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**PROTECTING  
THE  
HEALTH  
OF  
COAL MINERS**

**an interagency approach**



# **PROTECTING THE HEALTH OF COAL MINERS**

## **An Interagency Approach**

by

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# PROTECTING THE HEALTH OF COAL MINERS

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*Marilyn K. Hutchison, M.D.*

### INTRODUCTION

Throughout coal mining's long history in the United States, the death toll among workers in underground mines has continued to be very high. Underground coal miners have suffered sudden death from fires, explosions, and cave-ins; and slow miserable death from the crippling lung disease, coalworkers' pneumoconiosis ("black lung").<sup>1</sup>

On December 30, 1969, President Richard M. Nixon signed the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173). This law was enacted to protect the health of the coal worker and to guard the miner's safety in his underground work environment.

Because P. L. 91-173 covers both the health of the miner and the safety hazards of the mining environment, responsibility for implementing the Act was assigned to two Federal departments — the Department of the Interior, because of its long-time concern for mining affairs, and the Department of Health, Education, and Welfare (HEW) due to its responsibilities and expertise in health protection.

Essentially, HEW, through the National Institute for Occupational Safety and Health (NIOSH) is concerned with the health of the individual miner, while the Interior Department, through the Bureau of Mines (USBM) is concerned with maintaining a safe mining environment. However, because of the intimate relationship between personal health and environmental exposure, the separation of responsibilities is somewhat blurred in the major feature of the Act — respirable dust exposure. Close cooperation between NIOSH and USBM has been necessary in order to define the needs and boundaries of their respective programs, to avoid duplication of effort, and to identify potential operating problems as well as means for resolving them. The absence, to date, of significant problems in this interagency working relationship may be largely attributed to the effective liaison maintained between USBM and NIOSH.

P.L. 91-173 is primarily an occupational law designed to improve the working conditions in the coal mining industry and thereby protect the health of coal miners. However, the Act also includes provisions for compensating miners already disabled by coal workers' Pneumoconiosis and the survivors of miners whose death resulted from the disease. This compensation program, which is described in Title IV of the Act (Black Lung Benefits) is administered by the Social Security Administration of HEW, and is separate from the health and safety provisions of the law.

This paper will describe the liaison arrangements of NIOSH and USBM, discuss the principal health protective measure of the Act — respirable dust standards, and review the compensation features of Title IV for disabled miners and their survivors.

### HEALTH OBJECTIVES

The health provisions of the Federal Coal Mine Health and Safety Act of 1969 are directed primarily toward the prevention of coalworkers' pneumoconiosis (CWP or "black lung"). The major occupational disease of coal mining, CWP has been the cause of most work-related deaths in the coal industry. In 1970, the 29 States with coal mines reported 255 mining fatalities from underground roof falls, fires, explosions, and machinery accidents.<sup>1</sup> During this same period, thousands of non-working miners\* died from pneumoconiosis as a result of breathing excessive amounts of respirable coal dust during their working years in the mines. National figures are not available, but Pennsylvania reported 2,450 deaths from CWP in 1969.<sup>2</sup>

The Secretary of HEW is specifically charged by the Act to develop standards to protect the health of coal miners. Enforcement of standards is carried out by the U.S. Bureau of Mines. The principal health objectives of the Act are:

- (1) to provide all active coal workers with medical examinations to detect the presence and extent of pneumoconiosis;
- (2) to reduce the concentration of respirable dust in coal mines so that no new cases will develop and progression of existing disease will be minimized;
- (3) to transfer workers with evidence of pneumoconiosis to "safe" areas of low dust concentration, as further protection against progression of the disease;
- (4) to protect coal workers from occupational hearing loss due to excessive noise;

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\*Non-working miners include those retired and those unable to work because of breathing difficulties.

- (5) to insure minimum standards of sanitation in the workplace; and
- (6) to provide every injured worker with adequate first aid assistance and transportation to the nearest source of medical care.

Throughout the text of the Act is the continuing affirmation that employers are responsible for maintaining a safe and healthful workplace.

