employees on request and through NIOSH initiated projects. Through technical services, existing research knowledge is translated into professional practice, and a capacity is developed among the receiving organizations for sustained effort. The NIOSH health hazard evaluation program completed 78 hazard evaluations in 1973. Thirty-four of these hazard evaluations identified toxic or potentially toxic exposures in the workplace.

NIOSH has continued to offer short-term training courses in occupational safety and health. Demand for these courses has remained quite high despite a mid-year change to a fee-for-service basis.

In order that occupational safety and health training may be given regionally and that the expected large demand for training may be filled, NIOSH has begun to package its courses for presentation by external groups.

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Chapter 1

INTRODUCTION AND ADMINISTRATION

The National Institute for Occupational Safety and Health (NIOSH) in the Department of Health, Education, and Welfare conducts programs of research, standards development, technical assistance, and manpower development.

Many of these activities are directed to criteria for standards development. During 1973, 60 percent of the budget was expended for research to develop such criteria. The end products of industrywide studies, laboratory activities, and surveillance are used for such purposes.

Health deterioration at the workplace results from a variety of hazards and manifests itself in a variety of forms. These range from the easily recognized occupational diseases such as silicosis and lead and mercury poisoning to the insidious, delayed effects of exposures to noise on the job that cause partial or total hearing loss and to substances that produce subtle effects which are difficult to diagnose, such as manganese poisoning. Even beyond these effects, there are the considerations that exposures to some occupational hazards will cause, promote, or contribute to the development of cancer, hasten the onset of certain degenerative diseases, or otherwise shorten the life span. As directed by the Occupational Safety and Health Act of 1970, NIOSH looks for evidence of diminished health, functional capacity, or life expectancy as a result of work experience. In most cases, these effects are very difficult to detect because of their similarity or correspondence with nonoccupational diseases, especially the degenerative disease of aging.

NIOSH programs initiated with enactment of the Act have continued to develop and mature in 1973. As required by the Act, this report describes NIOSH's activities during the calendar year of 1973.

Section 20(a)(7) of the Act states, "... the Secretary of Health, Education, and Welfare shall conduct and publish industrywide studies of the effect of chronic or low-level exposure to industrial materials, processes, and stresses on the potential for illness, disease, or loss of functional capacity in aging adults." *Chapter 5* of this report includes a tabular summary of these industrywide studies. In addition to special NIOSH reports, detailed descriptions of the industrywide studies will be published in the occupational safety and health literature.

PROGRAM COSTS

In fiscal year 1973, NIOSH was funded at a total of \$25,872,000 in its program operations. The NIOSH budget in fiscal year 1974 is expected

TABLE 1-1—*NIOSH Budget Authority*

[Dollars in thousands]

	Fiscal year		
	1973	1974	1975 (est.)
Surveillance.....	1, 297	1, 847	1, 600
Criteria documentation.....	1, 737	4, 422	4, 600
Industrywide studies.....	2, 761	2, 819	3, 400
Laboratory research and services.....	8, 400	10, 998	11, 499
Coal (Public Law 91-173)...	5, 317	¹ 9, 100	4, 900
Technical assistance.....	2, 701	3, 591	3, 400
Manpower development....	2, 468	1, 469	3, 200
Program direction.....	1, 191	1, 269	1, 400
Total.....	25, 872	^{1 2} 35, 515	33, 999

¹ Includes \$3,582,000 in special funding for coal mine clinics.

² Includes \$4,161,000 in FY 1973 carry over funds, released for spending in FY 1974.

to be \$35,515,000, of which approximately \$9,100,000 is attributed to operations under the Federal Coal Mine Health and Safety Act of 1969, Public Law 91-173. Of the total fiscal year 1974 budget, \$4,161,000 are fiscal year 1973 carry over

funds which have been released in FY 1974. The NIOSH budget in fiscal year 1975 is \$34,000,000. *Table 1-1* is a summation of the NIOSH budget changes from fiscal year 1973 to fiscal year 1975.

Chapter 2

SURVEILLANCE AND PRIORITIES DEVELOPMENT

Statistical information describing the magnitude and extent of occupational safety and health problems is developed and organized through NIOSH's surveillance program. One approach characterizes the work environment in terms of the actual physical and chemical agents to which workers are exposed. A parallel activity compiles indices of worker health by analyzing and comparing occupational morbidity and mortality rates. The results from these two activities are useful in developing priorities for applied research and criteria development.

HAZARD SURVEILLANCE

NIOSH is conducting two types of hazard surveillance programs to develop basic descriptive information on the working environment in all non-farm places of employment covered by the Occupational Safety and Health Act of 1970.

National Occupational Hazard Survey

In the National Occupational Hazard Survey (NOHS) an on-site visit is made to each of a sample of places of employment selected by the Bureau of Labor Statistics. During the visit, a management representative is interviewed, summaries of illness and injury (Occupational Safety and Health Administration Form 102) are recorded, and a walk-through survey is made to enumerate the types of existing and potential health hazards and the numbers and occupations of persons exposed. By June 1974, all data gathering activities in the Survey, which began in 1972, will be completed. Over 5,200 facilities of varying industrial category and employment size in 67 metropolitan areas throughout the nation will have been visited. Following this, NIOSH will begin to estimate na-

tional statistics using information collected during the facility visits.

Concurrent with the data gathering activities of NOHS, NIOSH has two projects to clarify received data. One project standardizes the occupations of reported work groups according to a coding system used by the Bureau of the Census. The other enumerates ingredients contained in trade name products found during the survey through clarification requests to manufacturers. The scheduling of the data analysis will depend on the completion of these tasks.

National Surveillance Network

The second data collection activity in hazard surveillance is the National Surveillance Network (NSN)—a joint program with State agencies responsible for occupational health. The States use the NSN forms to record basic data while conducting their own compliance, surveillance, or consultative services. NSN, like the National Occupational Hazard Survey, affords a detailed and standardized procedure for recording inplant environmental conditions. For NIOSH, this system produces information which augments the Survey, and for the states, NSN provides a field-tested recording and data processing system for large amounts of valuable information on potential occupational health problems.

ILLNESS AND INJURY SURVEILLANCE

NIOSH's illness and injury surveillance program gathers and compiles data describing the magnitude and extent of occupational injury and disease. Broad-based statistics detailing comparative mortality and morbidity by occupation are reviewed to identify occupational groups with

unusual patterns of disease. Through systematic analysis of these data sources, occupational groups that may be at special risk can be further evaluated by appropriate epidemiological methods.

In 1973, a project was initiated to incorporate existing data relating mortality and disability by cause to occupation in an automated information retrieval system, whereby occupational groups with an unusual disease or accident experience can be readily identified.

A pilot study to test field surveillance procedures for identifying cases of occupational disease in the workplace became fully operational. Approximately 70 plants in the States of Oregon and Washington were visited, and environmental surveys were carried out to document all potential health hazards. These visits included medical examinations (of production workers) aimed at determining the prevalence of health effects associated with occupational exposure to lead and chlorinated hydrocarbon solvents.

An evaluation of two occupational disease reporting systems neared completion during 1973. Cases of occupational disease recorded under the *California Physician's First Report of Work Injury System* were compared with cases recorded by employers under the OSHA recordkeeping system. In this way, the depth and scope of existing

occupational disease reporting schemes can be assessed.

PRIORITIES DEVELOPMENT

During 1973, NIOSH developed the current *Priority List for Criteria Development for Toxic Substances and Physical Agents* and had it informally reviewed by staff of the Department of Labor, by members of the National Advisory Committee on Occupational Safety and Health, and by State occupational health agencies. The list contains 471 items, organized into 17 groups, ranked according to a measure which takes into consideration the estimated number of persons occupationally exposed and the severity of the effects. The current list will not be revised to any great extent until the results of the National Occupational Hazard Survey are available to provide nationally derived exposure estimates.

To complement the health hazard priority list, NIOSH has undertaken development of a safety priority list. A representative sample of safety professionals are being asked for their judgments as to "areas" where safety problems continue to exist in industry. Following the determination of a reasonable list of safety topics, a consensus of experts will be used to rank these items so that a priority list can be created.

Chapter 3

DEVELOPMENT OF CRITERIA FOR RECOMMENDATION OF STANDARDS

TOXIC SUBSTANCES

The annual revision of a list of toxic substances was published in *Toxic Substances List—1973 Edition* as required by Section 20(a) (6) of the Act. The definition of a toxic substance was modified in 1973 as indicated by italics: A toxic substance is one that demonstrates the potential to induce cancer, tumors, or neoplastic effects in man or experimental animals; to induce a permanent transmissible change in the characteristics of an offspring from those of its human or experimental animal parents; to cause the production of physical defects in the developing human or experimental animal embryo; *to produce death in animals exposed via the respiratory tract, skin, eye, mouth, or other routes in quantities which are reasonable for experimental or domestic animals*; to produce irritation or sensitization of the skin, eyes or respiratory passages; to diminish mental alertness; reduce motivation or alter behavior of humans; *to adversely affect the health of a normal or disabled person of any age or of either sex by producing reversible or irreversible bodily injury or by endangering life or causing death from exposure via the respiratory tract, skin, eye, mouth or any other route in any quantity, concentration, or dose reported for any length of time*. In complying with the requirements of the Act, more than 25,000 entries were included in the 1973 list, of which more than 11,000 were different substances. For each of these different substances, one or more toxic doses or concentrations for different routes of exposure and for different species were listed. Additionally, synonyms, Chemical Abstract Service Registry Numbers, molecular formulas, molecular weights, computer descriptors (known as the *Wiswesser*

Line Notations which enable the search of the list by chemical structure), and qualifying toxic dose data (with reference sources) were associated for each entry. For practical purposes, the list was restricted to those substances which were either reported or assumed to be pure chemicals. Unpurified extracts of natural substances, proprietary mixtures, and radioactive chemicals were excluded.

The purpose of the list is to identify all chemical substances which may be potential hazards to man, to define these chemicals in as many ways as may be useful to workers and researchers in identifying the substances in the industrial setting, and to serve as a bibliographic source of references about these toxic hazards. There is no exclusion from the list based on the use to which the chemical may be put or on where it may be found in the workplace as an unwanted contaminant. Additions to the list are made as sources are found and as definitions describing noxious effects are developed. The list can also act as a tool for locating information sources that are not readily found or identified through ordinary literature search mechanisms. Simultaneously, missing information for various entries provides guidelines for additional research.

The toxic data presented are the lowest doses reported for the listed effect, and no editorial judgment is exercised on the quality of the source. Therefore, the numerical relationships between the dose and the hazard cannot be deduced with any assurance of correctness. In practice, the degree of hazard that may be experienced can be determined only by critical evaluation of all available data and the manner in which a substance is used. The toxic substances list serves as a focal point for identifying known potentially hazardous sub-

stances and for collecting data which can be used later for the preparation of criteria for standards.

RESEARCH ANALYSIS

Criteria documents are developed as support for NIOSH recommended standards for the control of occupational exposure to chemical substances and physical agents.

Until recently, the first step in the process of preparing a criteria document was to do a research analysis. This effort was an attempt to determine if enough information was available to prepare a criteria document. Through the experience of the last two years, it was determined that there is no reliable way in which to predict the availability or the adequacy of the information required to prepare the criteria document for a standard. Therefore, in October of 1973, the Institute adopted a policy by which the search for information and the evaluation of that information were combined into one process. This decision results in the preparation of a criteria document containing a recommended environmental limit where the information is available to support it and/or recommend work practice controls along with the identification of specific research gaps that were established in the document's preparation.

CRITERIA DOCUMENTATION

The criteria document developed in fulfillment of the requirement of Section 20(a) (3) of the Act includes a critical evaluation of all known publicly available research and knowledge on a particular substance or agent and a recommended standard.

In the criteria documentation, it is assumed the standard would apply to reasonably healthy U.S. adult workers between the ages of 18 and 65. It is also assumed the workers are exposed to the hazard for a 40-hour work week during their working lives. When a criteria document is prepared, NIOSH requires both a physician specializing in occupational medicine and a board certified industrial hygienist to be directly involved in its preparation. The draft is subsequently reviewed by NIOSH staff, by consultants expert in the particular hazard, by professional societies, by applicable governmental agencies, and finally by NIOSH senior staff.

