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THE FEDERAL COAL MINE HEALTH PROGRAM
IN 1971



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ANNUAL HEALTH REPORT
OF THE FEDERAL COAL MINE
HEALTH AND SAFETY ACT
OF 1969

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SUMMARY

The Federal Coal Mine Health and Safety Act of 1969 assigned responsibility to the Department of Health, Education, and Welfare for conducting research to establish coal mine health standards, for assuring the availability of medical examinations for active underground coal miners and for making Black Lung Benefit payments. The Social Security Administration was delegated the responsibility for the Black Lung Benefits while the National Institute for Occupational Safety and Health (NIOSH) was delegated the responsibility for coal mine health research and for assuring the availability of medical examinations for underground coal miners.

This, the second Annual Report, describes the activities of NIOSH in meeting its responsibilities under the Act for calendar year 1971.

The first round of medical examinations of coal workers required in the Act was officially completed in 1971. NIOSH made the following arrangements for these examinations: (1) certification of physicians qualified to interpret and classify X-rays; (2) certification of X-ray facilities; (3) approval of coal mine operator plans for providing chest radiographs; and (4) contracts with independent certified facilities and physicians to take, interpret and classify X-rays at mines not covered by coal mine operator plans. In 1971, NIOSH had certified 696 physicians and 265 X-ray facilities, approved 464 coal mine operator plans, and received the first full round of X-rays under the Act. The second round of examinations is scheduled to begin in 1973 and to continue for about two years.

In March 1972, NIOSH will begin examinations of miners at strip and auger mines. These examinations will be conducted to assess the possible respiratory impairment and other occupational diseases associated with surface coal mining. The sample has been chosen to include mines in the Appalachian Coal Fields (Pennsylvania, Ohio, West Virginia, Virginia, Eastern Kentucky, Tennessee, and Alabama) and the Lower Ohio River Valley Coal Fields (Western Kentucky, Illinois, and Indiana) where 90 to 95 percent of the nation's strip mines are located. A few western mines also may be included. Approximately 1,200 miners will be examined in this study.

An autopsy program was developed in 1971 to aid survivors of coal miners in establishing claims for Black Lung Benefits under the Act. In late 1971, an average of seven autopsies per week were being submitted to NIOSH; all autopsy information received is to be filed and furnished to the Social Security Administration upon receipt of a proper request for release of medical information. In addition, the autopsy information, tissue specimens, and when available, chest X-rays made in life are being studied to learn more about the correlation of diseases and X-ray findings, the sequestering in the lungs of coal mine dust, and the composition of the dust retained in the lungs.

NIOSH coal mine health research concentrates on revealing the mechanisms whereby coal workers' pneumoconiosis develops and on devising more effective methods for early diagnosis of the disease. In 1971, the NIOSH research program included (1) biochemical investigations to detect the earliest effects of coal workers' pneumoconiosis; (2) pathological examinations of diseased lungs in order to relate changes in structure to radiographic changes; (3) investigations of the role of infectious disease in the development and progression of coal workers' pneumoconiosis; and (4) clinical and physiological investigations of cardiopulmonary function to more exactly delineate the symptoms of coal workers' pneumoconiosis and to devise diagnostic methods more relevant to coal workers' pneumoconiosis.

Development of coal dust sampling instruments continued in 1971. These were tested and evaluated both in the laboratory and in mines. The Act creates a statutory requirement that mine operators provide respirators for miners exposed to coal mine dust whenever the dust exceeds the established standard or when the miners are exposed for short periods to inhalation hazards from gas, dusts, fumes, or mist. When the exposure is for prolonged periods, other measures to protect the miners or to reduce the hazard must be taken. A concentrated research and development effort was initiated for the express purpose of developing new respiratory protective devices based on innovative techniques which will improve worker acceptance, thereby ensuring the adequacy of respiratory devices as a protective health mechanism.