### **INTERDEPARTMENTAL LIAISON**

Effective implementation of the Act requires continuing interaction between Interior and DHEW and between operating programs of both agencies. Program decisions, with considerable frequency, include policy decisions at the upper and middle management levels and technical decisions at the operating level. Such decisions must be made not only within each Department, but jointly, as well; effective communication is absolutely vital. A variety of arrangements have been utilized to effect close cooperation and communication, including the following:

#### **Advisory Groups**

The Secretary of the Interior has appointed an Advisory Committee on Coal Mine Safety Research. Similarly, the Secretary of HEW appointed an Advisory Council on Coal Mine Health Research. The nature of the membership of both groups is specified in the Act. Each group considers matters relating to its respective research area (health or safety) and consults with, and makes recommendations to, the appropriate Secretary. The groups meet regularly to review program activities, recommend priorities for grants and contracts, and to consider other topics relevant to accomplishing the purposes of the Act.

#### **Full Time Assignee**

The Public Health Service has traditionally provided professional assistance in health matters to other Federal agencies through its Commissioned Corps medical officers. The first formal agreement to supply medical consultation and services to the Bureau of Mines was signed by both agencies in 1911, and this working relationship has been in existence more or less continuously since that time.

Because of the broad scope of the Act in providing health protection to the coal worker, a full-time medical officer has been assigned to USBM from NIOSH to serve as advisor in health matters and as a liaison representative at the technical level. This arrange-

ment has helped, in turn, to bring about and maintain close contact between technical staff of the two agencies, to expedite exchange of program information, and to coordinate joint agency efforts in conveying appropriate medical and legal information to coal workers and mine operators.

### **Other Program Contacts**

A system of informal contacts has developed as a result of the above liaison arrangements. Direct program communication may take the form of personal telephone calls or office visits — or ad hoc groups working together to accomplish specific objectives for mutual benefit. One such interagency group, which includes both program and legal staff, meets periodically to review proposed health standards prior to their publication in the Federal Register. Other interagency groups are developing guidelines for noise control and for sanitation practices in coal mines.

These liaison arrangements have played a vital role in enabling two Federal agencies to work together effectively in implementing the provisions of an extremely complex occupational law.

### **ABOUT THE DISEASE**

Coal workers' pneumoconiosis (CWP), also known as miner's asthma, anthracosilicosis and "black lung", is a chronic condition that may be defined, in medical terms, as the accumulation of coal dust in the lungs and the tissue reaction to its presence.<sup>13</sup> The disease is caused by inhalation of coal mine dust<sup>14</sup> and is characterized by persistent cough, the production of sputum, and dyspnea (shortness of breath). Diagnosis is based upon a history of prolonged exposure to coal dust and typical roentgenographic (X-ray) patterns of dust retention in the lungs.

The basic lesion of coal workers' pneumoconiosis is the coal macule. The macule evolves by the incorporation of dust-filled macrophages (small phagocytic cells that engulf foreign particles) into the walls of respiratory bronchioles and adjacent alveoli. In many individuals, these bronchioles undergo dilatation and give rise to the condition known as focal emphysema.<sup>14</sup> The radiological features of simple pneumoconiosis in coal workers are due to the dust itself plus small amounts of fibrous tissue; chest X-rays reveal neither the existence nor the degree of focal emphysema.<sup>15</sup> Simple pneumoconiosis in coal workers shows identical features, and the same focal type of lesion, regardless of the rank of coal worked, that is, whether anthracite or bituminous.<sup>15</sup>

Coal workers' pneumoconiosis usually takes many years to develop. Eventually, in severe cases, simple pneumoconiosis may pro-

gress to the complicated form of the disease — progressive massive fibrosis — in which there is widespread consolidation involving large amounts of dust enmeshed in connective tissue, typically in the upper parts of the lungs.<sup>14</sup>

