A BETTER PLACE TO WORK

Transactions Bulletin No. 9

0

Foundation Facts, 1947-48

A Better Place to Work

Community Attitude on Working Conditions

Results of Foundation Field Research

Industrial Health Programs in Action

Summaries of Conferences

Industrial Health Administration

Atomic Power and Industry

Sickness Insurance

Health and Welfare Funds



INDUSTRIAL HYGIENE FOUNDATION
4400 FIFTH AVENUE PITTSBURGH 13, PA.

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TRANSACTIONS

of

TWELFTH ANNUAL MEETING

of

INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.

NOVEMBER 20, 1947

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FOUNDATION FACTS, 1947-48

ANDREW FLETCHER

President, St. Joseph Lead Company
Chairman, Board of Trustees, Industrial Hygiene Foundation

Members and Guests of the Industrial Hygiene Foundation:

It gives me great pleasure to welcome you to this, our 12th Annual Meeting. I can well remember the early years of our activities, and the skepticism with which Industry, Labor, and Governmental Departments viewed our proposed program of research directed toward the improvement of conditions for the American Workman, and for the community in which he lives. The foresight and courage of the original organizers has certainly been amply repaid in dollars, as well as in human happiness. Today the Foundation is sound financially, our membership now includes most of the leading industrial companies, and our name and findings are known throughout the United States—in fact, in many far distant lands. There are no Industrial Hygiene Foundations elsewhere in the world. The foreign visitors, who come to us, have difficulty in understanding that the Foundation is a wholly voluntary research organization, supported by industries united for the well-being of workers.

Mr. McMahon, our Managing Director, will give you a short report on the Foundation's affairs, and it is therefore unnecessary for me to comment on the results accomplished since our last meeting. You will be filled with a sense of satisfaction and pride in his report, and in the list of our new members. But we must not become complacent, as only a start has been made in the research that is necessary to solve the many hygienic problems that face, and will continue to face labor, management, consumers, and, in general, our entire population.

Research Needs and Implications

I had the great privilege of spending two weeks during last September with the top ranking officers of our Navy, who discussed their problems, as well as the relationship of industry to the Navy. I was greatly impressed by the attitude of the Navy toward the necessity of research, and I was extremely interested in the comment that the war would have been greatly extended if England had not developed, through research, the relatively crude radar that enabled their small airforce to successfully repel the large German bombing flights. It was also stated that the war might even have been lost, if Hitler had continued expenditures for research in the development of new weapons instead of stopping such expenditures in February, 1941 and not resuming the research on guided missiles, fast submarines, etc., until November, 1942. In the past, Europe largely provided the wellsprings of fundamental research, and the research in the United States has, for the most part, been concerned with the practical application of fundamental scientific facts. For instance, we took the German work in nuclear

physics and made the atom bomb; we aided England in the perfection of radar, etc. The President's Scientific Research Board, in its current studies on "Science and Public Policy," reports that for the fiscal year of 1947 the Government spent 625 millions for research and development in the physical and biological sciences—this sum, of course, does not include expenditures by the Atomic Energy Commission. It was also reported that private outlays for research were slightly less than 600 million, and that Russia's 1947 budget was $1,200,000,000. It would seem to me that even 1 billion, 200 million falls short of the amount that our country should spend in research to guarantee its existence and to guard the lives of its people.

Leadership in Industrial Hygiene

Just as continued research is necessary for our armed forces and our country as a whole, so too is research necessary to improve the health and welfare of the men and women in industry. Last year, in my opening talk, the question was asked, "Who is going to take the leadership in industrial health—the Unions, the Government, or Industry?" You probably know that in addition to the funds expended by Federal and State Governments on industrial hygiene, the Anthracite Health and Welfare Fund announced in June a grant of $575,000 to the Jefferson Medical College for a five-year study of "Miners' Occupational Diseases." Last month the Ladies Garment Workers Union announced a one million expansion of its Union Health Center in New York. If the accomplishment of the Industrial Hygiene Foundation in the past was based solely on the dollars expended, or if our present budget of around $100,000 per year was the sole indication of future results, then our contribution toward the improvement of working and living conditions would indeed be depressing. Although "dollars" are always helpful, the Foundation, through our competent staff, is even now able to stimulate industry toward taking the leadership in industrial hygiene that is so necessary. Your Board of Directors have not yet felt that the Foundation's financial resources, or the size of its staff, are sufficient to undertake fundamental research, especially as our membership covers such a large field, but we recognize our obligation toward fundamental research and at some appropriate time we will discharge our responsibility. We are in a position to efficiently and satisfactorily study particular industries, and to make constructive suggestions that will aid individual companies in that industry to improve conditions.