During 1973, six criteria documents with their recommended standards for the control of occupational exposure were completed by NIOSH and

forwarded to the Secretary of Labor. These were for chromic acid, coke oven emissions, inorganic mercury, toluene, toluene diisocyanate, and trichloroethylene. A seventh criteria document, inorganic lead, was forwarded to the Secretary of Labor on January 5, 1973, but has been reported as an accomplishment in the 1972 Annual Report and, therefore, will not be discussed in this document.

In addition to recommended environmental limits, the criteria document contains recommendations for medical control and surveillance procedures, for sampling and analytical procedures, for recordkeeping, for engineering and housekeeping control procedures, for personal protective clothing and devices, for placarding and labeling occupationally hazardous work areas and procedures, and for educating the worker concerning recognition and avoidance of the hazards and in their control.

Chromic Acid

The recommended occupational environmental standard defines an "occupational exposure to chromic acid" as being one-half of the environmental concentration that is considered to be a safe exposure in the worker's environment. The recommended occupational environmental standard for chromic acid, expressed as chromium trioxide, provides that workers shall not be exposed to concentrations greater than a ceiling of 0.1 milligram per cubic meter of air as determined by a 15-minute sampling time, and 0.05 milligram per cubic meter of air determined as a time-weighted average for an 8-hour work day and a 40-hour work week. The existing Federal standard for chromic acid is a ceiling concentration of 0.1 milligram per cubic meter of air, based on the American National Standards Institute recommendation, Z37.8-1971.

The basis for the recommended occupational environmental standard is the prevention of acute irritation and ulceration of mucous membranes, which lead to perforation of the nasal septum in a relatively short time, by limiting the acceptable ceiling concentration.

NIOSH estimates that 15,000 workers are potentially exposed to chromic acid mist which is primarily used in metal treatment, such as, chrome plating, copper stripping, and aluminum anodizing. It is used for purposes as diverse as catalysis, organic synthesis, and photography.

Coke Oven Emissions

An occupational environmental standard for exposure to coke oven emissions was not recommended because data were not available with which to establish a safe exposure level nor to identify the components of the emission that were hazardous. The recommendations provided for the reduction of both coke oven emissions and worker exposure to the emissions through a combination of work practices, engineering control, and respiratory protection. The recommendations are not intended to supplant the existing Federal environmental standard for coal tar pitch volatiles, but rather to supplement that standard as it is applied to coke oven operations.

The basis for the recommendations is the increased incidence of cancers of the lung and kidney in American coke oven workers. Workers of other countries similarly exposed to the combustion products of bituminous coal were found to have an increased incidence of skin and bladder cancer. A dose-response relationship could not be established because of the mixtures of substances, including polycyclic hydrocarbons produced. However the existing information indicates that a relationship does exist. A reduction of exposures should result in a reduction of the diseases associated with the exposure. NIOSH estimates that 10,000 workers are potentially exposed to coke oven emissions which are generated during the production of metallurgical coke for use in steel making.

Inorganic Mercury

The recommended standard for an occupational exposure to inorganic mercury applies to metallic mercury, all inorganic and all organic mercury compounds other than ethyl and methyl mercury compounds. An occupational exposure to inorganic mercury is defined as exposure of workers to more than 40 percent of the recommended occupational environmental concentration. The recommended occupational environmental standard for inorganic mercury requires that workers shall not be exposed to concentrations of more than 0.05 milligram of mercury per cubic meter of air determined as a time-weighted average exposure for an 8-hour day and a 40-hour work week. The existing Federal standard for mercury is a ceiling concentration of 0.1 milligram per cubic meter of air, based on the American National Standards Institute's

recommendation, Z37.8-1943 (R-1971). The basis for the recommended occupational environmental standard is the prevention of toxic effects to the central nervous system manifested by tremors, behavioral and personality changes, and nervousness attributable to occupational exposure to inorganic mercury.

NIOSH estimates that a minimum of 150,000 workers are potentially exposed to inorganic mercury which is produced in the electrical preparation of chlorine and caustic soda and in the manufacture of electrical apparatus.

Toluene

The recommended occupational environmental standard defines an "occupational exposure to toluene" as being equal to or greater than one-half of the environmental concentration that is considered to be a safe concentration in the worker's environment. The recommended standard for toluene provides that workers shall not be exposed to concentrations greater than a ceiling of 200 parts per million parts of air and 100 parts per million parts of air determined as a time-weighted average for an 8-hour day, 40-hour work week. The existing Federal standard for toluene is a time-weighted average of 200 parts per million parts of air, a ceiling concentration of 300 parts per million parts of air and a maximum peak concentration of 500 parts per million parts of air for 10 minutes, based on the American National Standards Institute recommendation, Z37.12-1967.

The basis for the recommended occupational environmental standard is a narcotic effect produced in workers with symptoms and signs of muscular weakness, incoordination, and mental confusion which may pose a risk to both the worker and others.

NIOSH estimates that 100,000 workers are potentially exposed to toluene which is primarily used for the production of other chemicals such as benzene, toluene diisocyanate, phenol, benzyl and benzoyl derivatives, benzoic acid, toluene sulfonates, nitrotoluenes, vinyl toluene and saccharin. It is also used as a solvent for paints and coatings and as a component of aviation fuel.

Toluene Diisocyanate

The recommended occupational environmental standard defines an "occupational exposure to toluene diisocyanate" as including any work area

where toluene diisocyanate is stored, transported, or used.

The recommended occupational environmental standard for toluene diisocyanate provides that workers shall not be exposed to concentrations greater than a ceiling of 0.02 part per million parts of air as determined by a 20-minute sampling and 0.005 part per million parts of air determined as a time-weighted average for an 8-hour work day, 40-hour work week. While the recommended standard does not change the acceptable ceiling concentration of 0.02 part per million parts of air provided in the existing Federal standard, it does provide for a time-weighted average not previously prescribed. The current standard is based on the recommendations of the Threshold Limits Committee of the American Conference of Governmental Industrial Hygienists in 1968, as used in the Walsh-Healy Public Contracts Act.

The basis for the recommended occupational environmental standard is the evidence that toluene diisocyanate is a respiratory irritant and can sensitize exposed workers in the same manner as allergens. Sensitized workers may develop asthma on re-exposure to immeasurably low concentrations, so the recommended standard applies only to nonsensitized workers. The recommended standard is believed to be low enough to prevent sensitization.

NIOSH estimates that 40,000 workers are potentially exposed to toluene diisocyanate, which is primarily used for the production of polyurethanes, polyureas, polyamides, allophanates, biurets, and simple polymers of the isocyanates themselves. They are used to produce rigid or flexible foams, surface coatings, adhesives, rubbers, and fibers.

Trichloroethylene

The recommended occupational standard defines an "occupational exposure to trichloroethylene" as being equal to or greater than one-half of the environmental concentration that is considered to be a safe concentration in the worker's environment. The recommended occupational environmental standard for trichloroethylene provides that workers shall not be exposed to concentrations greater than a ceiling of 150 parts per million parts of air as determined by a maximum sampling time of 10 minutes and 100 parts per million parts of air determined as a time-weighted average for an 8-hour day, 40-hour work week. While the recommended standard does not change the concentration of 100 parts per million of air determined as a time-weighted average for an 8-hour work day provided in the existing Federal standard, it does provide for a reduction of the acceptable ceiling concentration of 200 parts per million parts of air and the elimination of the acceptable maximum peak above the acceptable ceiling concentration of 300 parts per million parts of air for 5 minutes during any 3-hour period of an 8-hour work shift. The current standard is based on the American National Standards Institute recommendation, Z37.19-1967. The basis for the recommended occupational environmental standard is the prevention of fatigue, drowsiness, eye irritation, and irritation of the upper respiratory tract.

NIOSH estimates that approximately 200,000 workers are exposed to trichloroethylene which is primarily used as a solvent for the degreasing of metal products and to a lesser extent, a dry cleaning solvent for fabrics, and as an extraction solvent for drugs and chemicals.

Chapter 4

APPLIED RESEARCH

The largest effort within NIOSH, both in terms of dollars expended and personnel, is directed at applied occupational safety and health research. Much of this research is directed in some way toward the development or modification of criteria used for recommending occupational health or safety standards. In 1973, the NIOSH research program continued within the areas of toxicology, physical and chemical analysis, physiology and ergonomics, engineering, behavioral and motivational factors, physical agents, and epidemiology (industrywide studies). This chapter will describe the significant 1973 activities within each of these NIOSH research programs with the exception of industrywide studies.

NIOSH conducts its applied research program through in-house projects, contracts, agreements with other Federal agencies, grants, and special foreign currency arrangements with foreign countries (Public Law 83-480).

TOXICOLOGY

The NIOSH toxicology research program has two main functions: to develop toxicologic criteria as needed for high priority chemical hazards and to meet requests for evaluation of toxic hazards arising from the NIOSH health hazard evaluation program.

In 1973, the toxic effects of typical industrial solvents were studied intensively as part of NIOSH's criteria development program. The biologic procedures used represent an improved method of monitoring the exposure of workers. They are based on the level of solvents found in the exhaled breath after exposure, as well as the relationships of exposure to urinary metabolites and to the half-life of the solvents in body tissues.

By the end of 1973, such toxicologic criteria had been developed for trichloroethylene, trichloroethane, methylene chloride, and tetrachloroethylene.

Biologic response studies in animals were extended to a rigid urethane foam plastic in order to confirm or refute a recent animal study which implicated the dust as a carcinogen. As part of the work of industrial standards development, the industrial air standard for cadmium oxide fume was reexamined in long-term, multiple species, animal inhalation exposure studies.

The present experimental procedure for investigating the health effects of environmental factors uses animal models to better define and accelerate the accumulation of health data. The animal model developed and tested during 1973 on cadmium oxide fume, polyurethane foam, acetone, methyl alcohol, and coal dust uses a unique and sophisticated instrument that measures cardiopulmonary function in both nonhuman primates and smaller experimental animals. The instrument also permits evaluation of the production and degree of small airway dysfunction and of altered ventilatory capacities resulting from industrial exposures.

To better define hazards from coke oven emissions, a comprehensive study of the health effects of tar and volatile tar products is being evaluated through a combination of in-house, interagency, and contract work. These studies, which included inhalation chamber, skin painting, and chemical fractionation projects using coal tar obtained from eight different coke-oven operations, produced skin tumors as a primary toxic response to the coal tar. The tumors were produced by air concentrations of the tar as low as 2.0 milligrams per cubic meter of air but are not produced by concentra-

tions of 0.2 milligrams per cubic meter of air. It has also been shown that there is a time-related dose-response in the production of this skin tumor in mice.

In 1973, NIOSH toxicologists began a long-term investigation of the 160 persons employed at a newly constructed isocyanate plant. This investigation utilizes various physiologic and immunologic tests previously developed by NIOSH for evaluating the clinical responses of individual workers to isocyanates.

NIOSH toxicologists used a biologic model to investigate the effects of halogenated hydrocarbons (found in aerosol sprays) on the heart. It was established that (1) the completely fluorinated compounds produce the fewest cardiac effects and are chemically the most stable; (2) among the polyhalogenated compounds, the single carbon, trifluoro-compounds have mild cardiac effects; and (3) the 2-carbon polyhalogenated compounds have serious cardiac effects when their concentration in the inspired air exceeds 5 to 7 percent.