## Prevalence

Serious studies of the effects of coal dust in miners have been conducted only in the last half-century. A study of anthracite coal miners between 1928 and 1931 revealed that about 23 percent of miners had evidence of “anthracosilicosis” due to inhalation of coal dust.<sup>3</sup> American investigators continued to consider silicosis to be the only dust disease of any importance long after 1936, when the Medical Research Council of Great Britain initiated studies of the epidemiology, pathology, and roentgenography of chest diseases in bituminous coal miners. These and subsequent studies in both countries documented the existence of anthracosilicosis (later known as pneumoconiosis) in bituminous coal miners and further related X-ray evidence of nodulation to the disease.<sup>4,5</sup>

In a 1963-65 survey of Appalachian bituminous coal miners, Lainhart reported definite roentgenologic (X-ray) evidence of pneumoconiosis in 9.8 percent of working miners (6.8 percent simple CWP, and 3.0 percent the complicated form), and in 18.2 percent of non-working miners (9.2 percent simple, 9.0 percent complicated).<sup>6</sup>

At the close of 1972, preliminary findings in the National Study of Coalworkers’ Pneumoconiosis showed that 8.8 percent of the 9,076 bituminous coal miners surveyed had evidence of pneumoconiosis (6.3 percent simple, and 2.5 percent complicated).

## Diagnosis

To measure the law’s effectiveness in eliminating pneumoconiosis from the coal mining industry, it is necessary both to determine how many miners already have the disease and to detect new cases as they occur. The chest X-ray was selected as the basic diagnostic screening tool for detection of CWP, and in the first round of examinations, the chest X-ray was the only test administered.

As we have seen, pneumoconiosis is due to the accumulation of dust in the lungs. In order to make a diagnosis of pneumoconiosis, there must be a history of prolonged exposure to coal dust, and objective evidence of dust retention (nodulation) in the lungs. This evidence is easily obtained at autopsy, but in the living miner the only safe and simple test is the typical X-ray pattern of opacities signifying dust retention.

The chest X-ray does not measure pulmonary function or disability, although total disability may be presumed when there is X-ray evidence of progressive massive fibrosis.

Preliminary data from current research by NIOSH suggest that there may be a reliable correlation between the various stages of pneumoconiosis, as determined by the X-ray, and the results of certain pulmonary function tests. If these early conclusions are supported in the final data, other laboratory tests may eventually be used in place of, or in addition to the chest X-ray in the diagnosis of coal workers' pneumoconiosis.

In retrospect, the selection of the chest X-ray for industry-wide screening was a sound choice. The X-ray is a safe and painless test; it is simple to administer by qualified physicians and technicians; it uses equipment that is widely available; it is acceptable to workers, since it requires no preparation (such as resting, fasting, etc.) and it involves a minimum of time. The X-ray is convenient for mass screening from an administrative point of view, also. Finally, the test result itself — the X-ray film — may be kept on file for examination at a later date, both to check the original interpretation and to measure progression of the disease in an individual miner. The determination of pneumoconiosis has become a controversial issue, however, for a number of reasons. P.L. 91-173 is an occupational law, with its primary purpose to prevent death, injury, and disease from coal mining. Although miners and their families have no quarrel with this objective, many miners are more concerned with the compensation provisions of the Act. And the basis for compensation rests with the determination of what, in fact, constitutes pneumoconiosis or "black lung."

To most coal miners, shortness of breath, cough, and dust-laden sputum are evidence of "black lung disease", regardless of the label that doctors may give to these symptoms. Miners have been informed that the law provides compensation to those with black lung, and frequently believe that all respiratory symptoms result from working in the mines. Consequently, most miners with symptoms of pulmonary impairment expect to be included in any benefits awarded. In other words, the realities of the law frequently do not meet the expectations of the workers.

Much of the adverse publicity and criticism laid at the door of Federal agencies hinges on this difference between the expectations of the mining community and the actual language of the Act which, as in other workmen's compensation laws, restricts benefits to death or disease clearly attributable to employment. At the present time, pneumoconiosis is the only disease of coal miners with

medical evidence that it is work-related\*. The Act does not cover job injuries, which are provided for in State workmen's compensation laws.