Control of Air Pollution

For example, the Foundation has been studying air pollution in certain areas, and this problem may become even more important, as cities and communities throughout this country are tightening up on regulations governing air pollution. Pittsburgh, Niagara Falls, Cleveland and Los Angeles have already expressed deep concern, and Louisville has taken action against a large plant operating in that city to abate the public nuisance arising from dust, smoke and odors—eleven damage suits have actually been filed by citizens of Louisville against the corporation. There is continued public demand for the control of air pollution, just as there is a demand for improved working and living conditions. I am sure that industry should not wait until the demands are translated into stringent regulations and subsequent legal action. Industrial management must lead—not be led. Smoke cannot be banished by laws, neither can accidents nor industrial diseases. The technical problems must first be solved.

In addition to surveys for industries and individual companies, the Industrial Hygiene Foundation is watching the development of proper industrial codes, and is in position to aid on any problem where employer and employee need disinterested, competent advice of a technical nature.

Production Through Better Working Conditions

To combat inflation, and to aid a distressed world, what we need is greater production on the part of every worker in this country. I am hopeful that we are nearing the end of the cycle of industrial strife, and of the period of extreme positions on the part of either management or labor. I know of no better way for improving labor-management relations, and thereby improving production, than by developing together ways for improving working and living conditions. Industrial harmony and mutual respect must be earned—they cannot be bought or induced through propaganda, any more than an individual can buy respect or a good reputation. The maintenance of good working and living conditions speaks louder than all the pamphlets or posters ever published.

The Foundation is your organization, and at all times stands ready to aid employer, employee, our State or Governmental Departments in all problems of industrial hygiene.

Before introducing Mr. McMahon, I wish to express the appreciation of the Industrial Hygiene Foundation to Dr. Weidlein, and the Mellon Institute for the many courtesies that have always been so whole-heartedly extended, as well as for the guidance and financial assistance that we have received. Without the help of Dr. Weidlein and his assistant, Dr. Hamor, our Foundation could not have grown to its present magnitude, and American industry would probably not have such a competent organization for the handling of industrial health problems.

And now it gives me great pleasure to present Mr. McMahon, Managing Director of the Foundation, who will report to you on our accomplishments since the last Annual Meeting.

I-H-F IN 1947

JOHN F. McMAHON

Managing Director, Industrial Hygiene Foundation

What has Industrial Hygiene Foundation done during the past year?

The following are some partial answers to that question:

At the first meeting of the Foundation's Board of Trustees, on December 16, 1935, this organization was launched with 23 member companies and associations. As of today, there are 349 members.

Twenty-two companies and associations have affiliated thus far this year. They are:

American Can Company	Inland Steel Company
Anthracite Institute	National Ass'n Fan Manufacturers
Atlas Powder Company	National Pulverizing Company
Austin Motor Company (England)	National Steel Corporation
Crucible Steel Company	National Supply Company
Federal-Mogul Corporation	New Jersey Pulverizing Company
Firestone Tire & Rubber Co.	Pittsburgh Coke & Chemical Co.
Ford Motor Company	Sharon Steel Corporation
General Ceramics & Steatite Co.	Sun Oil Company
General Electric Company	Sun Sand Company
Godrej and Boyce Mfg. Co.	Sylvania Electric Products Co.

Actually, the number of new members is 54 inasmuch as one of the organizations is the Anthracite Institute, which has taken out a **multiple** membership covering its 32 member companies. There are now 103 special subscribers—governmental agencies, private institutions, etc.