Based on studies by NIOSH and the Bureau of Mines and on comments from professional and trade associations and State health departments, the American Conference of Governmental Industrial Hygienists' Threshold Limit Values for Noise were recommended as the Coal Mine Underground Noise Standard. This Standard was published in the *Federal Register* on July 7, 1971.

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**THE
FEDERAL
COAL MINE
HEALTH PROGRAM
IN 1971**

1. ORGANIZATION AND ADMINISTRATION

Public Law 91-173, the Federal Coal Mine Health and Safety Act of 1969, directs the Secretary of Health, Education, and Welfare to conduct several programs related to the health, protection of life, and prevention of diseases in miners and persons who, although not miners, work with or around the products of coal mines. To fulfill this mandate, the Secretary of HEW delegated operational authority for all aspects of the Act, except Title IV—Black Lung Benefits, to the Public Health Service's Bureau of Occupational Safety and Health. The provisions of Title IV are carried out by the Social Security Administration of the Department of Health, Education, and Welfare.

In 1970, the creation of the Environmental Protection Agency, and the subsequent transfer of the majority of the programs of the Consumer Protection and Environmental Health Service from the Public Health Service, left the Bureau of Occupational Safety and Health attached to the Office of the Assistant Secretary of HEW for Health and Scientific Affairs. The passage of the Occupational Safety and Health Act of 1970 gave the Secretary of HEW increased responsibilities for occupational safety and health and authorized the creation of the National Institute for Occupational Safety and Health (NIOSH).

In June of 1971, the new Institute was officially organized and the previously mentioned authorities under the Federal Coal Mine Health and Safety Act (exclusive of Title IV), along with the newly acquired authorities under the Occupational Safety and Health Act, were delegated to NIOSH which was organizationally located within the Health Services and Mental Health Administration of HEW.

NIOSH was authorized by the Occupational Safety and Health Act as of April 28, 1971, and became effective with the publication of the Organization and Function Statements in the *Federal Register* on June 30, 1971 (see Appendix A). The authority and responsibility of the new Institute is derived from the health provisions of the Public Health Service Act, P.L. 78-410; the Federal Coal Mine Health and Safety Act, P.L. 91-173; and the Occupational Safety and Health Act, P.L. 91-596.

The organizational structure of the Institute consists of seven staff Offices and six Divisions, with representation in each of the 10 HEW Regional Offices. The NIOSH organization chart is presented in Appendix B. The Appalachian Laboratory for Occupational Respiratory Diseases (ALFORD) located at Morgantown, West Virginia, has division status and is the principal organizational unit dealing with the Institute's responsibilities under the Federal Coal Mine Health and Safety Act.

By capitalizing on ALFORD's program orientation as the principal Division dedicated to occupational respiratory diseases and the complementing activities of other Divisions and staff Offices, NIOSH has made significant progress in fulfilling the responsibilities of the Department of Health, Education, and Welfare under the Federal Coal Mine Health and Safety Act of 1969.

The Institute has a very close working relationship with the Department of the Interior's Bureau of Mines, which is responsible for the safety and enforcement aspects of the Federal Coal Mine Health and Safety Act, and also with the Interim Compliance Panel (established by the Act) upon which the Director of NIOSH is represented by a permanent panel member.

2. COAL MINE HEALTH RESEARCH ADVISORY COUNCIL

The Secretary's Coal Mine Health Research Advisory Council was established in 1970 by the Federal Coal Mine Health and Safety Act to consult with, and make recommendations to, the Secretary of HEW on matters involving or relating to coal mine health research. Meetings of the Council held in 1971 were as follows: January 27-28, Washington, D.C.; May 5-6, Morgantown, West Virginia; September 11-12,

New York, New York; and December 10-11, Washington, D.C.

Dr. Eugene P. Pendergrass, the first chairman of the Council, retired on June 30, 1971. Secretary Richardson appointed Dr. Paul N. Yu his successor. Council members are listed in Appendix C.