Respiratory symptoms are, of course, not confined to the coal mine areas, nor even to the male population. Wheezing, coughing, sputum, and shortness of breath are common in men and women with chronic bronchitis and emphysema in every geographic area, including those states where there are no coal mines.

Even when miners have symptoms that are clearly disabling, coal dust may not always be the culprit. Smoking, air pollution from other causes, frequent respiratory infections, and the like may all be contributory factors in pulmonary dysfunction and may not necessarily be work-related. Even when respirable dust in coal mines has been reduced to safe levels throughout the industry, pulmonary disability will undoubtedly continue to occur from other causes.

### DUST STANDARDS

On December 9, 1968, the Department of Health, Education, and Welfare recommended to the Department of the Interior an interim standard for respirable dust levels in bituminous coal mines not to exceed 3.0 milligrams per cubic meter of air as measured by the Mining Research Establishment (MRE) horizontal elutriator instrument.<sup>61</sup> This standard, later incorporated into the P.L. 91-173 regulations, was based upon data from British and European sources and data from the Commonwealth of Pennsylvania.

How effective is the 3.0 milligram standard? Judging from recent data published by the U.S. Bureau of Mines, the new standard has been highly effective in reducing dust levels in American bituminous coal mines.

The average dust concentrations in high-dust areas of 29 coal mines in surveys conducted before and after the Federal Coal Act fell markedly between 1968-69 and March 1971 (Figure 1). February 1972, dust sampling by Federal Coal Mine Inspectors revealed that most high-risk occupations were below 3.0 mg/m<sup>3</sup>, and the average dust concentration of mines sampling in November 1972 was below 2.0 mg/m<sup>3</sup> in 80 percent of the mines. (Table 1) In addition, 41 percent of these mines had concentrations below 1.0 mg/m<sup>3</sup>. (Table 2.)

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\*Note: Recent amendments to the original Act have broadened the legal definition of pneumoconiosis to include other respiratory impairments. If an X-ray is interpreted as negative but other evidence demonstrates the existence of a totally disabling respiratory impairment, the miner is considered totally disabled due to pneumoconiosis.<sup>77</sup>

