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16. Abstract (Limit: 200 words) This testimony discussed coal mine health research efforts and technical assistance programs offered by NIOSH in support of protecting the health and safety of the miner. NIOSH has conducted research directed toward protection of life and health, detection of respiratory impairment, and prevention of occupational diseases of coal miners; established coal mine health standards; and assured the availability of medical examinations for underground coal miners. Morbidity and mortality studies indicated that coal mining continues to be one of the most hazardous occupations in the United States, causing excessive numbers of cases of chronic bronchitis and airway obstruction, coal workers' pneumoconiosis, deaths due to accidents and assorted respiratory diseases, and excessive numbers of lung cancer and stomach cancer deaths. The third round of the National Study of Coal Workers' Pneumoconiosis was scheduled to begin in fiscal year 1977. A prospective study of 400 new miners was underway to determine whether miners exposed to coal mine dust levels at or below the 2mg/m3 limit will develop significant lung impairment. The introduction of diesel powered equipment into coal mines was also of concern due to possible health effects of long term exposure to a combination of coal dust and the gases and vapors of diesel exhaust. An international workshop was being held to identify and address research gaps in the effects of diesel engines in underground coal mine operations. Hearing loss among miners has also been the subject of research. Specifics of the medical examination program for miners and the national coal workers' autopsy study were reviewed.

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Statement of
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National Institute for Occupational Safety and Health
Center for Disease Control
Department of Health, Education, and Welfare

Before the Subcommittee on Labor Standards
House Committee on Education and Labor

June 29, 1977

Mr. Chairman and Members of the Subcommittee:

I am Edward J. Baier, Deputy Director of the National Institute for Occupational Safety and Health (NIOSH). Before accepting the position as Deputy Director of NIOSH in 1972, I was Director of the Bureau of Mines and Occupational Health and Safety for the Pennsylvania Department of Environmental Resources. Accompanying me today are staff from the NIOSH Division of Respiratory Disease Studies located at our Appalachian Laboratory for Occupational Safety and Health (ALOSH) in Morgantown, West Virginia. Dr. Geoffrey Taylor is the Associate Director, Mr. William L. Wagner is Chief of the Environmental Investigations Branch, and Mr. Harlan Amandus is Chief of the Examination Processing Branch. We welcome the opportunity to appear before you today to discuss our coal mine health research and technical assistance programs and to express our support for your efforts to emphasize the importance of protecting the health as well as the safety of the miner in amending existing Federal mining legislation. I would like to review briefly our authorities under the Federal Coal Mine Health and Safety Act and then discuss certain areas of our program in more detail.

NIOSH COAL MINE HEALTH RESPONSIBILITIES

Under the Federal Coal Mine Health and Safety Act of 1969 (Coal Mine Act), NIOSH conducts research directed toward protection of life and health, detection of respiratory impairment, and prevention of occupational diseases of coal miners. We also establish coal mine health standards and assure the availability of medical examinations for underground coal miners. These standards are published in the Federal Register by the Secretary of the Interior as proposed health standards. The Mining Enforcement and Safety Administration (MESA) of the Department of the

Interior establishes coal mine safety standards and enforces both health and safety standards. Under the Coal Mine Act, NIOSH has joint responsibility with MESA to test and certify respirators and coal mine dust personal samplers. Under this program, our Testing and Certification Branch conducts all the tests on respirators and personal samplers with the exception of electrical components. Electrical safety tests are conducted by MESA. Certified equipment receives approval labels both from NIOSH and MESA.

The total NIOSH budget authority for fiscal year 1977 is \$48.8 million. About \$2.1 million of this budget has been allocated to coal mine health research and another \$2.1 million for related services to coal miners and mine operators. NIOSH conducts more research on occupational health problems of coal miners than on any other single occupational group.

COAL MINE HEALTH RESEARCH

Morbidity and mortality studies show that coal mining continues to be one of the most hazardous occupations in the United States. Studies have shown that coal miners have excessive rates of chronic bronchitis and airway obstruction when compared with a control population. Coal workers' pneumoconiosis, both in its simple and complicated form, continues to be a common finding in morbidity studies. Mortality studies have shown that coal miners have consistent excesses in death rates due to accidents and assorted respiratory diseases. In addition, a recent study of a large group of coal miners suggests significant excess in deaths from both lung cancer and stomach cancer. Coal miners also commonly suffer hearing impairment or hearing loss as a result of exposure to excessive noise.