The following papers and activities were presented during the Council meetings held in 1971:

Administration of P.L. 91-173.....	Dr. Marcus M. Key, NIOSH.
American College of Radiology Qualifying Courses.....	Dr. William S. Lainhart, NIOSH; Mr. Otha W. Linton, American College of Radiology.
Autopsy Research Program.....	Dr. Eugene P. Cassidy, NIOSH.
Beatrice Mine, Grundy, West Virginia.....	Dr. W. Keith Morgan, NIOSH; Mr. Earle P. Shoub, NIOSH.
Comparison of Pulmonary Status of Anthracite and Bituminous Miners in Pennsylvania.....	Dr. W. Keith Morgan, NIOSH.
Contracts and Grants.....	Mr. James H. Eagen, NIOSH; Dr. Alan D. Stevens, NIOSH.
Determination of Lung Volume from Chest Roentgenograms..	Dr. W. Keith Morgan, NIOSH.
Dust Reduction Schedule.....	Mr. James H. Eagen, NIOSH; Mr. Stanley J. Reno, NIOSH.
Highlights of Current Research on Respirable Dust.....	Dr. Welby G. Courtney, Bureau of Mines.
Medical Examination of Coal Miners.....	Dr. W. Keith Morgan, NIOSH; Mr. Robert B. Reger, NIOSH; Mr. Earle P. Shoub, NIOSH.
Noise Standards.....	Mr. Herbert H. Jones, NIOSH.
Origin and Geochemistry of Coal.....	Mr. Maurice Duel, Bureau of Mines.
Pittsburgh Field Health Group.....	Mr. Murray Jacobson, Bureau of Mines.
Pittsburgh Mining and Safety Research Center Experi- mental Mines Visit.....	Dr. Raymond T. Moore, NIOSH.
Proposed Revision of Specifications for First Round of Medical Examination of Coal Miners.....	Dr. Marcus M. Key, NIOSH.
Pulmonary Function Testing in Field Studies.....	Dr. N. LeRoy Lapp, NIOSH.
Radiological Progression Problems.....	Dr. W. Keith Morgan, NIOSH.
Recommended Mechanisms by which Pneumoconiosis in Retired Coal Miners Could be Studied.....	Dr. Lorin E. Kerr, United Mine Workers of America.
Research Direction.....	Mr. James H. Eagen, NIOSH; Dr. N. LeRoy Lapp, NIOSH; Dr. W. Keith Morgan, NIOSH.
Research on Particulate Clearance and Deposition.....	Mr. John L. Hankinson, NIOSH; Dr. W. Keith Morgan, NIOSH.
Sanitation Regulations.....	Mr. Frank W. Mackison, NIOSH.
Status of Enforcement of P.L. 91-173.....	Mr. Robert G. Peluso, Bureau of Mines.
Transfer of Minors with Pneumoconiosis.....	Dr. Marilyn K. Hutchison, NIOSH.

The following new grants were approved by the Council during 1971:

- Conference on Coal Workers' Pneumoconiosis
- Immune Injury in Occupational Respiratory Diseases
- Fate of Inhaled Coal Dust
- Effects of Environmental Pollutants in Germfree Rodents
- Cellular Response to Coal Mine Dust in Vitro (CWP)
- Interaction of Coal Dust With Essential Metals
- Pathophysiology of Coal Pneumoconiosis in Equidae
- Influence of Airborne Factors in Lung Clearance

The Council also approved the following proposed contracts:

- Micro-quartz Analysis for Personal Size-Selective Samples
- Coal Handlers Study
- Breathing Metabolic Simulator
- Head Protective Devices for Coal Miners
- Rehabilitation for Coal Miners With Respiratory Disability
- Quartz Study
- Coal-Tar Pitch Volatiles
- Infectious Disease Investigation
- Physiologic Investigations
- Dust Control in Mines

- Development of Protective Knee Pads for Mine Workers
- Factors Affecting Removal of Coal Dust From the Lungs
- Development of an Intermediate Volume Personal Sampler
- Testing of Advanced Respiratory Prototypes in Mines
- Testing of Prototype Knee Protective Devices
- Chest X-Ray Analysis by Computer

The following motions were passed by the Council:

—*May 5, 1971.* That the Council endorse the principles of the proposed dust reduction schedule and that steps should be taken to discuss these with the appropriate federal agencies before transmittal of a mandatory health standard to the Secretary of the Interior from the Secretary of Health, Education, and Welfare.