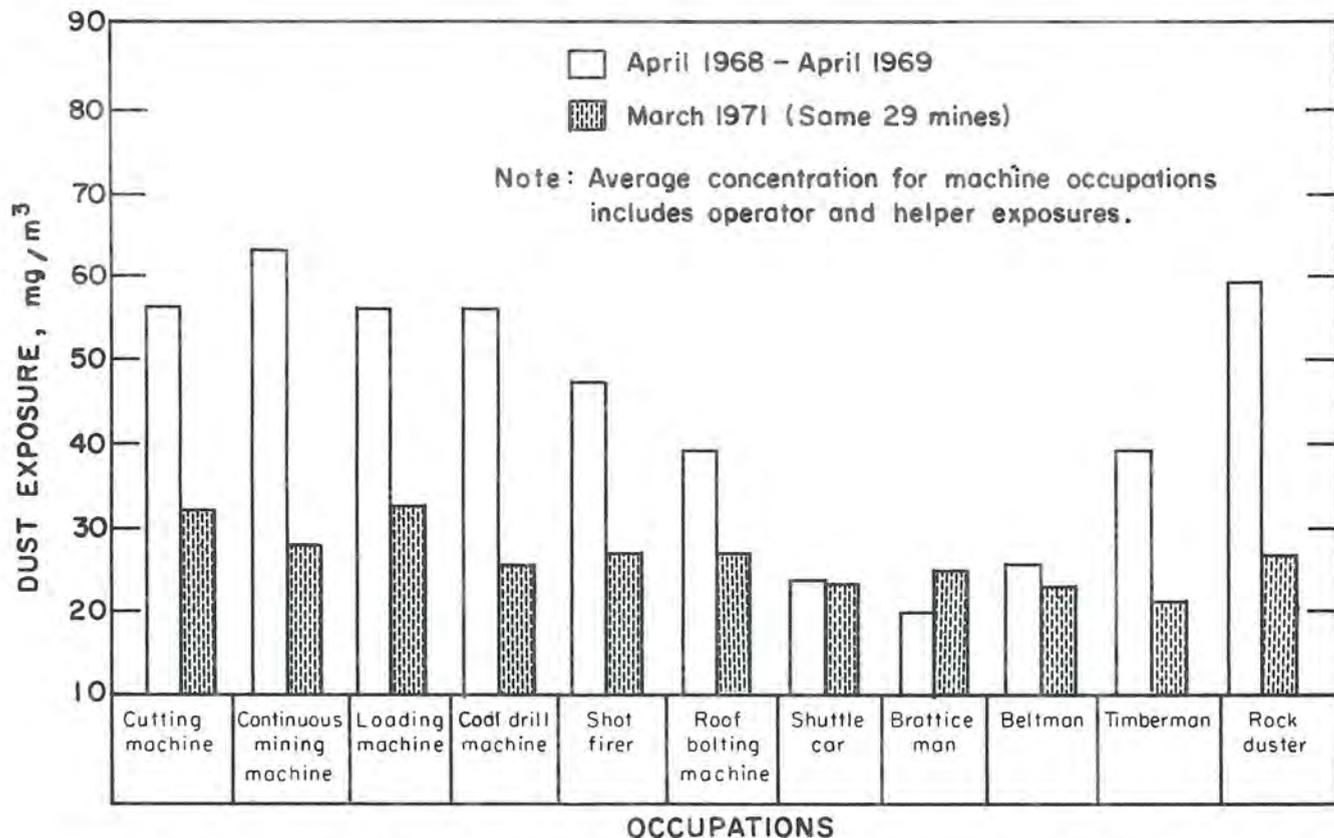


Figure 1. COMPARISON OF AVERAGE RESPIRABLE DUST CONCENTRATIONS IN 29 COAL MINES, BEFORE AND AFTER THE FEDERAL COAL ACT. (From Bureau of Mines Technical Progress Report No. 32, An evaluation of the Respirable Dust Sampling Program in United States Underground Coal Mines, April 1971.)

**TABLE 1**  
**RESULTS OF RESPIRABLE DUST SAMPLES**  
**TAKEN BY FEDERAL MINE INSPECTORS**  
**BUREAU OF MINES, FEB. 1972**

Occupation	Avg. Resp. Dust Conc., mg/m <sup>3</sup>
Cutting machine	2.4
Continuous mining machine	2.5
Loading machine	2.2
Coal drill machine	2.2
Shot firer	2.1
Roof bolting machine	2.6
Shuttle car operator	1.7
Brattice man	2.2
Beltman	2.3
Timberman	3.2
Rock duster	2.1

**TABLE 2**  
**AVERAGE DUST CONCENTRATIONS OF MINES SAMPLING.**  
**BUREAU OF MINES, NOV. 1972.**

Dust level	Percent of sections
Below 3.0 mg/m <sup>3</sup>	96.3
Below 2.0 mg/m <sup>3</sup>	80.7
Below 1.0 mg/m <sup>3</sup>	41.0
Above 4.5 mg/m <sup>3</sup>	1.1

Preventive measures against pneumoconiosis in United States coal mines under Public Law 91-173 are similar in most respects to those of other countries. All programs include environmental control of respirable dust and medical surveillance of coalworkers.

Dust control in underground coal mines is based upon water infusion of the coal face, water sprays during blasting, sprays of automatic hauling equipment, and an emphasis on continuing and adequate mine ventilation.

Medical surveillance of coal workers, although relatively new in the United States, has been carried out in British and European coal mines for many years. Radiologic features have constituted the principal diagnostic criterion in the determination of pneumoconiosis.

## COMPENSATION

Title IV of the Federal Coal Mine Health and Safety Act of 1969 deals with compensation under the heading "Black Lung Benefits." This portion of the Act provides for monthly cash payments, from general tax funds, to coal miners who are totally disabled due to pneumoconiosis arising out of employment in underground coal mines, and to widows of coal miners who died from this disease.