Based on 1976 estimates, 44 percent of U.S. coal production is derived from underground mining which employs 71 percent of the coal mining

population. Underground mining currently accounts for 82 percent of mining fatalities and 85 percent of non-fatal injuries. Recent chest X-ray studies of the prevalence of coal workers' pneumoconiosis for underground miners suggest that approximately 13 percent have the disorder, and the prevalence is about 2.5 percent for surface miners. These figures are a conservative indication of the overall effect, since prevalence studies cannot take into account sick miners who have left mining. Moreover, chronic obstructive airways disease which is detected by lung function tests has been found in 30 percent of underground miners and 19 percent of surface miners.

We will begin the third round of the National Study of Coal Workers' Pneumoconiosis in fiscal year 1977. The first two national studies were conducted from 1969 to 1971 and from 1972 to 1975 in selected mines. Although approximately 10,000 miners in each of these epidemiologic studies were examined by medical teams from our Morgantown laboratory, we had to rely on information previously collected for regulatory purposes to estimate what dust levels the miners had been exposed to. In the third round in addition to conducting medical examinations, we will work cooperatively with the Bureau of Mines, MESA, and the National Bureau of Standards to study the adequacy of the coal mine dust sampling program. These studies of the mining environment, in addition to the medical tests, should enable us to better evaluate whether sampling techniques are appropriate and whether the existing dust levels, in fact, effectively protect the miners' health.

NIOSH is conducting a prospective study of 400 new miners. The objective of the study will be to determine whether miners exposed to coal mine dust levels at or below this 2 mg/m³ (milligrams per cubic meter of

air) standard develop significant lung impairment. In a related investigation, NIOSH will study respiratory disease in a group of 400 ex-miners to assess the effect of outward migration of sick miners on results obtained from the National Study of Coal Workers' Pneumoconiosis. Miners in the Morgantown, West Virginia area will be studied over a 3-year period.

It is important that before a new technology is introduced, its occupational health and safety impact be evaluated. Historically, advances in technology have been accompanied by new hazards which are often apparent only many years later, after workers become sick or die. It is particularly important, with the current emphasis on increased coal production, that we do not continue to repeat the mistakes of the past.

The introduction of diesel-powered equipment into coal mines is of particular concern to NIOSH because of the possible health effects of long-term exposure to a combination of coal dust, known to cause pneumoconiosis, and the gases and vapors of diesel exhaust, many of which are known or suspected to cause pulmonary disease. NIOSH is working cooperatively with MESA to study the health effects of exposure to mine contaminants and diesel exhausts components found in non-coal underground mines. NIOSH is also conducting a study in coal mines where diesel engines are regularly used underground.

Although standards currently exist for coal mine dust, nitrogen dioxide, and some other components of diesel exhaust, these are based on controlling health effects of exposures to individual substances. We cannot be confident that adherence to these individual standards will protect miners exposed to complex mixtures of substances such as diesel exhaust. In fact, there is scientific evidence that the adsorption of certain diesel exhaust components to respirable-sized particles can

potentiate their effect upon the lung tissues. The possibility that such synergism exists between respirable coal dust particles and known or suspected respiratory irritants found in diesel exhaust must be seriously considered. In addition, we know very little about the possible carcinogenic hazard of use of diesel engines in coal mines. We are concerned however since there are known carcinogens present in diesel exhaust.

In addition to our medical and environmental studies, NIOSH is sponsoring an international workshop designed to identify and address research gaps in the effects of diesel engines in underground coal mines. Based on available evidence concerning underground exposure to diesel emissions, NIOSH has advised MESA to caution all concerned in the coal mining industry against further introduction of diesel equipment into underground mines until the health, safety, and production implications have been fully assessed.

In a survey of 1,500 miners, NIOSH found that underground coal miners have measurably worse hearing than the national average. Preliminary evidence also indicates that miners have a higher than normal incidence of ear abnormalities. These results were obtained by examining miners at eleven randomly selected mines in Kentucky, Pennsylvania, and West Virginia. Noise surveys were performed at the same mines by MESA. This study does not support the notion that the intermittent nature of noise exposure in a coal mine makes it less hazardous. The results reaffirm the need for effective hearing conservation practices, including developing quieter machinery, conducting periodic hearing tests on miners, using personal ear protectors as appropriate, and educating the miner and mine operator about the risk associated with noise exposure and preventive

measures available. NIOSH has begun a followup study to investigate the unexpectedly high incidence of middle ear abnormalities found among these miners.