Field Work

Field work continued to increase in a satisfactory manner and involved studies in approximately 70 different plants. This work will be described by Mr. Hatch, the Foundation's Research Director. In an engineering survey for the pottery industry, directed by Mr. Hemeon, Head Engineer, the Foundation collaborated with the U. S. Potters Association to hold a Pottery Dust Control Clinic here in Mellon Institute on October 13. Sixteen companies sent 31 representatives to this all-day conference.

Conferences

Conferences are proving a practical measure for increasing Foundation services to member companies. A Medical Conference, an Engineering Conference, and a Conference for Attorneys and Compensation Officials were held here yesterday. Tomorrow there will be a conference for research directors, chemists, industrial hygienists and toxicologists. These closed sessions, limited to member firms in mining and manufacturing, draw together specialists, with similar interests and problems, from all types of heavy industry and so serve as valuable vehicles for the exchange of information and experience. But already, some of these sessions are beginning to exceed conference size. In the year ahead the Foundation hopes to sponsor several conferences for specific industries, possibly for engineers in the steel industry or for physicians associated with the asbestos industry, etc.

Publications

"Health in Industry," the Transactions of our last annual meeting, was issued early in the year. Yesterday the printer delivered two new bulletins, "Air-Conditioned Crane Cabs," a publication in our Engineering Series, and "Industrial Air Sampling and Analysis," a handbook for plant chemists, and the first bulletin in our new Chemical and Toxicological Series.

In mid-year the Legal Committee issued a short analysis of Occupational Disease Compensation Statutes and Developments in the 1947 Sessions of the State Legislatures, as well as a memorandum on sickness insurance. More recently the Foundation released a comprehensive digest of the important Medical Survey of the Bituminous Coal Industry. Meanwhile, members of the Foundation staff published a number of papers in appropriate journals. Foundation publications for the year are on display in the lobby.

The Staff

The Foundation's staff is now composed of 10 people, seven men, and three girls in the general office. An engineer was added this year and early in the coming year we hope to appoint a laboratory assistant who will also help with the monthly Industrial Hygiene Digest. The staff now includes a Research Director, a Medical Director, a Head Engineer, together with other engineers and chemists. Member companies can regard these specialists as advisory members of their own staffs and can call upon them accordingly.

We are glad to announce the establishment of an x-ray panel, under the auspices of the Foundation's Medical Committee, to which member companies may refer questionable chest x-rays. You may obtain details from Dr. Walmer, our Medical Director.

Industrial Health in General

Now a view of the field at large--Top developments of the year in industrial health include:

1. Completion of the Medical Survey of the Bituminous Coal Industry, which high government officials are reported to have said could well be a "pattern for all industries."

2. The grant of $575,000 from the United Mine Workers Anthracite Welfare Fund to Jefferson Medical College for research on "miners' occupational diseases."

3. Establishment of industrial health education centers at New York University and University of Cincinnati.

4. Completion of the Foundation's two-year study on Industrial Heath Departments by Dr. C. O. Sappington.

5. The Saranac Symposium on Beryllium.

6. Establishment of a Division of Medical Research by the U. S. Atomic Energy Commission.

7. The inauguration of sickness insurance in California and the introduction of some 30 bills on this subject in 13 other state legislatures at the 1947 sessions.

8. Expansion of industrial and research attention to problems of hygiology, resulting in many useful contributions to the literature. The Foundation endeavors to stimulate all such useful activity.