HEW responsibility for administering the benefits program has been delegated to the Social Security Administration. This responsibility is limited to claims filed before June 30, 1973\* at which time administrative responsibility for other new claims, and for any continuation of miner's benefits already awarded will shift to the Department of Labor. Claims will be processed through workmen's compensation agencies in states that have enacted legislation to provide comparable benefit payments and the prescribed coverage. In other states, claims will be processed through the Department of Labor. However, HEW is to retain responsibility for prescribing standards for determining whether a death is due to pneumoconiosis. These standards will have a direct effect on the provisions of State workmen's compensation laws, since the standards for determining total disability or death due to pneumoconiosis in these laws must be substantially equivalent to those established by the Secretary of HEW, to comply with the requirements of Part C of Title IV.<sup>7</sup>

This shifting of responsibility from the states to the Federal Government was intended as a temporary measure in order to process what was correctly anticipated to be a substantial backlog of claims for miners already totally disabled or dead due to pneumoconiosis. After this time, benefit payment costs would revert to the employers through State workmen's compensation programs.

### Types of Benefits

The Act provides for two basic benefits to miners or their widows as described above. The age of the miner does not matter and, until 1973, it does not matter how long ago the disability began or when the miner died.<sup>7</sup> This allows SSA to "catch up" with the backlog of claims submitted during this interim period of Federal administration.

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\*An amendment signed by President Nixon on May 19, 1972 extended the original time by 18 months.

## **Amount of Payments**

The amount of basic black lung benefit payable monthly to an entitled miner or widow is defined as 50 percent of the current minimum monthly amount payable to a totally disabled Federal employee in grade \*GS-2 under the Federal Employees' Compensation Act. This amount is increased with the number of dependents, up to double the basic benefit. Because of the relationship to Federal salaries, the amount is increased when Federal salaries increase.

Certain reductions ("offsets") can apply against these benefits. For example, where a totally disabled miner is employed, his benefits are subject to reduction on account of excess earnings under the same criteria that apply in reducing Social Security retirement payments. Earnings of widows, wives, and children do not result in a reduction in benefits, however.

Black lung benefits of a miner or widow are reduced by the amount of any workmen's compensation, unemployment compensation, or State disability insurance payments received on the miner's disability. This offset represents an effort to prevent duplication of benefits that could exceed his regular salary. Where the sum of all benefits exceed 80 percent of the man's usual earnings, there is a reduction in the amount of any excess.

## **Disability Determination**

Determination of total disability for black lung benefits reflects the general evaluation principles and criteria followed under the Social Security disability benefits program. However, there is an important difference between the basic concepts which underlie the two programs.

Social Security disability insurance benefits are payable to covered workers who are totally disabled, regardless of the nature of the medically determinable impairment or disease that causes the disability, and regardless of whether there was a causal connection with employment.<sup>7</sup> On the other hand, "black lung" benefits may be paid to an applicant only if he is totally disabled due to pneumoconiosis and if this disease arose out of employment in underground coal mining.

To assist in establishing causality, the Act permits a rebuttable presumption that pneumoconiosis was due to employment when the miner was employed for 10 or more years in an under-

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\*As of Nov. 1972, the basic benefit rate is \$161.50 per month, plus supplements for dependents.

ground coal mine. Due to the slow development of the disease, this time allowance is a reasonable period.

A miner is considered to be totally disabled within the meaning of the law if he meets a presumptive test described in the law itself: either X-ray or pathological findings show that he has what is commonly referred to as "complicated" pneumoconiosis. He can also be found totally disabled if he meets certain medical criteria showing severe breathing impairment due to pneumoconiosis or has another serious condition, such as heart disease, secondary to pneumoconiosis.

Finally, if he is not disabled according to any of these criteria, he may, nevertheless, be considered totally disabled if he has pneumoconiosis and such functional breathing limitation as to prevent him from doing coal mining work and from engaging in any other type of substantial gainful activity consistent with his vocational competence. Under this evaluation, an older miner with minimal education and skills who is unable to perform heavy work because of pneumoconiosis, will ordinarily be found to be totally disabled.