NIOSH pathologists investigating the interactions among mixtures of various toxic elements made two highly significant observations during 1973. (1) The combination of arsenic and tellurium given in drinking water to rats, that have been administered beryllium, potentiates the pulmonary carcinogenic effect of the beryllium in the rat. This observation is significant, because both arsenic and tellurium are commonly found in sulfide ores and may be contributing to the high incidence of lung cancers observed in smelter workers where sulfide ores are handled. (2) In contrast, it was observed that copper, a natural, body trace element, prevented the cell-stimulating activity of the carcinogens, benzpyrene and asbestos, and that manganese partially inhibits the highly malignant cancer induced by nickel sulfide in rats. These findings provide substantial evidence that chemical carcinogenesis can result from the interaction of multiple factors in the environment. It also demonstrates that carcinogens can be inhibited by modifying the metabolic balance of biologically active trace elements to which the responding animal is exposed. The mechanism of the toxic action of beryllium on liver cells was shown to be associated with the combination of beryllium with the microsomes of liver cells and their subsequent destruction by lysis. Furthermore, it was shown that steroids, therapeutically administered, pre-

vented beryllium toxicity by mobilizing beryllium out of the liver and lung into the bone where its toxicity is not manifested.

Other toxic mechanism studies resulted in a previously unobserved finding that nickel salts prevent the release of insulin from the pancreas, thus, producing a diabetic-like response in rats. The mechanism of this appears to be mediation by the pituitary gland.

The diagnosis of industrial disease was rendered more precise by the acquisition of a newly developed instrument, the scanning electron microprobe to be used in combination with the electron microscope. Using the extraordinary analytic capabilities of these instruments on human lung biopsy samples, it has been possible to positively identify the causative agent(s) in dust lesions found in either experimental animal tissue cells or in human necropsy tissue sent for diagnosis. Efforts are being made to encourage industrial physicians to contribute bio-assay or autopsy specimens to this service for diagnostic consultation on occupational diseases.

The extreme resolving power of the microprobe procedure is also used to define the mechanism of action of toxic industrial elements. As an example, the microprobe technique has shown that mercury and selenium concentrate and combine to form a physiologically inactive compound in the reticulo-endothelial cells. As the amounts of intracellular mercury and selenium exceed their lethal doses by more than 5-fold, the mechanism of cellular detoxication is apparently the chemical combination of selenium with mercury to form insoluble and, hence, inactive mercury selenide. This is probably why mercury poisoning does not occur in areas where the ground water contains significant amounts of selenium.

In order to increase analytic capabilities for determining compliance with industrial air standards, NIOSH chemists are identifying biologic indicators of exposure and developing automated procedures for their use in the field. During the year, blood and urine specimens of exposed workers have been examined quantitatively for indicators of exposure to carbon disulfide, carbon monoxide, toluene, xylene, trichloroethylene, tetrachloroethylene, and lead fumes. The results of these studies have provided evidence of industrial hazards and have assisted in the evaluation and improvement of industrial work environments.

PHYSICAL AND CHEMICAL ANALYSIS

During 1973, the NIOSH physical and chemical analysis research program continued to develop, improve and evaluate analytical methods for measuring toxic materials in the workplace. The program provides analytical methods for use in criteria documents and for use by other NIOSH laboratories and the Department of Labor. The aim is to provide analytical methods which have been thoroughly evaluated, collaboratively tested by several laboratories, and proved reliable for industrial hygiene use. The analytical methods developed are each classified according to the following scale of reliability:

Class A (Recommended)—A method which has been fully evaluated and successfully tested by a selected group of laboratories.

Class B (Accepted)—A method which has been subjected to a thorough evaluation procedure in the NIOSH laboratory and found to be acceptable.

Class C (Tentative)—A method which is in wide use and which has been adopted as a standard method or recommended by another Government agency or by one of several professional societies such as the American Conference of Governmental Industrial Hygienists, the American Organization of Analytical Chemists, the American Industrial Hygiene Association, the American Society for Testing and Materials, or the Intersociety Committee on Air Sampling and Analysis.

Class D (Operation)—A method in general use or approved by most professional industrial hygiene analysts but has not been thoroughly evaluated by NIOSH or any professional societies.

Class E (Proposed)—A new, unproved or suggested method not previously used by industrial hygiene analysts but which gives promise of being suitable for the determination of a given substance.

The OSHA *Industrial Hygiene Operations Manual* lists about 400 compounds taken from the Federal Occupational Safety and Health Standards List. NIOSH must develop methods for use by the Department of Labor to measure these chemicals in the workplace air. In order to meet the need for analytical methods, a loose-leaf manual of analytical methods has been prepared.

To expedite production, a contract was let to editorially review the 130 method descriptions and prepare a first draft copy of the manual. NIOSH has also entered into a contract for an in-depth technical and editorial review of the various methods which have been generated by NIOSH and to obtain some 23 other methods for publication in a hard-cover book.

Some of the work currently being done in inorganic methods development includes a comparison of the optical counting technique for asbestos fibers with a quantitative X-ray diffraction technique. This information will aid in the upgrading of the method used by the Department of Labor. The determination of free silica by X-ray diffraction, infrared spectrophotometry, and colorimetry also is under comparative evaluation.

A two section sampling tube containing special solid adsorbents for sampling both organic and elemental mercury in the workplace environment has been developed and evaluated. With this single tube, both types of mercury may be tested in the air for determining occupational exposure. Work on methods for analysis of organic contaminants in air was highlighted by the continuing critical examination of activated charcoal as a medium for sampling, concentrating, and storing organic vapors found in workplace air. Significant work was done on carbon disulfide, benzene, toluene, styrene, dichloromethane, and cyclohexanone in 1973. The collaborative test of this technique and the accompanying analytical methods for six organic vapors was successful and the method is now a Class A (Recommended) procedure for six chemicals. About 60 chemicals may be analyzed in this way.

A sampling and analytical technique for aniline and substituted anilines was developed through a continuing interagency agreement with the Atomic Energy Commission. Air samples are collected on silica gel in tubes clipped onto the worker's lapel.

An improved analytical method was developed by a NIOSH contractor for benzo(a)pyrene, a carcinogenic hydrocarbon, which may be an index of exposure to coal tar pitch volatiles. Also, the ultraviolet absorption and fluorescent emission spectra of 404 samples of coal tar pitch volatiles were evaluated to determine the feasibility of a spectral index relating absorbance or fluorescent intensity to exposure.

A photodynamic bio-assay for carcinogenic polynuclear aromatic hydrocarbons was developed. In-

cluded in this work was research on the application of time-resolved phosphorimetry to the quantitative determination of these hydrocarbons.

PHYSIOLOGY AND ERGONOMICS

Excessive physiological strain may develop in a worker if the task to be performed in a job and the physical environment are not adapted to human anatomical, physiological, and psychological capacities. The consequences of excessive strain are evident not only in the occurrence of undue fatigue, loss of fitness, and performance capacity, but also in diseases, such as low-back pain, tenosynovitis, heat exhaustion, or heat stroke. It also may increase susceptibility to toxic substances, may aggravate existing bodily malfunctions, and may act as a causative factor in accidents. In order to prevent accumulation of excessive physiological strain, human tolerance limits to environmental stresses, as well as limits of human performance capacities in different tasks have to be determined. Only if this information is available can standards be recommended which will ensure that the job demands and the exposure to the physical agents of the work environment are kept within the limits of human tolerance.

Ergonomics is the scientific discipline which deals with establishing the anatomical, physiological, and psychological capacities of man. NIOSH ergonomics researchers are working to develop objective measures of the strain accumulating in the worker's body while exposed to stressful conditions. A battery of 45 tests has been developed, including physiological, biochemical, biomechanical, and psychological methods. This test battery is applied to experimental subjects before and after a standard stress exposure in the laboratory. In order to determine the amount of strain accumulated during the work day, a small group of tests will be selected for application to industrial workers before and after their work shift.

Biomechanical research during 1973 was directed toward developing criteria for standards for materials handling, particularly if it involved lifting of objects. Materials handling is a task which is associated with low-back pain syndrome, a condition which is responsible for the largest number of lost work days in industry.

Studies were conducted (1) to develop methods for screening employees prior to placement on materials handling jobs, (2) to assess strain on the spinal column and other body parts as a result of

holding loads of different weights and bulks, and (3) to develop methods for calculating limits for postural stability while lifting and holding loads of different weights and bulks.

In jobs where objects must be lifted, held, or carried, the muscles of the body are often used in static (isometric) contraction. The results of research to establish human tolerance to work involving different amounts of static components were evaluated in 1973. These results suggest that static contractions lead to accelerated manifestations of fatigue and are stressful, particularly to the cardiovascular system, by increasing blood pressure. However, it was determined that recovery from fatigue can be significantly promoted by interposing short bouts of dynamic (isotonic) work. This finding has great significance with respect to establishing an optimal work-rest routine for different industrial jobs in order to prevent accumulation of excessive physiological strain.

During 1973, research continued to obtain more information on human tolerance to heat exposure with special emphasis on determining whether significant differences exist among worker populations living in different climatic regions or working in different industries. Studies were performed in the subtropical region in steel, aluminum, cement, and meat cutting plants. The differences in the abilities of men and women to tolerate work in hot environments were also investigated. NIOSH is working to simplify the methods used to monitor climatic conditions and work intensity in hot jobs.

A long-range study of the combined effect of heat and noise was started in 1972. In 1973, a follow-up study of the medical records of workers exposed to heat and noise in the steel industry was initiated and will continue for 4 years. Furthermore, an animal study was performed to determine whether exposure to heat would change the organism's sensitivity to nitrogen dioxide.

Field studies were also performed to assess the validity and applicability of the provisions of NIOSH's recommended standard for occupational exposure to hot environments. The data obtained will be used in assessing the recommendations. Results of the NIOSH field studies were made available to the Occupational Safety and Health Administration's Standards Advisory Committee on Hot Environments to assist it in evaluating the NIOSH recommendations and in developing its own draft standard.

Another environmental stress to which many workers are exposed on the job is vibration. In order to establish what health damage may result from vibration exposure, studies are underway to determine the physiological function changes in primates due to chronic vibration exposure and to develop vibration monitoring and data reduction techniques suitable for use in the industrial workplace.

In order to correlate medical findings with actual worker exposure to vibration, NIOSH has three medical record studies in progress: one seeks to correlate health and injury data of heavy equipment operators with vibration exposure time; a second seeks to correlate medical records of bus drivers with vibration exposure time; and the third is a preliminary study seeking out the sources, quality, and availability of the records of workers exposed to hand tool vibration. Field studies in the heavy equipment industry were directed to ascertaining the type and amount of vibration affecting the worker as he performed his duties. NIOSH has established a vibration exposure laboratory where the responses of human subjects to wholebody vibration are studied. The type of vibration used in these laboratory experiments will simulate exposures recorded in field studies by playing back recordings on the laboratory shaker.

ENGINEERING

The NIOSH engineering research program develops and evaluates instrumentation, techniques, and criteria for measuring and controlling airborne toxic substances, physical agents, and injury hazards in the workplace. During 1973, engineering research focused on research and development in the areas of particulate air sampling, gas and vapor sampling, ventilation controls, heat stress measurements, respirator evaluation, and safety criteria development.

Particulate air sampling activities were directed toward the development of personal and environmental air measurement instruments and methods. A vertical elutriator cotton dust sampler was calibrated with monodispersed aerosols. A smaller and more portable version of this cotton dust sampler was designed, constructed, and calibrated.

Projects related to the sampling and analysis of airborne asbestos fibers included development of a method for preparing filters containing standard amounts of asbestos fibers. This method is cur-

rently used by NIOSH's proficiency analytical testing program. A method for permanently mounting these filters on glass slides was also developed. These permanent mounts can be shipped to a group of industrial hygiene laboratories so that each laboratory can count the same filter for standardization purposes.

Two new asbestos fiber counting techniques were investigated. An automatic image processing system for automated counting of particulates was under development during 1973. Using this system, it may be possible to count asbestos or other particulates by attaching a camera directly to the microscope. The other method for assaying asbestos fibers should allow the determination of fiber volume and length. Results of these investigations should be available in 1975.

The feasibility of using the personal respirable dust sampler to measure the concentration of airborne fibrous glass was investigated. The sampler has been tested with laboratory generated fibrous glass aerosols, and the findings are reproducible over a variety of size distributions. The method will be field tested in 1974.