—*December 10, 1971.* That a feasibility study be made of the mechanism by which pneumoconiosis in retired coal miners could be studied.

—*December 11, 1971.* That the Council be involved in contracts at a program objective or operational level (rather than as a contract review mechanism).

—*December 11, 1971.* That a group of experts develop a standard set of films on pneumoconiosis so that the performance of film readers can be compared to this standard set of X-rays and further that this be patterned similar to the system developed by Dr. Russell Morgan at Johns Hopkins.

3. MEDICAL EXAMINATIONS OF COAL MINERS

NATIONAL STUDY OF COAL WORKERS' PNEUMOCONIOSIS

The National Study of Coal Workers' Pneumoconiosis began in August 1969. At that time the Public Health Service and the Bureau of Mines, U.S. Department of the Interior, selected for study 31 underground coal mines located throughout the United States. The mines were chosen to represent varying geographical regions, coal seams, and mining methods. Further criteria for inclusion in the Study were that each mine employ at least 100 miners, that the mine have an expected working life of about 10 years, and wherever possible, that retrospective dust exposure data be available.

The main purposes of the Study were to estimate the prevalence of coal workers' pneumoconiosis (CWP), to provide a basis for determining the progression of the disease by serial X-rays, and to relate disease progression to the dust levels that have prevailed in the mines over the same period.

The miners employed at the 31 selected mines were asked to undergo limited medical examinations. Each examination included an occupational history, standard postero-anterior and lateral chest X-rays, a pulmonary function test, and completion of a short questionnaire on chronic bronchitis developed by the Medical Research Council of Great Britain. The first round of examinations was completed by July 1971 and included X-rays of 9077 miners. The miners were examined by teams from the Appalachian Laboratory for Occupational Respiratory Diseases (ALFORD) of the National Institute for Occupational Safety and Health (NIOSH) in Morgantown, West Virginia.

To insure the reliability of the prevalence study and to provide a sufficiently large base

for the progression study, the NIOSH team determined that it would be necessary to examine over 80 percent of the men at the 31 mines. Since participation in the study was voluntary, a concerted effort was made to encourage the men to participate and to make doing so as convenient as possible. At the outset, the only commitment made to a participant was that any pneumoconiosis found would be reported to him in strict confidence and, with his permission, to his physician. The latter was also to be advised of any other significant findings.

When the Federal Coal Mine Health and Safety Act of 1969 was enacted, however, the reporting procedure of the Study was retroactively modified. In order to meet the requirements of the Act and still comply with the rigid promise of confidentiality of findings made to the miners at the outset of the Study, the following provisions were made: (1) to report to each miner the findings with regard to pneumoconiosis in his case; (2) to report to each miner's designated physician all significant abnormalities found; (3) to advise the miner of his rights under the Act; and (4), when applicable, to ask the miner to notify the Bureau of Mines if he wished to exercise the right of transfer to a less dusty area of the mine.

Participation in the Study

Between January and July 1971, 4497 out of a possible 5163 miners were examined. This completed the first round and brought the total of miners included in the entire Study to over 9000 men. This figure represents an 87-percent participation in the 1971 portion of the study, a reduction of 7 percent from the 94-percent participation in examinations made in 1969 and 1970. For the study as a whole, however, more

than 90 percent of those eligible participated. The geographic distribution of the mines in the

study group and the employee participation in each State is contained in Table 3-1.