To assist widows in qualifying for benefits, the law provides an irrebuttable presumption that death was due to pneumoconiosis if the miner had complicated pneumoconiosis, and a rebuttable presumption that a miner's death was due to pneumoconiosis if he had worked in underground coal mining for 10 years or more and died from a "respiratory disease."

### **Development of Medical Evidence**

The black lung benefits program became effective as soon as the Federal Coal Act was enacted, and the huge initial volume of claims (100,000 in the first month) presented a major operational problem in developing sufficient medical evidence for processing. This difficulty was further complicated by the need to determine the cause of death where death had occurred many years previous.

Since the initial group of claims included many claimants who had previously filed for social security benefits, considerable medical evidence was already available in Medicare, disability, and survivor records. Evidence was also obtainable from other sources, such as union records and workmen's compensation claim files. In addition, thousands of death certificates were available from state vital statistics departments. As a result, a large number of claims could be processed without going back to the applicant for additional information. Copies of medical records and death certificates are obtained at the program's expense, and claimants are reimbursed for costs of any records they obtain.

Obtaining existing medical evidence through State workmen's compensation files was considerably easier in states, such as Pennsylvania, where pneumoconiosis was already recognized as an occupational disease.\* As a consequence, claims from such states, were processed more quickly and awards were made earlier. In other states, where "full" coverage was apparently given to occupational diseases, (see Attachment #1) pneumoconiosis was not always accepted as a distinct clinical disease and causality was more difficult to establish.

Despite the availability of medical evidence in a large number of cases, thousands of other applicants had no such records and medical examinations were usually required to provide the necessary evidence of total disability. Arrangements were made with state agencies to have claimants examined by qualified physicians in medical facilities as close to the claimant's residence as possible. By April 30, 1971, more than 180,000 medical examinations of applicants had been arranged by State agencies to determine disability due to pneumoconiosis.

From the start of the "black lung" benefits program, about one-half of all claimants have been allowed monthly payments. Factors influencing the allowance denial rate include (1) age, where proportion of awards increases with age of applicant; (2) years of employment in mines, where rate increases with length of time in mines; and (3) prior claim under workmen's compensation, where three-fourths of those receiving State black lung benefits were awarded benefits under Title IV.<sup>16</sup>

### PROGRAM COSTS

All expenses attributable to implementation of the Federal Coal Mine Health and Safety Act cannot be precisely identified. Administrative budgets do not always separate safety and health activities, particularly in the areas of monitoring and enforcement, and there are no reliable estimates of the industry costs for respirable dust reduction and other compliance-related undertakings.

Nevertheless, available cost data provide a fairly good indication of the full cost of the industry-wide health effort. The following budget information is presented for the three Federal programs that bear the major expenses for carrying out health measures of the Act.

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\*Pennsylvania has had a workmen's compensation program since 1965 for coal workers disabled by black lung, thus medical records are available for many miners. West Virginia, however, did not have coverage for pneumoconiosis until July 1969.

## **National Institute for Occupational Safety and Health (NIOSH)**

Responsibilities of NIOSH include standard setting, health research, and medical surveillance. The NIOSH budget for coal mine health activities was \$5.7 million in fiscal year 1971 and \$6.2 million for fiscal year 1972.

Approximately \$750,000 in 1971 and \$950,000 in 1972 was expended for medical surveillance authorized in the Act for initial and periodic medical examinations to determine the presence and extent of pneumoconiosis. In the first round of examinations after enactment of the law, more than 61,000 coal miners were provided a chest X-ray. An additional 9,076 miners received chest X-rays as part of the National Study of Coal Worker's Pneumoconiosis, a project initiated before the Act. A total of approximately 70,000 X-rays were processed in the X-ray Receiving Center of NIOSH. Operating expenses of the Center included contract costs for physician interpretation and classification of X-rays and expenses incurred in providing X-rays to miners where mine operators did not arrange this service. Such X-rays were largely taken through contracts with state agencies and private physicians and facilities. The average cost for taking an X-ray and providing a first reading was about \$17, with a range between \$10 and \$20.50, depending upon the availability of qualified resources and the accessibility of the miner population. All X-rays were interpreted two or more times by physicians.