Two areas investigated, which may affect currently used industrial hygiene measurement equipment, were weight variations in filters and manufacturing problems with the 1/2-inch steel cyclone (an air sampling instrument). Significant weight changes in the filters of air sampling devices, due to the collection of material from the filter holder on the filter (cassette plasticizer outgassing), have been demonstrated and are being documented. Four different 1/2-inch steel cyclones from four production runs of the same model have been acquired, and the manufacturer's quality control is being evaluated as the first step toward documenting the problems associated with large steel cyclones.

Sampling data sheets were prepared for several new compounds bringing the total to 29. Interim sampling data sheets were also prepared for seven of the 14 carcinogenic compounds that have been the subject of OSHA standards development.

Evaluation programs for portable direct-reading air sampling instruments have been completed as part of the effort to develop performance and testing specifications for these instruments. The performance and testing specifications obtained in these tests will form the basis for future portable instrument certification regulations.

Other contract work performed included the development of solid sorbent sampling devices for inorganic toxic vapors, the development of an integrated whole air sampler to be used for long-term sampling, and the finalization of an optical instrument for reading gas detector tubes.

Industrial ventilation design criteria for cotton processing machinery, open surface tanks, welding, abrasive blasting, and grinding, buffing, and polishing operations were investigated in 1973. In these studies the overall ventilation problem will be assessed, the adequacy of current standards or design practices will be evaluated, and recommendations for ventilation design criteria will be developed.

A prototype air purification unit for supplying air to traffic control cubicles in vehicular tunnels, previously developed by NIOSH, was evaluated in a coke plant. This unit proved feasible for providing clean air to coke oven cabs and standby rooms.

As recommended in the NIOSH criteria document on hot environments, projects are underway to develop and evaluate instrumentation for assessing the thermal environment. A field survey is underway to investigate the effectiveness of evaporative cooling systems as an engineering control method in hot working environments.

Research programs are underway to develop improved criteria for respiratory protective devices. Field studies to evaluate the performance of respirators and the effectiveness of respirator protection programs for paint spraying, coal mining, abrasive blasting, and firefighting operations were completed in 1973. These studies included on-site tests of respirator effectiveness. A project to develop a prototype supplied-air respirator system for use by the operators of underground coal mining equipment was also completed in 1973. This respirator system was developed in order to evolve design criteria which overcome coal miners' objections to using respirators. NIOSH continued to develop more valid methods and improved equipment for approval and quality control testing of respirators. The respirator program has also initiated development of a respirator program guide for industry including recommendations for establishing an acceptable program. Another design guide is being developed for use by respirator manufacturers; this guide will provide anthropometric data on the range of variability in facial measurements that is inherent in the working

population and which must be accommodated in the sizing and design of respirator face pieces.

Activities in NIOSH safety engineering research are gaining momentum, and initial steps were taken to establish a NIOSH occupational safety research laboratory. Research on industrial helmets was completed in 1973, and the findings are being evaluated for possible revisions to the existing American National Standard Institute standard adopted by the Occupational Safety and Health Administration as the standard for head protection devices.

Study programs are underway on the need for industrial protective clothing and machine guarding. When completed, these studies will serve as the basis for subsequent development of criteria for standards in those areas showing the highest rates and severity of disabling injuries. Another area of research is the development of specifications for eye and face protective devices. Studies conducted during 1973 showed that the existing standards are often vague and incomplete and that the test methods need to be more completely defined in an attempt to afford better protection to the worker. Other work on fire research and personal protective equipment is specifically aimed at improving protection for firefighters.

BEHAVIORAL AND MOTIVATIONAL FACTORS

Studies of the human elements involved in worker accidents and accident prevention involve efforts to learn about different worker factors which may influence accident risk. Then, behavioral science principles may be applied to these findings to develop recommended work practices for industrial accident control. During 1973, work continued in a study contrasting the behavioral performance capacities, personality characteristics, job attitudes, and work habits of workers having few accidents with those having many accidents in roofing, a segment of the construction industry which the Occupational Safety and Health Administration has targeted for accident reduction. Preliminary results, based on half of the test population, suggest no significant differences between the performance capacities of workers with high and low accident histories. However, those with repeated accidents did show higher impulsiveness in their personality measures.

Regardless of their accident histories, the roofers tested so far were nearly unanimous in the views that (1) excessive work pace is an important cause of roofing accidents, (2) the foreman's attitude toward safety is a key factor in the safety level of the work crews, (3) available apprenticeship training is not effective in instilling safe work practices, (4) much roofing equipment and many tools could be better designed and maintained, and (5) available protective clothing is ineffective.

Another project is attempting to demonstrate the utility of behavioral science principles in reducing worker accidents. An index was prepared of over 100 behavioral safety guidelines translated from the psychological literature. Each guideline is expressed as an action statement which offers a specific idea for improving worker safety. The next step in this project is the development of a diagnostic safety form, enabling safety personnel in a company to choose the appropriate safety guideline(s) after analyzing aspects of the work situation in which there are frequent accidents or "near misses."

A critical review of the literature acknowledging key psychological and physiological factors related to worker safety and health problems is almost complete. The review includes digests of research data dealing with age, sex, physical work capacity, life stress, and personality variables, and contains abstracts of several hundred articles similarly classified. The review highlights gaps in knowledge and needed research.

During 1973, research was continued to define behavioral capacities and underlying nervous system functions which may be degraded by neurotoxic chemicals and physical stresses found at the workplace. This work has a two-fold aim: to establish whether behavioral/neurological changes may serve as early warning indicators of potential illness from exposures to such agents, and to assess the actual nature of the apparent behavioral loss in terms of increased accident risk. Individual projects in this program consist of evaluating behavioral task performance and certain nervous system responses which are observed in workers or other test groups with exposure doses at or below the recommended safe limits for various substances.

Field studies were conducted on workers having airborne lead and carbon monoxide (CO) exposures at their job sites. In the lead study, over 300 workers exposed to lead fumes in the

manufacture of storage batteries, with employment periods of a few months to several years, were given a set of performance tests measuring tremor and different mental and perceptual abilities. Preliminary analyses indicate that higher body burdens of lead in the urine and blood of the exposed workers tended to correlate with decreased muscle strength, erratic eye-hand performance, increased arm tremor and some loss in hearing sensitivity for high frequency sounds. Analyses are underway to determine if these losses occur for exposure doses at or below recommended values as compared with the control group performance.

The behavioral effects of CO exposures from vehicle exhaust on nonsmoking highway toll-booth operators were studied. Each operator was given assorted performance tasks before and after each work shift. CO exposure levels were monitored via breath and blood samples as well as by environmental determinations made in the toll booths. Carboxyhemoglobin measurements were found in the test subjects to exceed 5 percent on days when traffic volume was high, though on most days it tended to be lower. Analysis of the behavioral performance data showed slowed reaction time and impairment in performing simultaneous tasks when the CO exposure levels were high. Follow-up studies of CO effects on performance are underway at border-crossing stations in an attempt to isolate the effects of fatigue on performance from those due to CO inhalation alone.

Several laboratory studies of performance changes resulting from exposures to chemical and physical agents were also conducted during 1973. One study investigated the effect of exposure to trichloroethylene, an industrial solvent, at the recommended threshold limit of 100 parts per million parts of air on short-term memory, visual perception, and complex reaction time. The study did not find effects at the specified exposure level.

Another investigation evaluated the effects on performance of the trace levels of anesthetic gases that can escape into operating rooms from anesthesia dispensing equipment. Performance tasks included the detection of infrequent changes in an audio-visual display, in short-term memory, and in complex reaction time. Initial results indicated some loss in these performance capabilities on exposures to 15 parts of halothane per million parts of air and 500 parts nitrous oxide per million parts of air, which is not uncommon in operating room

atmospheres. This study is part of a much larger project investigating the ventilation requirements in operating rooms.

Other experimental studies are investigating whether recommended noise standards may still permit sufficient noise-induced changes in non-auditory sensory functions to pose added danger at the workplace. Tests completed in 1973 indicate that steady-state and impact noise levels at hearing conservation limits for daily exposures have no significant effect on thermal sensation thresholds or on measures of equilibrium.

NIOSH's investigation of psychological job stress and worker health and safety is initially attempting to evaluate job demands or other aspects of the workers situation apart from physical and chemical hazards, which can be stressful enough to cause physical and mental health problems or lead to accidents. In this regard, information overload, decisionmaking affecting the safety or well-being of others, conflicting or ambiguous job requirements, monotonous work routines, and poor worker-supervisor relationships are considered potent stress elements.

During 1973, progress continued in a project designed to relate the amount of stress actually perceived by job holders and evidence of health problems, either physical or mental, among these workers. The data collection phase has just ended for 2,000 workers drawn from a variety of white and blue collar jobs and having different levels and kinds of responsibility. Data reflecting apparent strain and morbidity resulting from job stress problems have been collected via psychological interviews, attitude-adjustment inventories, and medical histories which were administered to all subjects. Cardiovascular measures and biochemical reflectors of stress in blood and urine samples, were examined for a portion of the workers studied. By years end, correlational analyses were being performed to demonstrate the degree of relationship between perceptions of job stress and measured health for the different job types.

A project is also underway to assess the stressful attributes of police work. An exploratory study using in-depth interviews with 130 policemen and police administrators found factors of variable shift work routines, isolation, physical confrontations, interpersonal difficulties, and conflicts with the community and the courts to be perceived as significant psychological stress factors. These problems were reported in a symposium on job

stress in police work, organized by NIOSH, and held in connection with a national psychology conference. This meeting has resulted in increased interest on the part of police departments in participating in an expanded study of job stress among police personnel and its health consequences.

Also in connection with job stress problems, NIOSH, through an interagency agreement, introduced questions in the Department of Labor Employment Standards Administration's Triennial Interview Survey of a national probability sample of 1,500 U.S. workers. The added questions probed sources of psychological stress at work, aspects of physical and mental health status, and accident data among those interviewed. Preliminary results of these interviews show that higher levels of perceived job stress are associated with poorer physical health, lowered motivation at work, escapist drinking, increased labor turnover, and absenteeism. The level of job stress also was found to be positively related to accident rates both on and off the job.

PHYSICAL AGENTS

Noise

In 1973, NIOSH's physical agents research program worked to fill research and criteria gaps revealed during preparation of the 1972 NIOSH criteria document on occupational exposure to noise, particularly with respect to fluctuating, interrupted, or widely varying noise levels. The nature of the relationship between the level and duration of a noise exposure must be defined, and impulse noise, ultrasonic noise, infrasonic noise, and seasonal or prolonged-workday exposures need extensive investigation. Therefore, emphasis was placed on initiating a series of research projects in this area.

NIOSH recommended an 85 decibel (dbA) daily (8-hour) noise exposure limit. Subsequently, in the standard setting process it was modified by discussion about the technological feasibility of compliance, the adequacy of existing data relating noise exposure to hearing loss, and the appropriateness of various alternative formulas for assessing the impact of hearing loss on the health and welfare of affected workers. Alternative recommendations for both higher and lower limits have come from the scientific, governmental, industrial,

labor, and public sectors. In view of the Department of Labor's Noise Standards Advisory Committee's recommendation that the Federal noise standard be given a mandatory review after 5 years, NIOSH initiated efforts to clarify that standard. A report presenting the results of a series of NIOSH field studies of occupational noise and hearing was published in 1973.

The first phase of a study of the occupational hazards involved with ultrasonic and high frequency noise was completed. This work included a review and evaluation of existing scientific literature, analysis of worker medical records, development of measurement techniques, and identification of principal sources of industrial high frequency noise. The following are tentative conclusions resulting from this study: (1) the control of ultrasonic noise from most industrial sources is relatively easy, (2) few insidious health effects have been found, and (3) it may be possible to establish safe limits for the near-audible or marginally-audible range of ultrasonic noise merely by extending or extrapolating criteria already established for audible noise.

Radiation

NIOSH's physical agents research program placed emphasis on initiating research activities to fill the gaps in knowledge identified in *Criteria for a Recommended Standard—Occupational Exposure to Ultraviolet Radiation*. This included development and testing of a portable ultraviolet radiation hazard monitor, evaluation of the ultraviolet exposure levels from black light bulbs and welding arcs, and initiation of research to determine the ocular effects of ultraviolet radiation between 300 and 400 nanometers.