MR. FLETCHER: Each year the Foundation has been extremely fortunate in having an outstanding citizen as its keynote speaker. Today, our keynote speaker is one of the most interesting, as well as the most likable individuals I know. We have been friends for over twenty-five years, and after you have heard him speak, you will understand what I mean. He heads one of America's outstanding industrial organizations, the American Brake Shoe Company, which employs 10,000 people and operates 60 plants located in 21 States and several foreign countries. While his office is in New York, he spends much of his time in the plants, three of which are located here in Pittsburgh. He says the world is plagued with problems so immense that individually we are overwhelmed, but he expresses the opinion that if we will work together and concentrate on the problems one at a time, and on the ones of which we have some knowledge, then perhaps the other problems will take care of themselves! I suppose it is because of this belief that he has developed a first-hand knowledge of working conditions and industrial health. As a matter of fact, there is probably no man in the top management of a large industrial organization who is more actively interested in the broader aspects of employee health, than is this gentleman. That is why the Foundation recently elected him to its Board of Trustees, and why he is the keynote speaker for our meeting today. I am happy indeed to introduce Mr. William B. Given, Jr., President, American Brake Shoe Company.

interpretation. If not, there are many in the public who are all too ready to supply an unfavorable interpretation. Whatever you do, you must remember that Industrial Hygiene must be interpreted as managing with a heart.

MR. McMAHON: I would like to ask, Mr. Stock, what are the social responsibilities that the public seems to expect from the plant?

MR. STOCK: When we asked the citizens in a number of representative communities, "What should a plant do for its employees," the very first idea that comes into their mind is security. To a large extent this word, "Security," is just a nice tasting word to the American public, having no specific meaning. But a fairly large portion of the public use the word "Security" to mean good working conditions, healthful and safe jobs. A fourth to a third of the general public mention specifically that industrial plants should provide for their employees clean places to work, good lighting, good ventilation, showers, good drinking water, safety devices of all kinds and so forth.

MR. McMAHON: If I may ask one more question, what do you find is the benefit of using the "Y" in the formula, of telling the story?

MR. STOCK: I am glad you asked that. Recently, in a study of about 48 companies, we made a comparison of the top 12 and the bottom 12 in public vote in their communities. We found that all top 12 in public vote not only lived right but interpreted their living right. The management of the bottom 12 told us they didn't bother to interpret their good acts. None of the top 12, with average age older than the bottom 12, had ever had a strike. Of the bottom 12, eleven had had one or more strikes within the last 10 years.

We have studied numerous examples of the pay-off of adding good interpretation to good acts. Notably, we have observed cases where strikes have been averted or shortened, production increased, and costly turnover cut down. Mr. Given has pointed out that when people know that a plant is a good place to work they want to work there. This has tremendous meaning to a firm that's trying to hire and keep the most qualified workers.

SUMMARY OF FIELD STUDIES AND RESEARCH - 1947

THEODORE F. HATCH

Research Director, Industrial Hygiene Foundation
President, American Industrial Hygiene Association

Field research undertakings by the Foundation during the past year have exceeded the work of previous years in magnitude and scope as well as in the number of projects. Studies have covered a wide variety of representative industrial problems, ranging from investigation of underground operation to measurements of amounts and composition of wastes discharged from stacks. A few undertakings were routine in nature, requiring the use of highly standardized procedures for the correction of well-recognized hazards. For the most part, however, the studies have been more basic, even requiring entirely new procedures, and having to do with broader problems than the simple discovery and correction of a hazardous exposure. This is best indicated by the following list, which summarizes briefly the primary objectives of some major projects:

SUMMARY OF PRIMARY OBJECTIVES OF SPECIAL PROJECTS 1947

1. Coordination of dust control procedures (industry-wide).
2. Over-all appraisal of industrial health problems and advice on organization and operation of industrial hygiene service by company.
3. Preliminary investigations of new dust and fume problems to develop the needed research program for further study.
4. Basic engineering analysis of operations with Engineering Department to develop sound design procedures for ventilation and other control measures in place of empirical practices.
5. Over-all study of operations in a chemical plant to provide the most effective layout and design of a new plant and equipment for maximum "built-in" control of hazardous materials.
6. Development of an operator training program, basic control measures, and a continuous sampling and alarm system for a toxic gas which characteristically escapes accidentally rather than as a daily occurrence.
7. Basic investigation of radiant heat in a hot industry, to determine the primary sources and pattern of exposure, with a view

to the development of more effective control measures and further improvement of working conditions.