## **Social Security Administration**

Expenses of SSA may be divided into two categories, (1) administrative costs, including expenses for obtaining medical evidence of black lung, and (2) the amount of actual payments made to disabled miners and their survivors.

By January 1972, the SSA had received 350,000 claims from miners and widows.<sup>7</sup> Awards had been made to 82,000 miners and 69,000 widows. Benefit supplements were added for 91,000 dependents. By January 1972, black lung benefits were being paid at the rate of about \$28 million a month, or \$336 million a year.

Administrative expenses in fiscal year 1971 totaled approximately \$22 million, including \$5.3 million for State agencies and \$3.2 million for purchasing medical information for black lung claimants.<sup>12</sup>

## **Bureau of Mines**

Research related to respirable dust and programs of education and training comprised the bulk of expenditures. In fiscal year 1971, research costs were \$2 million and \$2.5 million was expended for education and training, chiefly in the area of first aid. Fiscal year 1972 costs for the two programs were \$2.2 million and \$2.3 million respectively.

Dust sampling costs were \$650,000 for 1971 and \$1 million for 1972. Expenses charged to coal health in the data processing unit amounted to \$320,000 for 1971 and \$555,000 for 1972.

In addition, Federal coal mine inspectors spent considerable time performing health monitoring during visits to check safety hazards, but the cost of this activity cannot be easily identified. Similarly, expenses related to noise surveys, assessment of penalties for violations, and some administrative costs are not separated in the budget from safety activities.

## **Other Costs**

Under the Federal Coal Mine Health and Safety Act, the full responsibility for reducing respirable coal dust in the mines is placed on the coal mine operator. Although standards for dust exposure are set by NIOSH and enforced by USBM, it is up to the operator to carry out measures that effectively reduce coal dust levels. No reliable cost data are available to appraise the financial impact of these standards on the industry. Considerable dust reduction can be accomplished by close and conscientious attention to such routine dust suppression techniques as rock dusting and water sprays. Machinery modification and major alterations of mine ventilation systems are, of course, far more costly.

Although there were early predictions that the Federal Coal Act would force hundreds of coal mines to shut down because of the high cost of complying with the Act, few mines have actually closed.

In the meantime, the complex task of carrying out the provisions of the Federal Coal Mine Health and Safety Act of 1969 continues under the joint auspices of the Departments of Interior and Health, Education, and Welfare. Now, more than ever before, there is emerging optimism that coal miners will soon be able to work a lifetime in underground mines without suffering permanent and ruinous damage to their lungs as a result of their employment.

**BLACK LUNG COVERAGE  
UNDER WORKMEN'S COMPENSATION LAWS**

Underground Coal Mining States	Full Coverage of Occ. Dis. <sup>1</sup>	Specific Coverage Pneumoconiosis <sup>2</sup>	Coverage Coalworkers' Pneumoconiosis <sup>2</sup>
Alaska	x	—	—
Alabama	x	x	x (1973)
Arizona	—	—	—
Arkansas	x	—	—
California	x	—	—
Colorado	—	—	—
Georgia	x	—	—
Illinois	x	—	—
Indiana	x	—	—
Iowa	x	—	—
Kansas	—	—	—
Kentucky	x	x	x
Maryland	x	—	—
Missouri	x	—	—
Montana	x	—	x
New Mexico	—	—	x
N. Dakota #	x	—	—
Ohio	x	—	x
Oklahoma	—	—	—
Oregon	x	—	—
Pennsylvania	x	x	x
S. Dakota	x	—	—
Tennessee	—	—	x
Texas #	x	—	—
Utah	x	x (1973)	x
Virginia	x	x	x
Washington	x	—	—
W. Virginia	x	—	x
Wyoming	—	x	—

#Lignite mines.

<sup>1</sup>From: Extent of Protection under workmen's compensation laws. U.S. Dept. of Labor, Employment Standards Admin. January 1972.

<sup>2</sup>Staff communication from U.S. Dept. of Labor, Employment Standards Admin. March 1972.

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