Current occupational safety and health standards include regulations limiting occupational exposures to radiofrequency and microwave radiation between the frequencies of 10 megahertz (MHz) and 100 gigahertz (GHz). In order to assure compliance with this standard, the NIOSH physical agents research program is working to develop monitoring instruments for frequencies between 10 to 100 MHz.

In other research, microwave radiation levels have been measured at airport and radar guidance facilities to determine the potential for hazardous occupational exposures. Industrial equipment has been evaluated for potential hazards from X-rays,

microwaves, radiowaves, and infrared radiation. Future plans are to continue research and field studies to evaluate present and proposed standards and investigate the biological significance of radiation exposures.

GRANTS

The research capabilities of universities, State and local agencies, and other public and private non-profit institutions are directed toward research and demonstrations relating to the causes, definitions, elucidation, and control of occupational disease and injury through the NIOSH research grant program. This program is closely coordinated with NIOSH's intramural and contract research programs, and primary emphasis is placed on obtaining information on emerging or potential occupational safety and health problems. These data provide guidance in the development of priorities for technical assistance, hazard control, and standards development activities. The program also contributes to the development of work practice recommendations and procedures for occupational injury and disease prevention and control.

During 1973, grant supported research was conducted in the following areas: instrumentation and analytical methodology for improved measurement of exposures to dusts, fumes, and other chemicals; the epidemiology of occupational health and safety problems in defined work populations; behavioral and motivational factors; ergonomics; bioengineering and physiology; physical agents (noise, heat, and vibration); occupational respiratory disease; toxicology and pathology; and occupational health program management.

Publications and reports derived from research grants were made available to the Occupational Safety and Health Administration and widely distributed, and two symposia were held in 1973 with grant support. A conference-workshop on occupational exposures to heat stress was attended by industry officials, university scientists, labor union officials, representatives of OSHA and NIOSH, and representatives of State health departments as well as members of the OSHA review committee for a heat stress standard.

The other symposium provided a comprehensive evaluation of the status of human behavioral and neurophysiological testing procedures for occupa-

tional safety and health. Behavioral and neurophysiological criteria are increasingly recognized as sensitive and valuable means for early detection of toxicity. Acceptable guidelines for methodology and interpretation were defined, and directions for subsequent psychotoxicity research were suggested. The proceedings of this meeting are being published and should serve to highlight the need for behavioral methodology in evaluating and protecting worker safety and health.

In 1973, a total of 69 grant funded projects were active; of these, 35 continuing projects and 5 new projects were awarded funds totaling \$1,671,115. The fiscal year 1974 research grant budget of \$1,652,000 provided support for a similar number of projects.

SPECIAL FOREIGN CURRENCY PROGRAM

The NIOSH special foreign currency program (SFCP) supplements the domestic program in research directed at establishing objective criteria for occupational health standards. The program is supported by U.S.-owned foreign currencies which have been determined by the Department of the Treasury to be in excess of normal U.S. needs in

certain designated countries. The NIOSH program includes eight projects in Yugoslavia, three in Poland, three in Egypt, one in India and two in Israel.

The special foreign currency program activities emphasize research into the recognized occupational health problems: chest diseases (asbestosis, coal workers' pneumoconiosis, byssinosis, chronic bronchitis, cement pneumoconiosis); toxic industrial chemicals (lead, mercury, carbon disulfide, cadmium); and physical hazards (noise, vibration, heat, cold). Combinations of hazards (noise and vibration, heat and noise, heat and drugs), behavioral and motivational problems in safety, daily variability in tolerance to occupational stresses, and tests for early detection of potential health effects of toxic agents are also being investigated in projects funded through this program.

A study, underway in India, has produced evidence that the combination of a facultative pathogen normally found in the throats of miners and amosite asbestos dust produces extensive collagenous fibrosis in the lungs of monkeys; this finding supports the concept that fibrotic asbestosis may involve an infective process as well as the presence of asbestos fibers.

Chapter 5

INDUSTRYWIDE STUDIES

Occupational exposures to toxic materials or harmful physical agents can result in illnesses which manifest themselves relatively rapidly and whose causes can be readily identified or those which result in delayed effects. The effects of long-term exposures to low levels of such agents, or the latent effects of acute exposures are much more insidious and require a variety of detailed studies, both to ascertain that occupationally related health effects exist and to identify the determinants of these effects. The concern of the Congress with this area was expressed in Section 20(a) (7) of the Act.

In accordance with the directive of this section, NIOSH has implemented a program of industry-wide studies. The objectives of these studies are:

1. To determine the health experience of current or former workers;
2. To evaluate the industrial environment in terms of stressful agents present, degree of exposure, sources of contaminants, and controls presently employed;
3. To develop to the extent possible, an exposure-response relation between each agent or combination of agents and incidence of specific diseases;
4. To devise medical examination procedures which will detect in employees the effects of exposures (either acute or chronic) to harmful agents. The emphasis is on detection of early, preclinical changes, or on methods to identify susceptible individuals; and
5. To formulate sampling methods and environmental survey strategies which will characterize the environment as it relates to the health of individuals.

Such information is essential for the development of sound criteria for control of industrial

exposures to noxious agents which encompass a recommended exposure standard, procedures for environmental evaluation, methods of medical surveillance, and engineering control measures.

PROGRAM APPROACHES

The choice of industrial populations selected for study and the degree to which health effects are measured is governed within the limits of available personnel and funds, by (a) the level of suspicion concerning possible adverse health effects resulting from occupational exposures, (b) the feasibility of recovering information of the required validity on occupational exposures and health effects either by study of existing records or by detailed environmental, medical, and biostatistical studies, and (c) the size of the population which is potentially affected.

Where there is a low level of suspicion concerning adverse health effects or where there is concern with an overall assessment of the distribution of occupational disease in a variety of industrial environments, investigations are limited to gross analyses of health effects such as reviews of mortality patterns. In such studies, the industrial populations selected are those for which existing data resources can be utilized. Such data consists of records of occupational exposures or health status which have been maintained by the employer, the union, or Government agencies.

Where a review of the available information suggests that serious health hazards exist and the existing data resources are inadequate for quantitating the relationship between the specific biological response and type and degree of exposure, more in-depth studies are initiated. In some cases, many of the employees in a plant may have a common but different degree of exposure to a toxic agent.

Sufficient information may be obtained from men working in one facility, if the industrial group is large enough, while in other instances, the population and environments of several plants in a particular industry or of workmen in different industries with similar exposure may have to be pooled to obtain definitive data.

Studies can be initiated at several levels and expanded as required, or be terminated at any stage as dictated by the findings. If the review and analysis of mortality records for a particular industry does not disclose any unusual findings, an assumption might be made that further investigations would be unproductive. If clinical observation of employees or a laboratory observation from screening programs for suspect toxic agents reveal adverse findings, it might be necessary to conduct a cross sectional medical survey or retrospective cohort study of mortality patterns to assess the real extent of the hazards.

Separation of the effects of multiple causes of similar diseases may require innovative and sophisticated techniques as the adverse health effects of urban air pollution, cigarette smoking, and other environmental contaminants may complicate identification of disease attributable to industrial exposures. Thus, the circumstances of each situation will determine the course of the study.

Environmental Investigations

Environmental investigations are primarily designed to ascertain the types and levels of atmospheric contaminants to which employees are currently exposed and to the extent possible develop estimates of prior exposures. Additionally, environmental surveys are designed to evaluate the types and effectiveness of engineering control procedures and work practices, thus addressing the issue of technical feasibility of industry to achieve atmospheric concentration at or below levels recommended in criteria documents and those adopted as standards by OSHA.

Environmental investigations begin with a preliminary study of the potentially toxic raw materials used in the processes, the operations involved, determination of what toxic substances may be produced as byproducts during the manufacturing process (for example, production of arsine during the electrolytic refining of copper) and the control procedures and work practices used. Information is also obtained concerning changes in proc-

esses and materials and changes in control methods and work practices which may have altered concentrations of toxic substances. After evaluation of this information, detailed survey procedures are designed incorporating selection of appropriate sampling and analytic methods, development of new procedures where needed, and development of sampling strategies.

Field surveys are subsequently undertaken to evaluate current atmospheric concentrations of all potentially hazardous substances and to identify sources of these contaminants. The control measures, operating procedures, and work practices in use are also observed and evaluated, and recommendations for further engineering and work practice procedures are made if warranted.

Results of individual surveys and industrial hygiene recommendations are forwarded through NIOSH Regional Consultants to appropriate health and labor agencies for their information and subsequent utilization.

Medical Investigations

Medical investigations develop and implement medical surveys of working populations to characterize the nature and extent of biological responses. The primary objectives are:

- To determine the prevalence and incidence of occupational and nonoccupational diseases;
- To determine and interpret pertinent occupational, medical and social variables;
- To investigate and determine the chronic effects of low level occupational exposures on various organ systems;
- To determine the sensitivity and specificity of various early diagnostic techniques;
- To delineate disease processes of occupational origin under continued and terminated exposure conditions; and
- To disseminate public health education concerning disease causation and prevention.

Research has primarily been in the areas of occupational lung disease, teratogenesis and mutagenesis, nerve disorders, heart disease, and occupational cancer. Medical findings, both normal and abnormal, along with pertinent occupational histories are reported to physicians who have been authorized by the examinee to receive this information. Information about the etiology and clinical features of occupational disease is distributed to the general medical community.

Biostatistical Investigations

Biostatistical investigations involve the application of appropriate statistical techniques to a wide variety of data collected from the field in order to define relationships between occupational exposures to particular agents and subsequent disease response. A significant part of this program is concerned with analyses of employment and mortality/morbidity data for individuals who have worked in specific occupations and industries.

This investigative approach begins with the development of collection mechanisms such as coding forms on which work history data including dates, departments, job titles, and environmental exposures are recorded and the implementation of efficient procedures for recovering large numbers of death certificates. Maximum utilization of the medical information entered on these certificates is made possible through the services of an experienced classifier of disease (nosologist). Underlying causes of death are classified according to the appropriate revision of the International Classification of Diseases (ICD) and multiple cause of death coding following prescribed protocols is performed when it is considered productive. The conduct of these investigations incorporates the flow of large volumes of data from initial coding to the creation of a computerized dataset. Data handling systems are utilized which ensure that the multitude of basic data items collected on large numbers of individuals are finally recorded without loss of completeness and accuracy.

The simplest analytical approach to a set of mortality data is through a comparison of the relative frequencies of specific causes of death observed in an industrial group with those predicted by a suitable control population such as national mortality data. This method is particularly useful when data on the underlying population-at-risk is not available and when it is necessary to obtain an initial step in evaluating worker health experience.

A more definitive approach is the conduct of a retrospective cohort study utilizing the modified life table method to examine cause-specific mortality rates in relation to on-the-job exposures. In this type of investigation a group of individuals is defined as having worked in a particular environment many years in the past. The cohort is

then followed to some recent point in time at which vital status is determined. The job of tracing large numbers of persons over extended periods of time requires a large-scale effort. Obviously, workers who are still actively employed as of the ending date may be classified as alive, but workers who have left the particular plants or industry under study must be located. A variety of resources can be used including Federal agencies such as the Social Security Administration, Veterans' Administration, and Internal Revenue Service; State agencies such as motor vehicle departments; and private groups such as retail credit associations. Other sources include post office follow-up cards and local directories.

The risk of dying for an individual in the cohort is based on the actual length of time over which he is observed and is measured in terms of "person years." Expected numbers of deaths from specific causes are estimated by applying a standard set of death rates specific for age, race, sex, and cause to the corresponding "person years" at risk of death contributed by the study group. The significance of differences between observed and expected numbers of deaths is evaluated by appropriate statistical tests.

The biostatistical program also provides innovative statistical methods (experimental design, analysis of variance, regression analysis, and other qualitative data analyses) for demonstrating exposure-response phenomena and elucidating cause-effect relationships between environmental exposures in industry and risk of morbidity or mortality.