8. Further investigation of silicosis hazards and other dust exposures to provide more meaningful methods for distinguishing between hazardous and nuisance dusts and to give more meaning to occupational history as an essential aid in the diagnosis of chest x-ray films.

Industry-wide Studies

Of especial interest in our report last year was the number of projects undertaken on an industry-wide basis. Investigations of this type account for an even larger portion of the work this year. The procedure is entirely in keeping with the underlying function of the Foundation, which is to promote industrial health through the joint effort of its members. Furthermore, the returns are greater when investigations are planned and undertaken on the broader base of a joint undertaking. An outstanding feature of an industry-wide study is the advisory technical committee from the industry which is set up to take part in the planning of the investigation, selecting the plants for study, reviewing the data and collecting detailed information from the several plants in the group. There is greater utilization of the accumulated experience within industry in respect to a common problem. In a single investigation there is little opportunity to utilize this experience. What is more important, it is not possible to bring the varied experiences of different plants together for comparison and critical evaluation when plant studies are conducted separately.

The significance of these joint undertakings extends far beyond the enhanced value of the studies themselves. The free exchange of experiences, chemical and engineering data, and even details of manufacturing processes which has taken place in each case is a tribute to the sound policy and the high objectivity of the companies involved.

Mention has been made previously of the extensive studies conducted in potteries during the past three years. This year the Foundation was invited to visit all of the companies in the U.S. Potters' Association for the purpose of correlating the dust control work in that industry. Recently the Association conducted a Clinic on dust problems here at the Mellon Institute, the primary purpose of which was to discuss in considerable detail the dust control practices throughout the industry. Other industries may find this a worth while procedure and the Foundation will welcome the opportunity to assist in such meetings.

Expenditures for Greatest Good

Industrial hygiene is concerned with relationships between the health of the worker and the stresses of his job and of the industrial environment. The actual practices of industrial hygiene are based upon the assumption, borne out by research and experience, that these relationships can be expressed in quantitative terms. That is to say, the effects of the industrial environment upon the workers' health can be determined from quantitative measurements of the levels of exposure to offending substances or other

deleterious forces present in the environment. The factual and objective basis of industrial hygiene not only justifies its existence as a technical specialty, but is of the greatest practical value, since, so far as possible, it aims to substitute facts for opinions. By means of quantitative analysis, major health problems are distinguished from minor ones. Important sources of trouble are identified so that, in the health program, money and effort can be expended for the greatest good.

A formidable array of instruments and analytical techniques have been developed which are capable of measuring environmental factors with considerable precision. An equally extensive list of standards of permissible exposure have been proposed which make it possible, in the appraisal of working conditions, to determine whether or not health hazards exist. These developments are the result of many years of research in the laboratory and in industrial plants. The record of accomplishments in the practical solution of health problems in industry, through the use of quantitative methods, speaks for itself and accounts for the increasing numbers of industrial hygiene services being set up within industry.

Because of the excellent record of accomplishment, there is danger that industrial hygiene methods may become too standardized and acquire a degree of scientific sanctity not justified by the researches upon which they are based. This can be avoided only by constant, critical review of the procedures and standards and continuing research. Only in this way can the practical usefulness of industrial hygiene be extended and strengthened.

Research Needs

Research needs are emphasized by our day-to-day plant experiences where situations are repeatedly encountered which differ in many ways from those considered in the original studies upon which existing standards are based. The question constantly arises, therefore, as to the universal applicability of standards and procedures. The following examples may be taken from the work this year:

1. Shaver's disease—this is a pulmonary disease caused by fumes from the fusing of bauxite in electric furnaces for the production of synthetic abrasive. The causative ingredient in the fume is not known. Fume particles are sub-microscopic in size and cannot be studied properly by analytical methods in common use.

2. Asbestos dust exposures—a preliminary study of asbestos dust exposures, using the electron microscope and other advanced techniques, indicates the need for considerable further study of this problem and the development of new analytical techniques.