In addition to clinical and epidemiological studies, NIOSH conducts basic research on the mechanisms of lung disease found among coal miners. These include physiological, biochemical, and microbiological studies on the effect of coal dust on the lungs. One of the purposes of these studies is to learn why there is individual variation in response to given coal mine dust exposure.

RELATIONSHIP BETWEEN HEALTH AND SAFETY

In separating mine health research from mine safety research, it is important not to overlook those aspects of human behavioral research that have important implications for job safety. The Institute has been conducting limited research in the area of human behavioral factors affecting job safety. NIOSH recently brought these and other safety research projects into a new Division of Safety Research located in Morgantown. Human behavioral studies tend to link injuries to such factors as effects of shift work, eye-hand coordination, and the role of the first line supervisor. Research has already established that job stress is a hazard that can make workers ill, less productive, and more likely to have an accident.

A NIOSH contract study evaluated the impact of physiological, behavioral, and organizational factors upon the safety performance of coal miners. A sample of 1,000 mine personnel selected from 15 matched pairs of high- and low-accident rate mines was surveyed regarding their attitudes toward safety and accident related occupational issues. The data indicated that keeping good safety records, correcting safety hazards in the mine,

having miners wear protective equipment, and upholding the company's safety record were more important to management in low-accident mines than to management in high-accident mines. Companies in which workers perceived management as having a great concern for safety did, in fact, have better safety records than those where this was not perceived.

MEDICAL EXAMINATION PROGRAM

Section 203 of the Federal Coal Mine Health and Safety Act provides that each underground coal miner shall have the opportunity to have a chest X-ray at intervals not to exceed 5 years.

NIOSH plans to begin the third round of these examinations in January 1978. They will be given at a facility approved by NIOSH which is convenient to the miner at no cost to him. The chest X-rays along with a work history are submitted to our Morgantown Laboratory for processing, evaluation, and filing. The medical findings are reported to MESA for transmittal to the miner. MESA also notifies the miner of any rights he may have as a result of the X-ray findings. If a miner's chest X-ray reveals evidence of category 2 or 3, simple pneumoconiosis, complicated pneumoconiosis, or the development of category 1, simple pneumoconiosis with less than 10 years of working in a coal mine, the miner has a right to transfer to a position in the mine where the dust level is less than 1 mg/m³ of air. If such an area does not exist, he has a right to be transferred to an area where the level does not exceed 2 mg/m³. The Act provides that the miner shall be transferred without reduction in his rate of pay.

More than 160,000 examinations have been given since the program began in 1970. The prevalence of coal workers' pneumoconiosis during both rounds was approximately 11 percent. By January 1, 1977 5,853 miners had been

notified that they were eligible to transfer and 1,193 of these miners (20 percent) exercised their option.

In reviewing the administration of the first two rounds of medical examinations, we have been concerned about the relatively poor participation. Examinations were not received for any miners for approximately one-third of the coal mines during the second round of examinations. The lowest level of participation occurred in coal mines which employed fewer than 100 miners. These smaller mines employ 33 percent of the miners and represent 80 percent of the coal mines in the United States. Reasons for poor participation include a scarcity of NIOSH approved facilities in a few coal mine areas, a lack of awareness, interest and confidence in the program on the part of some miners, and noncompliance with the Coal Mine Act on the part of some coal mine operators.

To deal with this problem, NIOSH has taken several positive steps:

1. The medical examinations program at ALOSH has been reorganized and has been provided with its own computer and more efficient data processing equipment.
2. An informational and educational program is being developed for implementation during the third round of examinations.
3. A regular publication covering the results of these examinations, as well as abstracts of research in the area of coal workers pneumoconiosis, is being developed for distribution to all coal mine operators, union locals, and miner associations.
4. Finally, in the third and in future rounds of medical examinations, NIOSH will notify MESA of cases of noncompliance on the part of coal mine operators. MESA will instruct their inspectors to take necessary enforcement action.