In addition, exposure time response models are developed for projecting the risk of disease at selected levels of exposure where data do not permit direct observation.

SPECIFIC PROJECTS

Table 5-1 lists the industrywide studies which NIOSH has underway or planned for future action and summarizes the pertinent data concerning each. Examination of this listing shows the wide variety of industries and potential health hazards involved. The numbers of persons included in each of these studies are only a portion of the total population potentially exposed. For example, the data obtained in the study of 59,000 steelworkers provides information on occupational hazards for a workforce in excess of 600,000.

TABLE 5-1.—*Industrywide epidemiological research studies*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Construction machinery operators.	Engine exhausts, whole body vibration and dusts of various kinds.	Malignant and non-malignant respiratory disease.	Death benefit file of International Union of Operating Engineers.	2, 000	Cross-sectional comparison of cause-specific proportionate mortality with that of general population.	Exploratory research into possible association between on-the-job exposures and death from specific causes.
Stationary engineers.	Combustion products, carbon monoxide, heat and asbestos.	Malignancies, particularly of the respiratory system, cardio-vascular-renal disease.	-----do-----	1, 000	-----do-----	Do.
Woodworkers	Wood dust	A. Malignancies of nasal pharynx, reticuloendothelial system and other sites.	A. Death benefit file of United Brotherhood of Carpenters.	28, 000	-----do-----	Do.
Longshore workers	Physical activity	Cardiovascular and other chronic diseases.	Existing medical data and employment file of International Longshoremen's and Warehousemen's Union.	7, 000	Retrospective cohort study utilizing life table method to examine cause-specific mortality according to category of physical activity.	Exploratory research into possible association between on-the-job exposure and death from specific causes.
Dentists	X-radiation, mercury and anesthetics.	Leukemia and lymphatic malignancies, suicides and diseases of the nervous system.	Records of the American Dental Association.	100, 000	Retrospective cohort study utilizing life table method to examine cause-specific mortality.	Do.
Gray-iron foundry workers.	Silica and iron oxide dusts, metal fumes and various chemicals.	Malignant and nonmalignant respiratory disease.	Pension and personnel files of several companies operating gray-iron foundries.	5, 000	Cross-sectional comparison of cause-specific proportionate mortality with that of general population.	Do.

Sheet metal workers.	Fibrous glass and asbestos.	-----do-----	A. Membership file of Sheet Metal Workers' International Association.	5, 000	A. Retrospective cohort study utilizing life-table method to examine cause-specific mortality according to type of work performed.	Do.
			B. Sheet metal fabrication shops and construction job sites.	-----	B. Industrial hygiene and air sampling surveys.	
Machine tool operators.	Cutting oil mists	-----do-----	A. Employment file of a large manufacturing plant.	24, 000	A. Retrospective cohort study utilizing life-table method to examine cause-specific mortality according to amount of exposure.	B. Identification of materials in use, chemical exposures and noise in relation to the particular type of sheet metal work. A. Initial analysis directed toward identifying associations between oil mists and disease manifestation. Data capable of supporting exposure-response relationship analyses.
			B. Medical survey of currently employed workers.	2, 500	B. Examination of currently employed workers utilizing X-rays, pulmonary function tests, and respiratory questionnaires.	B. Determination of health status of exposed workers and assessment of association between oil mist exposure and disease manifestation. Initial analyses directed toward identifying association between job specific exposure and disease manifestation. Data capable of response relationship analyses.
Steelworkers.	Coal tar pitch volatiles and a great variety of other exposures.		Employment files of seven steel plants in Allegheny County, Pa.	59, 000	Retrospective cohort study utilizing life-table method to examine cause-specific mortality according to different work areas and job classification.	

TABLE 5-1.—*Industrywide epidemiological research studies—Continued*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Aluminum refinery workers.	Bauxite/alumina, fluorides, coal tar pitch volatiles, carbon monoxide, sulfur dioxide, and other air contaminants.	Chronic respiratory disease, lung cancer.	A. Examination of currently employed workers utilizing X-rays, pulmonary function tests, and respiratory questionnaires. B. Ten aluminum refineries.	----- -----	A. Cross-sectional study of prevalence of pulmonary abnormalities. B. Industrial hygiene and air sampling surveys.	A. Exploratory research into association between multiple exposures and prevalence of pulmonary abnormalities. B. Assessment of implant contaminant levels, worker exposures & practices, and environmental controls.
Uranium miners----	Radon daughters----	Malignant respiratory disease.	A. Physical examination and annual census of uranium industry and radon daughter measurements. B. Annual sputum cytology examination.	14, 000 2, 000	A. Retrospective cohort study utilizing life-table method to examine cause-specific mortality. B. Regression analyses of atypical sputum and cumulative radiation exposure.	A. Determination of exposure-response relationship between radon daughters and lung cancer risk. B. Determination of diagnostic value of sputum cytology and early detector of cancer.
Potash miners and millers.	Diesel fumes and chemicals.	Malignant and non-malignant respiratory disease.	Employment files of seven potash mining companies.	5, 500	Retrospective cohort study utilizing life-table method to examine cause-specific mortality.	Evaluation of question of association between underground mining and lung cancer.
Hard rock miners---	Silica dust, radon daughters.	-----do-----	Employment files of mining companies.	12, 000	-----do-----	Determination of the extent of lung cancer risk associated with very low levels of radon daughters.
Uranium mill workers.	Thorium 230-----	Malignancies of lymphatic system.	Employment files of two uranium companies.	3, 000	-----do-----	Confirmation of previous indication of an excess risk and the quantification of that risk.

Copper smelter workers.	Sulfur dioxide, arsenic trioxide, and metal fumes.	Nonmalignant and malignant respiratory disease.	4,000	A. Examination of currently employed, non-ferrous smelter workers utilizing X-rays, pulmonary function tests, sputum cytology, and respiratory questionnaires. B. Examination of non-ferrous smelter workers utilizing X-rays, pulmonary function tests, and respiratory questionnaires. C. Six copper smelters.	A. Cross-sectional study of prevalence of pulmonary abnormalities according to SO₂ and other air contaminant exposure levels. B. Longitudinal study of incidence of pulmonary abnormalities. C. Industrial hygiene and air sampling surveys.	A. Exploratory research into association between chronic SO₂ exposures and disease manifestation. B. Exploratory research into association between current SO₂ exposure levels and incidence of pulmonary abnormalities. C. Assessment of inplant contaminant levels, worker exposures & practices, and environmental controls.
Asbestos products workers.	Asbestos	Asbestosis, lung cancer, mesothelioma; and other neoplasms.	20,000	A. Personnel files of 10 asbestos products plants. B. Examination of currently employed workers utilizing X-rays, pulmonary function tests and respiratory questionnaires.	A. Retrospective cohort study utilizing life-table method to examine cause-specific mortality. B. Cross-sectional study of prevalence of pulmonary abnormalities.	A. Determination of association between asbestos exposure and a variety of disease responses; and quantitation of the association and evaluation of cigarette smoking in etiology of asbestos related lung cancer risk. B. Determination of health status of asbestos plant workers and assessment of association between on-the-job exposures and disease manifestation.

TABLE 5-1.—*Industrywide epidemiological research studies—Continued*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Asbestos products workers—Con.			C. Do.	800	C. Medical surveillance.	C. Evaluation of effect of early diagnosis and medical intervention on a high risk population.
			D. Four asbestos textile plants.	-----	D. Technological feasibility study.	D. Assessment of technological feasibility of attaining the OSHA 2-fiber/cc health standard.
Fibrous glass production workers.	Fibrous glass-----	Malignant and non-malignant respiratory disease.	A. Employment files of five fibrous glass plants.	3, 500	A. Retrospective cohort study utilizing life-table method to examine cause-specific mortality.	A. Evaluation of speculated association between fibrous glass exposure and malignant and non-malignant respiratory disease.
			B. Examination of currently employed workers utilizing X-rays, pulmonary function tests, and respiratory questionnaires.	200	B. Cross-sectional study of prevalence of pulmonary abnormalities.	B. Determination of health status of fibrous glass workers and assessment of association between on-the-job exposure and disease manifestation.
			C. Five fibrous glass manufacturing plants, four fibrous glass user plants, and a reinforced plastics plant.	-----	C. Industrial hygiene and air sampling surveys.	C. Assessment of inplant contaminant levels, worker exposures, work practice and environmental controls.

Cotton workers;
I. Cotton Gin
workers.

Cotton dust----- Byssinosis and
chronic lung
disease.

A. Examination of cur-
rently employed
cotton gin workers
and matched con-
trols utilizing
X-rays, pulmonary
function tests, and
respiratory ques-
tionnaires.

B. Thirty cotton gins-----

B. Industrial hygiene
and air sampling
surveys.

B. Assessment of inplant
contaminant levels,
worker exposures, and
work practices, and
environmental
controls.

II. Mattress
industry
workers.

-----do-----do-----

A. Medical survey of
currently employed
workers at two
mattress factories.

50 A. Cross-sectional study
of prevalence of
pulmonary abnor-
malities.

A. Exploratory research
into the association
between on-the-job
exposure and dis-
ease manifestations.

B. The above men-
tioned two mat-
tress factories.

----- B. Industrial hygiene
and air sampling
surveys.

B. Assessment of inplant
contaminant levels,
worker exposures, and
work practices, and
environmental
controls.

III. Cotton
Textile
workers.

-----do-----do-----

A. Employment files
of two cotton
textile companies.

10, 000 A. Retrospective
cohort study
utilizing life-table
method to
examine cause-
specific mortality.

A. Exploratory
research into the
association be-
tween on-the-job
exposures, and
disease mani-
festation.

Beryllium
production
workers.

Beryllium----- Berylliosis and
malignant
respiratory
disease.

A. Employment files
of four beryllium
production plants.

8, 800 A. Do-----

A. Evaluation of spec-
ulated association
between beryllium
exposure and lung
cancer.

B. Four beryllium
production plants.

----- B. Air sampling.

B. Assessment of
appropriate
sampling methods.

C. Beryllium case
registry.

----- C. Investigation of
causes of new
beryllium disease.

C. Discovery of ill
effects of previous
unsuspected low
levels of exposure.

TABLE 5-1.—*Industrywide epidemiological research studies—Continued*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Operating room personnel.	Halothane, nitrous oxide, and other anesthetic agents.	A. Miscarriages congenital anomalies and malignancies.	A. Examination of currently employed operating room personnel and appropriate control groups utilizing a questionnaire.	82,000	A. Cross-sectional study of incidence of miscarriages, anomalies, and malignancies in operating room personnel before and after venting waste anesthetics.	A. Exploratory research regarding expected decrease in disease associated with reduction in trace concentration of anesthetics.
		B. Alterations in psychological function.	B. Examination of currently employed operating room personnel utilizing battery of psychometric tests.	-----	B. Cross-sectional comparison of trace concentrations of anesthetics with alteration in psychological functions.	B. Exploratory research regarding expected association between exposure to trace concentrations of anesthetics and alteration in psychological functions.
			C. Hospitals-----	-----	C. Industrial hygiene and air sampling.	C. Development and evaluation of procedures for controlling waste anesthetic gases and determination of feasibility of applying these procedures.
Bis(chloromethyl) ether workers.	Bis(chloromethyl) ether.	A. Malignancies, especially of lung.	A. Sputum cytology examination of currently employed workers in facilities using BCME.	80	A. Cross-sectional study of cytological changes.	A. Rapid confirmation of human carcinogenic of bis(chloromethyl) ether.
		B. do-----	B. Personnel file of a plant manufacturing anion exchange resins.	600	B. Retrospective cohort study utilizing life-table method to examine cause-specific mortality.	B. Do.