3. Silicosis—despite the many years of study of this disease much remains to be learned. Present criteria of the silicosis hazard are limited to the simple determination of dust concentrations and percentage of free silica in the dust. Little is understood about the importance of sub-microscopic particles not revealed by present analytical methods; no consideration is given to the possible influence of ingredients other than silica in a mixed dust; variation in the physical state of the air-borne dust which may alter the fate of the dust in the respiratory system is not now taken into consideration. Experienced roentgenologists emphasize

the non-specificity of lung changes seen in many chest x-ray films and depend upon the occupational history for confirming evidence of exposure to a hazardous dust before making a diagnosis of silicosis. This dependence upon an adequate history of the dust exposure emphasizes, in turn, the necessity for the most complete understanding of the etiology of the disease.

Research is needed in the engineering aspects of industrial hygiene as well as in respect to analytical methods and in the formulation of quantitative relationships between the worker and his environment. Major dependence is placed upon ventilation and other engineering measures for the control of occupational diseases. Despite the great progress that has been made, the design of industrial ventilating systems remains largely empirical, with little consideration given to the fundamental engineering factors which determine ventilation requirements. Too often, satisfactory results are obtained only because of over-design. In other cases, systems fail to perform satisfactorily, not because of deliberate curtailment of capacity but simply through routine, empirical following of past experience without considering basic differences in operation which alter the design requirements. Systematic study of the forces which cause the dispersion of contaminants into the plant atmosphere must form the basis of sound engineering design of industrial ventilating systems. Theoretical analysis, supplemented by engineering research, is required if this field of engineering design is to improve. Work in this direction has continued during the past year, but must be augmented by more extensive research facilities if any considerable progress is to be made.

Atmospheric Pollution

Community concern over industrial atmospheric pollution is increasing rapidly. In the near future industry will be called upon to curtail many wastes which now escape into the atmosphere. Research in the field of atmospheric pollution must be accelerated. Existing community standards, based largely on smoke, are not adaptable to the industrial waste problem. Sound relationships must be established between the community standards and the amounts of polluting material which industries may discharge into the atmosphere. Basic research in the methods of waste collection and air cleaning is required to supplement the practical experience upon which much of the available commercial equipment is based. To avoid confusion and conflicting claims when community regulations are adopted, industry will do well to take an early inventory of its atmospheric waste problems and to embark upon the needed researches.

The technical work of the Foundation has a practical basis and there is no place in the program for research except as it serves this same practical end. On the other hand, continued dependence upon routine and standardized procedures results in little progress. The great variety of problems encountered in our field work constantly emphasizes the limitations of present methods of appraisal and of engineering design and consequent need for research to supplement the practical work in industry. A primary objective of the Foundation is to foster such research for the advancement of industrial hygiene. For industry it is a good investment, especially as it should be oriented toward the discovery and development of better and more economical methods for the control of industrial health hazards.

INDUSTRIAL HEALTH PROGRAMS IN ACTION*

HAROLD A. VONACHEN, M.D.
Medical Director, Caterpillar Tractor Company
President-Elect, American Association of Industrial Physicians and Surgeons

Those of us who are devoting our professional lives to industrial medicine find it is a most pleasant, exciting, interesting, and absorbing specialty. From our established procedures, good health practices, daily and weekly experiences are built the "case histories" which go to make up our archives. To us it has opened new avenues of usefulness; to industry it has proven profitable; to the employee it has been highly beneficial.

I feel we are not fostering foolish fads nor indulging in vague humanitarianism. Today, the prospective employee sees industrial medicine not only as a profession that seeks to cure, but a profession that seeks to prevent. The attention and skills which are afforded employees creates in them a real incentive to improve their own health. Equally important, they carry these attitudes to their families, to their neighbors, and friends. They carry it to others. They are convinced that the program is for their benefit. Its influence extends into the community from which an industry draws its people. We have every reason to believe that our medical program has materially influenced the health standards of our community.

This is not looked upon by us as a philanthropy; above all, it is not paternalistic or done for its advertising effect or as a sop to the employees. Rather, it is an important function of management.

Disease prevention, you will agree, is modest and unassuming. Many industrial physicians may feel that they have prevented sickness or death in an individual, yet they are very often unable to prove it to others. Curative medicine, treatment, when successful is spectacular and highly convincing, although, even there, no one knows how much the recuperating power of the body and the mind or their resistance has helped to cure.