NIOSH is also revising its regulations covering the medical examination program to streamline its administration, to obtain a more consistent diagnosis, interpretation, and classification of chest X-rays, and to comply with recent legislation including the Privacy and Freedom of Information Acts. Included in these proposed regulations are provisions to cover underground coal mine construction workers, previously not covered in this program. We are developing appeal procedures for both the miner and the coal mine operator. The regulations will continue to allow mines participating in the National Study of Coal Workers Pneumoconiosis, an epidemiological research survey of approximately 10,000 working coal miners, to have their miners examined at no cost. Other operators, on a mine by mine basis, will be given the opportunity to select a specified period of six months during which their examinations must be provided. This schedule will continue to recur at 3 1/2 to 4 1/2 year intervals. Together with the increased emphasis on participation and compliance, we feel these new regulations will increase the effectiveness and quality of the medical examination program.

NATIONAL COAL WORKERS' AUTOPSY STUDY

The National Coal Workers' Autopsy Study is authorized by Section 203(d) of the Coal Mine Act. The study is a service program for survivors of coal miners and is conducted with the cooperation of the United Mine Workers of America and MESA to assist with benefits where applicable. With the consent of a miner's widow or next-of-kin, NIOSH provides for pathologist to perform an autopsy on a miner. The results of approximately 2,100 autopsies have been submitted since the program began. We also provide a team, including a pathologist to assist in the event of a mine disaster, such as we did at the Scotia Mine disaster near

Whitesburg, Kentucky, and at the Porter Tunnel Mine, Tower City, Pennsylvania.

COAL MINE HEALTH STANDARDS

The Federal Coal Mine Health and Safety Act requires HEW to establish mandatory health standards for underground coal mines and authority for the development of these standards has been delegated to NIOSH. Interim standards were established on June 30, 1970, implementing the requirements of the law to reduce the level for respirable coal mine dust to 3.0 milligrams per cubic meter of air. In 1972, that level was reduced to 2.0 milligrams per cubic meter of air. Subsequently other health standards have been revised and developed.

Section 205 of the Coal Mine Act requires the Secretary to establish a formula for determining the standard when the concentration of respirable dust in a mine contains more than 5 percent quartz. The quartz standard was established March 16, 1971.

Revised amendments for respirable mine dust in underground coal mines are being forwarded to the Secretary of HEW for transmittal to the Secretary of the Interior. The proposed amendments would: (1) revise standards for silica dust and other airborne contaminants to conform with improved standards recently developed by NIOSH and recommended by the American Conference of Governmental Industrial Hygienists; (2) provide for increased training in the maintenance and calibration of sampling equipment and in the collection of samples of respirable coal mine dust and other airborne contaminants; (3) substitute area sampling for periodic sampling of miners working in areas not directly associated with removal of coal from its seam; (4) revise sampling schedules and procedures to remove ambiguities and extraneous requirements; and (5) revise the definition of

respirable dust to conform with section 202(e) of the Federal Coal Mine Health and Safety Act of 1969.

In accordance with Section 206 of the Coal Mine Act, HEW established on July 7, 1971, a standard specifying a maximum noise exposure level of 90 dBA for up to an 8-hour working day in all underground coal mines. NIOSH recently submitted to the Department of the Interior proposed amendments to the Coal Mine Health Noise Standard to permit the use of integrating noise dosimeters to meet the noise measurement requirements of Parts 70 and 71 of Title 30, CFR.

Recommendations were also made to the Department of the Interior for their standards on sanitation, potable water, and disposal of refuse and sewage in underground coal mines. These standards were published on August 14, 1970. NIOSH has since revised and expanded its recommendations for sanitation standards, and these are undergoing interdepartmental review. We are also contributing to revision of emergency medical standards in coal mines. Development of a proposed document for improved emergency medical care at coal mines will begin in July. It is expected that the amendments will include first-aid equipment and supplies, first-aid training, and the relationships between coal mine operators and health care providers.

SURFACE MINE STANDARDS

NIOSH has developed mandatory health standards for surface mines and surface work areas of underground coal mines. A notice of proposed rule-making on standards for respirable dust, airborne contaminants, asbestos, and noise was published November 7, 1972. After consideration of written comments, these standards, with the exception of asbestos, were promulgated on May 13, 1974. A public hearing on the asbestos standard was held June

5, 1974, and findings of fact were published on August 5, 1974. The asbestos standard, which was transmitted to the Department of the Interior in January 1975 has not yet been promulgated.

Mr. Chairman, this concludes our formal testimony. We will be pleased to answer any questions you or members of your Subcommittee may have.