TABLE 5-1.—*Industrywide epidemiological research studies—Continued*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Motor vehicle inspectors.	Carbon monoxide----	Cardiac disease-----	A. Examination of currently employed motor vehicle inspectors using ECG, DCG, and blood analysis. B. Fifteen motor vehicle inspection stations. C. Employment files of a state.	500	A. Cross-sectional morbidity study of cardiac abnormalities.	A. Exploratory research to evaluate effect of long term low level carbon monoxide exposure.
					B. Air sampling surveys.	B. Assessment of contaminant levels and worker exposures.
					C. Retrospective cohort study utilizing life table method to examine cause specific mortality.	C. Exploratory research into the association between on-the-job exposure and disease manifestations.
Munition workers---	Nitroglycerin-----do-----	do-----	A. Examination of currently employed munition workers using ECG, DCG, and blood analysis. B. Two munitions plants. C. Employment files of two munitions plants.	1,000	A. Cross-sectional morbidity study of cardiac abnormalities.	A. Exploratory research to evaluate effect of long term low level nitroglycerin exposure.
					B. Air sampling surveys and industrial hygiene.	B. Assessment of contaminant levels and worker exposures.
					C. Retrospective cohort study utilizing life table method to examine cause specific mortality.	C. Exploratory research into the association between on-the-job exposure and disease manifestations.
Cadmium smelter workers.	Cadmium-----	Malignancies and heart disease.	Personnel files of a cadmium smelter.	1,200	Retrospective cohort study utilizing life table method to examine site specific cancer incidence.	Exploratory research into the association between on-the-job exposures and disease manifestation.

Chemical plant workers (e.g. coated fabrics; paint manufacturers).	Solvent plasticizers and other contaminants.	Peripheral neuropathy.	A. Examination of current employees using neurologic examinations and EMC's, if appropriate. B. Seven industrial plants.	1, 000	A. Cross-sectional medical study to determine prevalence of nerve disorders. B. Industrial hygiene and air sampling surveys.	A. Exploratory research into the association between on-the-job exposures and disease manifestations. B. Assessment of in-plant contaminant levels, worker exposures, work practices, and environmental controls.
Talc workers-----	Asbestos, silica, tremolite and other minerals.	Malignant and non-malignant respiratory disease.	A. Company personnel files. B. Talc mines and mills and talc users.	800	A. Retrospective cohort study utilizing life table method to examine cause specific mortality. B. Industrial hygiene and air sampling surveys.	A. Exploratory research into the association between on-the-job exposures and disease manifestations. B. Characterization of components of talc and assessment of in-plant contaminant levels, worker exposures, work practices, and environmental control.
Granite and brick industry workers.	Silica-----	Non-malignant respiratory disease.	A. Examination of current granite shed workers utilizing X-ray, pulmonary tests and respiratory questionnaires. B. Granite shed and brick manufacturers.	1, 000	A. Longitudinal medical study of incidence of pulmonary abnormalities to examine annual decrements in function at known exposure levels. B. Industrial hygiene and air sampling surveys.	A. Confirmation of previous indications of an excess risk and the quantification of that risk. B. Assessment of in-plant contaminant levels, worker exposures, work practices, and environmental controls. Do.
Chrome plating workers.	Chromic acid-----	Mucous epithelial damage.	Five chrome plating plants.	-----	Industrial hygiene and air sampling surveys.	Do.

TABLE 5-1.—*Industrywide epidemiological research studies—Continued*

Occupational group	Suspect agents	Biological response under investigation	Source of data	Number of individuals in study	Type of study	Implications to occupational safety and health
Clothing workers...	Trichlorethylene dusts, ultra-violet radiation, and other contaminants.	Unknown.....	Male apparel production plants across U.S.	-----	Identification and assessment of implant contaminants, worker exposures, and work practices possibly leading to future mortality and morbidity studies.	Exploratory research into the association between on-the-job exposures and disease manifestations.

Chapter 6

LABORATORY SERVICES

ANALYTICAL CHEMISTRY

Laboratory support is essential to the operation of effective industrial hygiene and occupational health programs. The sampling and subsequent analyses of air contaminants in the occupational environment are necessary to accomplish protection of worker health and safety. Laboratory services are provided in four areas: (1) analytical chemistry; (2) chemical reference; (3) maintenance and calibration; and (4) testing and certification. Laboratory services are provided to all NIOSH programs and to other Federal, State, and local agencies.

The analytical chemistry laboratory provides support primarily in analyses of air samples to determine the presence of toxic products which may be generated into industrial atmospheres. The chemical reference laboratory seeks to develop standard analytical and sampling procedures to achieve precision and comparability of analytical data. The engineering group at the maintenance and calibration laboratory supports field teams by providing air sampling and measurement equipment. The testing and certification laboratory provides testing and certification services for safety and health equipment and develops performance standards for certification.

Analytical chemistry services were provided to NIOSH programs and OSHA compliance activities, during 1973, by the Cincinnati and Salt Lake City service laboratories. While both laboratories support NIOSH programs, OSHA samples are analyzed by OSHA chemists in the Salt Lake City facility. The Salt Lake City service laboratory has been integrated into a single service unit made up of both NIOSH and OSHA personnel under NIOSH supervision. This arrangement of per-

sonnel, facilities, and equipment has proven to be most advantageous.

During 1973, 31,560 samples were submitted to the laboratories, and 59,697 analyses were performed. This represents an increase of 40 percent more samples and 46 percent more analyses over 1972 (22,547 samples, 40,988 analyses). *Table 6-1* identifies the sources of these samples.

Samples generated by OSHA's compliance activities (12,917 samples, 21,702 analyses) increased by 115 percent over 1972 (6,001 samples). Compliance samples analyzed with the highest degree of frequency were free silica, lead, asbestos, iron oxide, toluene, xylene, styrene, methyl ethyl ketone, and benzene. Analyses for approximately 124 different toxic substances were performed in providing this service.

TABLE 6-1.—*NIOSH Analytical chemistry laboratory services*

Source	Samples	Analyses
NIOSH research program:		
Engineering.....	576	648
Toxicology.....	8, 454	18, 074
Industrywide studies.....	2, 140	4, 897
NIOSH technical services:		
Health hazard evaluations....	3, 370	8, 242
Medical.....	231	250
Industrial hygiene.....	1, 056	1, 709
Department of Labor.....	12, 917	21, 702
Other:		
Cities, counties, and universities.....	922	1, 137
Quality control.....	1, 894	3, 038
Total.....	31, 560	59, 697

Analytical chemistry services in support of NIOSH research, technical services, and other activities comprised some 18,643 samples and 37,995 analyses. This sample load represents an increase of about 13 percent over 1972. This apparently small percentage increase actually represents a significant increase in manpower investment caused by the ever increasing complexity of analytical problems to be solved; particularly the need to measure new toxic substances for which there are no established analytical methods.

The major portion of analytical chemistry services provided to NIOSH research programs involved biological samples analyzed for toxic metals and environmental samples collected from controlled chambers or under actual field conditions and analyzed for a variety of toxic substances. Analytical chemistry support provided to NIOSH technical services is done on a priority basis. These samples involve primarily bulk process materials and samples taken from workers' breathing zones. They are collected by a variety of techniques and are analyzed for many materials including acrylonitrile, n-butyl glycidyl ether, epichlorohydrin, acrylamide, 25 specific organic solvents, and 16 metals. Support of all activities included the determination of appropriate sampling techniques to be used by field personnel.

CHEMICAL REFERENCE

The Occupational Safety and Health Act of 1970 requires that the amounts of toxic materials in workers' environments be measured by employers and by the State or the Department of Labor. In order for these measurements to be accurate, the Federal, State, and private industrial hygiene laboratories, which analyze the test samples, must use standard techniques and materials.

The results of different laboratories analyzing identical samples has been found to vary greatly. These variations demonstrate the necessity for improving and standardizing the quality and uniformity of the analyses. The NIOSH proficiency analytical testing (PAT) program provides the mechanism by which the expertise of diversely equipped and staffed industrial hygiene laboratories throughout the country are evaluated on a continuing basis. Through this program, the NIOSH laboratory prepares and submits to participating laboratories, for analyses, monthly reference samples of key or indicator contaminants

at various concentration levels. Contaminants studied in the program are inorganic lead, free silica, and asbestos. The proficiency of the laboratories in performing the analyses is determined from the results of these monthly tests. Inherent in the PAT program are the quality controls necessary to ensure a continuing supply of reliable samples, with identifiable precision and accuracy.

At the beginning of 1973, 15 laboratories were participating in the program and this was increased to 38 laboratories by year's end. Although participation in a program such as PAT cannot be considered the only reason for a laboratory's improved performance, it is an important part of satisfactory progress. The number of laboratories showing proficient performance increased by about 12 percent for identifying and measuring silica during 1973; by about 19 percent for lead; and by nearly 40 percent for asbestos. This increase in proficiency can be attributed to greater emphasis within these laboratories on quality control procedures and standardization of analytical techniques.

During the latter half of the year, effort was expended in preparation for expansion of the PAT program to include laboratories applying for accreditation under the NIOSH-funded American Industrial Hygiene Association accreditation program for industrial hygiene laboratories. Participation in the PAT program is a requirement for accreditation.

To familiarize industrial hygiene laboratories with the needs, benefits, and requirements of a quality control system. NIOSH developed and distributed for review, drafts and comments of a quality control manual for industrial hygiene laboratories in 1973. The published manual will be ready for distribution in early 1974.

To ensure and maintain quality performance, industrial hygiene laboratories must routinely test known standard (or control) samples in conjunction with analyses of unknown specimens. The use of standard samples with known accuracy and precision of content provides a laboratory with reliable references for use in verifying internally its procedures. NIOSH entered into an agreement with the National Bureau of Standards for development of such standard reference materials for selected occupational contaminants. Developmental work on some of these materials was completed in 1973. During 1974, the following standard reference materials on membrane filters will be avail-

able: lead, cadmium, zinc, tin, beryllium, manganese, and silica. Seven organic samples on charcoal tubes will also be available as well as two biological specimens: mercury and fluoride in urine.

MAINTENANCE AND CALIBRATION

Maintenance and calibration services are provided as an engineering service function within NIOSH, to OSHA, and to other government agencies on request. These services encompass maintaining and calibrating equipment used in OSHA inspections, improving and developing calibration systems, and acceptance testing of equipment. The systems in use are related to standards maintained by the National Bureau of Standards, so that meaningful results may be obtained with this equipment.

Calibration systems in operation during 1973 included light, steady and impact noise, low and high volume air flow rate, low and high air velocity, mercury vapor, combustible gases, carbon monoxide, high energy ionizing radiation, and halogenated hydrocarbons. In 1974, calibration systems for low energy ionizing radiation and non-ionizing radiation and a reverberant room (for noisemeter calibration) will be put into operation.

One of the primary functions of NIOSH's maintenance and calibration laboratory is acceptance testing of NIOSH and OSHA equipment to be certain it meets specifications. Approximately 8,000 individual instruments were tested and then calibrated in 1973; after testing and calibration,

the equipment is distributed throughout the country.

TESTING AND CERTIFICATION

The objective of the NIOSH testing and certification laboratory is to ensure that devices used for evaluation and control of occupational hazards meet minimum standards required to protect the health and safety of workers. The responsibilities of the laboratory include: (1) development of performance specifications for each device; (2) publication of these specifications and certification procedures in the *Federal Register*; (3) initial approval testing of such devices; (4) surveys of sampling and equipment manufacturers' establishments to ensure continuous operation of a satisfactory quality control program; and (5) periodic testing of certified items procured on the open market.

Responsibility for testing industrial respiratory protective devices for joint certification by the Bureau of Mines, Department of the Interior, and NIOSH was transferred from the Bureau to NIOSH on March 15, 1973. The respirator testing and certification work is now performed by NIOSH's laboratory in Morgantown, West Virginia. Certification of industrial gas and vapor detector tube systems and coal mine dust personal sampler units was begun in 1973. Proposed regulations for the certification of industrial personal protective devices and for sound-level meters were prepared during the year.