Most of Benefits Immeasurable

The potentialities of an industrial health program cannot be interpreted into dollars and cents, because it frequently results in confusion. Who can calculate the value to our Company in the reduction of lost time by curbing sickness or epidemics? Furthermore, it would be most difficult to appraise the assets to our Company, or the economic savings accruing to our employees, resulting from adequate physical examinations. What about the many consultations, referrals, and medical opinions offered employees and those affecting their families, which are aired in the industrial physician's office

* Report presented by Milton Kronenberg, M.D., Assistant Medical Director, Caterpillar Tractor Company.

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— N —

National Association of Fan Manufacturers
National Association of Mutual Casualty Companies*
National Crushed Stone Association, Inc.
National Grinding Wheel Company
National Industrial Sand Association
National Lead Company
National Pulverizing Company
National Sand & Gravel Association
National Slag Association
National Steel Corporation
National Supply Company
The Neville Company
New Jersey Pulverizing Company
New Jersey Zinc Company
North American Refractories Company
Norton Company
Norton Pike Company

— O —

Ontario Mining Association
Oriental Abrasive Company
Ottawa Silica Company
Owens-Corning Fiberglas Corporation
Owens-Illinois Glass Company

* Multiple Membership

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— P —

Peninsular Grinding Wheel Company
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Pittsburgh Coke & Chemical Company
Pittsburgh Plate Glass Company
Portland Cement Association
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Powers X-Ray Products, Inc.
Precision Grinding Wheel Company, Inc.
The Pullman Company
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R

Raybestos-Manhattan, Inc.
Republic Steel Corporation
Revere Copper and Brass, Incorporated
Rialto Mining Corporation
H. H. Robertson Company
Robertson Manufacturing Company

— S

Safety First Supply Company
Sand Products Corporation
Claude B. Schneible Company
Scott Aviation Corporation
Sharon Steel Corporation
Shenango Furnace Company
Simonds Abrasive Company
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South West Box Company
St. Joseph Lead Company
Standard Lime & Stone Company
The Standard Ultramarine Company
Sterling China Company
Sterling Grinding Wheel Division
Sun Oil Company
Sun Sand Company
Sylvania Electric Products, Inc.

— T —

Tata Industries, Ltd.
Taylor, Smith & Taylor Company
Tennessee Copper Company
Texas Gulf Sulphur Company
Titan Abrasives Company
Toledo Edison Company
Trenton Potteries Company

— U —

Union Asbestos & Rubber Company
Union Carbide & Carbon Corporation
United States Potters Association
United States Smelting Refining & Mining Company
United States Steel Corporation of Del.
Universal Sanitary Manufacturing Corporation
Utilities Research Commission*

— V —

Valley Mould & Iron Corporation
Van Cleef Bros.
Vanadium Corporation of America
Vesuvius Crucible Company
Vitreous China Plumbing Fixtures Association
Vitrified Wheel Company

W

Waltham Grinding Wheel Company
Washington Mills Abrasive Company
Wedron Silica Company
Western Precipitation Corporation
Westfield Grinding Wheel Company
Westinghouse Air Brake Company
Westinghouse Electric Corporation
Whitehead Brothers Company
Willson Products, Inc.
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Wolf's New Process Abrasive Wheel, Inc.

— Y —

Youngstown Sheet & Tube Company

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Naval Air Station, Pensacola, Florida
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Navy Yard, Boston, Mass.
Navy Yard, Bremerton, Wash.
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Navy Yard, Pearl Harbor, Hawaii
Navy Yard, Philadelphia, Pa.
Navy Yard, Portsmouth, N.H.
Navy Yard, Portsmouth, Va.
Navy Yard, San Diego, Calif.
Navy Yard, San Francisco, Calif.
Navy Yard, San Pedro, Calif.
Office on Industrial Relations, Navy Dept.

Other Federal Agencies

Tennessee Valley Authority
U. S. Civil Service Commission
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