Chapter 7

TECHNICAL SERVICES

NIOSH provides technical consultation under certain circumstances to Federal, State, and local agency employers and employees. As directed by the Occupational Safety and Health Act, NIOSH conducts studies upon the request of "any employer or authorized representative of employees" to determine whether a particular workplace substance has potential toxic effects in the concentrations used or found in the workplace. Upon an affirmative finding, and if the substance is not covered—or not covered adequately—by an existing OSHA standard, NIOSH submits criteria for such a standard to OSHA. NIOSH also self-initiates some studies in selected workplaces to fulfill its research needs in particular areas. In this regard, NIOSH attempts to uncover and identify previously unknown safety and health problems for future research efforts, especially those associated with new compounds or processes. Finally, NIOSH provides technical assistance to OSHA and State occupational safety and health agencies, upon request, when those agencies lack the necessary expertise, at the time, to address a particular problem.

In providing technical consultation, NIOSH frequently relies on a team approach to evaluate the potential hazard of substances in the workplace and the safety aspects of particular industries. The teams utilize a combination of industrial hygienists, physicians, safety specialists, engineers, health physicists, chemists, toxicologists, and nurses. In coordination with OSHA, NIOSH develops and disseminates technical information to various appropriate constituencies.

HEALTH HAZARD EVALUATIONS

An initial-screening policy for the hazard evaluation service was recently established making

possible on-site investigations usually within 30 days after receipt of a request for a hazard evaluation. In some cases, a toxicity determination can be made following the completion of an initial investigation; in other cases more detailed studies involving varying degrees of medical and environmental evaluation are required. In 1973, 78 hazard evaluations were completed. Thirty-four of these hazard evaluations identified toxic or potentially toxic exposures in the workplace. In 11 instances, harmful effects of multiple chemical agents were identified, and additional information is now being gathered about these substances. Where a health hazard or violation of a health standard is found, recommendations for control or alleviation of the hazard with monitoring procedures are given to the individuals and management. Copies of hazard evaluations are forwarded to OSHA.

TECHNICAL INFORMATION

Through the operation of technical libraries and other information systems, NIOSH's technical information service carefully gathers and evaluates technical information for the benefit of NIOSH staff and other government agencies, industrial management, labor unions, private citizens, and foreign parties. In 1973, specific information packets were provided in response to 1,120 formal requests for occupational safety and health technical information.

NIOSH has developed a central computer file for occupational safety and health technical documents. This system, called NIOSH-TIC, provides for rapid search and retrieval of occupational safety and health technical documents from a present data base of about 15,000 documents. A thesaurus or dictionary of structured occupational

safety and health terms used in the file was published in 1973. Access is also used to other national and international computer and information retrieval systems.

In cooperation with OSHA, an industrial hygiene inspection procedures guide was developed for use by OSHA, State and local agencies, and other groups concerned with industrial hygiene. The guide will be reviewed and published in 1974. In 1973, pamphlets presenting good work practices for workers were published on ammonia, chlorine, asbestos, ultraviolet radiation, mercury, ozone, and formaldehyde, and an intensive dissemination program was initiated, particularly for the asbestos booklet. These, and other NIOSH technical publications are available, on request, from NIOSH or the Government Printing Office.

INDUSTRIAL HYGIENE SERVICES

NIOSH provides industrial hygiene and engineering technical assistance to governmental agencies, upon request, when those agencies are confronted with unusually difficult problems or unique hazards which promise to advance knowledge in this area. Industrial hygiene services generally take the form of on-site environmental/medical investigations involving extensive sample collection, analysis, and evaluation in order to assist employers and employees in recognizing, evaluating, and controlling health hazards. Previously undefined health hazards observed are being evaluated in a newly developed hazard identification program.

Thirty-eight industrial hygiene surveys were conducted in 1973, affecting approximately 2,700 workers. As a result, 190 recommendations were made to OSHA, State occupational safety and health agencies, and the concerned businesses pertaining to ways to alleviate existing hazards. Additionally, many requests for industrial hygiene information were answered by letter or telephone.

In consultation with OSHA, different occupations and industrial processes have been selected for a series of manuals of good industrial hygiene practice. Nineteen such manuals have been published thus far on: metal welding and cutting, electroplating, brazing and soldering, inorganic metal cleaning, organic metal cleaning, printing, pesticide formulating, spray painting, lead battery manufacture, auto-body repair, insulation installation, bulk pesticide application, fibrous glass lay-

up workers, metal finishing, renderers, polyurethane foam workers, tannery workers, epoxy resin workers, and textile dryers. *Metal Welding and Cutting* was completed in 1973, and the remainder are in various stages of preparation.

Other industrial hygiene projects included an extensive study completed in 1973 which identified the health hazards associated with the copper smelting industry and related areas of needed research. A representative sample of aluminum reduction plants was investigated, and exposures to coal tar pitch volatiles, heat, fluorides, and other contaminants were evaluated. A final report has been prepared for dissemination in 1974.

At the request of the Department of Labor, NIOSH regularly reviews and computerizes material safety data sheets covering toxicity data and safe handling procedures for hazardous materials. During 1973, approximately 3,000 material safety data sheets containing 6,000 hazardous agents were reviewed and computerized.

In coordination with OSHA, NIOSH also develops "fact sheets" on certain industries, particularly for the benefit of small businesses. These "fact sheets" are written in nontechnical language and collated into a *Health and Safety Guide* for the specific business studied. These "Guides" include the legal requirements of the Act, such as recordkeeping and posting, and depict the most common serious problems associated with the workplace.

MEDICAL SERVICES

The NIOSH medical services program provides medical support for health hazard evaluations, problem identification studies, and other NIOSH activities. This program initiates and implements projects in a variety of occupational medical and nursing areas to develop medical methods that protect the worker.

In almost all health hazard evaluations, medical evaluation is required. These medical evaluations often involve administering physical examinations, tests, and medical questionnaires to exposed workers in order to determine whether toxic effects are present.

A survey to gather information on the occupational health and safety services available to hospital workers, who are exposed to many physical, chemical, and biological agents, was continued in 1973. The data have been collected, processed, and

analyzed and will be published in a series of seven reports.

The text book, *Occupational Diseases—a Guide To Their Recognition*, is being revised under contract. Earlier editions of this book have been a valuable reference for those working in occupational health. It is anticipated that the text will be available in 1975. Also, a slide program with a recorded text on occupational dermatology was prepared in 1973 for distribution to all hospital dermatology residency programs in the United States to assist in training resident physicians in occupational dermatology.

OCCUPATIONAL HEALTH PROGRAMS

An occupational health program is the delivery system which carries the technical and professional knowledge acquired by research and development activities to the worker. The occupational safety and health program provides environmental control and medical services for employee protection. The staff carrying out these functions include, safety professionals, industrial hygienists, fire prevention and control specialists, nurses, paramedical personnel, and physicians. Most of the existing occupational safety and health programs are in the large industries, employing many thousands of people. Small industries are usually served on a piece-meal basis, but rarely by a comprehensive program. Thus, NIOSH has given priority to developing model occupational safety and health programs for the small industrial plants which employ 75 percent of the nation's work force.

In 1973, projects were devised for the establishment and testing of three prototype occupational safety and health programs. These projects were scheduled to begin early in 1974. The specialized areas of the three projects are as follows:

1. An association of industrial clinics and a medical school to provide occupational safety and health services to the employees of small businesses;
2. Coordination of a local health department to provide occupational safety and health program services to employees of small industry; and
3. Utilization of all the appropriate resources in the community to provide occupational safety and health services to agricultural workers.

In another project, an evaluation was made of the occupational safety and health program provided to small industries by a hospital clinic over a period of five years. Preliminary findings of the evaluation are:

1. Forty-six percent of the small industries in the study group that employed twenty or more people utilized the services of the clinic for their employees.
2. Of the industries that had 20 or more employees and utilized the services of the clinic, 71 percent continued to utilize the clinic during the five year period that the clinic-occupational health service was provided.
3. The characteristic of having 20 or more employees, without regard to the company turnover in employees, appeared to be a significant factor in predicting the use of the occupational safety and health program by small companies. The fact that the very small companies tend not to utilize the clinic is a significant planning and evaluation concern. For example, of the more than 28,000 manufacturing establishments in New York City, approximately 19,000 (about 70 percent) have fewer than 20 workers. Less than two percent have 250 or more employees. The distribution of size of service establishments in the city is even more skewed in the direction of smallness: over 90 percent have fewer than 20 workers.
4. There is a strong indication that the manufacturing industry served by the hospital based occupational safety and health clinic was less dangerous than the manufacturing industry as a whole in the United States.

Two contracts were awarded to develop information on the management of occupational safety and health programs.

Under the first, coordination between the occupational medical program in the industrial clinic of a large shipyard and the general health care delivery system of the community adjacent to the shipyard is to be evaluated. This contract is expected to be completed early in 1974, and the interim progress reports suggest that the project will provide data on the advantages of combining occupational health services with the general health care provided by a health maintenance organization.

The second contract provided for the cost-benefit analysis of an existing occupational safety and health program in a large steel mill. This study was 60 percent completed at the end of 1973. The design of a computerized theoretical model for the clinic and a full-scale field test of the model will be completed using the existing program at the steel mill. One interesting

aspect of the industrial clinic at the steel mill was the extensive use of rehabilitative techniques of physical medicine with a greater than average expenditure of funds and use of personnel. As a result, this company has a lower than average record of lost work time due to injuries such as bruises, muscle strains, and sprains which are treated directly in the physical medical facilities.

Chapter 8

MANPOWER DEVELOPMENT

SHORT-TERM PROFESSIONAL TRAINING

In 1973, NIOSH offered 59 short-term training courses in occupational safety and health. Fees began to be charged for training in the latter half of the year, and the change to reimbursable training did not decrease the level of training provided. The transition to reimbursable training has been successful. NIOSH's direct training program was self-supporting in the last half of 1973.

In order that occupational safety and health training may be given regionally and that the expected large demand for training may be filled, NIOSH has begun to package its courses for presentation by external groups. NIOSH's Industrial Hygiene Measurements Course was packaged for independent presentation by the American Industrial Hygiene Association, which will offer the course in joint sponsorship with NIOSH five times in 1974. At the end of the year similar packaging was underway for other courses in occupational safety, industrial hygiene chemistry, and occupational hazard recognition.

INTERAGENCY TRAINING

The NIOSH training program had considerable contact with other government agencies, both Federal and State. NIOSH instructors presented course packages or participated in the presentation of courses for the U.S. Navy, the Indian Health Service, the Bureau of Indian Affairs, the Environmental Protection Agency, and the OSHA Training Institute, as well as for the governments of California, New Jersey, New Mexico, Idaho, Utah, Pennsylvania, Florida, Hawaii, South Dakota, Montana, Missouri, South Carolina, Massa-

chusetts, and Puerto Rico. All of these courses were presented in the field. In addition, trainees from many other Federal and State agencies participated in the regularly scheduled courses presented at NIOSH's training facility in Cincinnati, Ohio.

COURSE DEVELOPMENT

Development of courses in new subject areas continued in 1973. These dealt with heat stress, industrial ventilation, ionizing and non-ionizing radiation, laboratory accreditation, and industrial hygiene laboratory setup. NIOSH's training program continues to emphasize the development of training materials and courses in response to current problems and needs in occupational safety and health. Attendance at these new courses has been very high.

TRAINING GRANTS

NIOSH training grants in 1973 assisted ongoing occupational safety and health educational programs. As in the past, these funds were directed to the development and upgrading of occupational safety and health professionals, paraprofessionals, and research personnel through grants to educational institutions with a capable base for providing appropriate training. The \$1,200,000 training grant budget was used to provide continued support for 17 university-based training programs. Some of the fields of training represented were occupational health nursing, industrial hygiene, occupational biomechanics, safety engineering, occupational medicine, industrial toxicology, safety management, and industrial biostatistics. Two training institutes for specialized short-term training were also

supported; one award was made to support a post-doctoral fellow in an occupational respiratory physiology program, and one grant was given to provide for the planning and organization of a safety training program at the technician (2 year)

level. A total of 229 students received stipend and/or tuition support from these programs. Approximately, 1,000 non-supported students received training in one or more courses within the graduate supported programs.