TABLE 3-1.—EMPLOYEE PARTICIPATION IN THE NATIONAL STUDY OF COAL WORKERS' PNEUMOCONIOSIS

State	Mines, number	Employees, number	Employees examined, number	Participation, percent
Pennsylvania:				
Anthracite	2	608	523	86.0
Bituminous	6	1,517	1,461	96.3
West Virginia	9	3,000	2,565	85.5
Virginia	2	613	560	91.4
Kentucky	3	1,035	959	92.7
Indiana	1	297	275	92.6
Ohio	1	474	450	94.9
Alabama	2	799	777	97.0
Illinois	2	671	524	78.1
Colorado	1	219	219	100.0
Utah	2	799	764	95.6
Total	31	10,032	9,077	90.5

Prevalence Data From the Study

An important aim of the Study is to achieve the most conclusive data possible; therefore, each chest roentgenogram is classified for CWP independently by three experienced readers using the UICC/Cincinnati System for classification of CWP (see Appendix D). The first reading is made soon after the field examination in order to insure that any miner who may have a condition in need of immediate attention is notified. A second and third reading are then taken and a final, or consensus, reading for CWP is obtained when two of the three readings are in agreement. Of the readings made to date, less than 5 percent required a fourth reading to achieve consensus. A fifth reading was necessary only in a very few rare instances.

CWP prevalence data derived from the Study are presented in Table 3-2. By December 31, 1971, consensus readings had been made of X-rays from the first 17 mines in the Study and the data shown for these 17 mines are final.

The X-rays from the remaining 14 mines have received preliminary readings only, and the data are therefore not final. However, the final readings for these X-rays are not expected to differ substantially from the data presented below.

On a purely statistical basis, the consensus method for arriving at a classification of CWP might be criticized, and investigations were started in 1971 to evaluate the validity of this method as compared to others. The best estimate for determining progression of the disease, i.e., side-by-side or independent single readings of X-rays, is being evaluated in preparation for the second phase of the Study. Analyses have been completed to determine the effect of film quality on X-ray interpretation and to compare the accuracy of professional readers with that of lay readers trained to classify CWP. Film quality was found to significantly influence the X-ray interpretation and trained lay readers were found to compare favorably with professional readers in classifying CWP.

TABLE 3-2.—PREVALENCE OF COAL WORKERS' PNEUMOCONIOSIS FROM THE NATIONAL STUDY OF COAL WORKERS' PNEUMOCONIOSIS

State	Status of data ¹	Mines, number	Category CWP, percent				
			0 ^a	1	2	3	Complicated
Pennsylvania:							
Anthracite	Final	2	40.0	23.7	17.6	4.4	14.3
Bituminous	Final	6	53.1	31.8	11.7	1.1	2.3
West Virginia	Final	9	72.0	19.8	5.8	.4	2.5
Virginia	Preliminary	2	72.3	22.0	3.2	.4	2.1
Kentucky	Preliminary	3	71.3	25.0	1.9	.2	1.6
Indiana	Preliminary	1	64.4	30.9	2.5	.4	1.8
Ohio	Preliminary	1	66.7	28.7	2.9	.9	.9
Alabama	Preliminary	2	86.0	11.6	1.2	.0	1.8
Illinois	Preliminary	2	86.6	12.0	1.1	.0	.2
Colorado	Preliminary	1	96.3	3.7	.0	.0	.0
Utah	Preliminary	2	88.2	10.5	.4	.1	.8
Total:							
Bituminous	Preliminary	29	72.4	20.9	4.4	.4	1.8
Bituminous and anthracite	Preliminary	31	70.6	21.1	5.2	.7	2.5

¹ Data status effective Dec. 8, 1971.

^a No X-ray evidence of CWP.

EXAMINATIONS UNDER THE ACT

The Act specifies that all underground coal miners be afforded the opportunity for a medical examination including chest X-ray at no cost to the miner within 18 months of its passage. NIOSH has made the following arrangements for chest X-ray examinations under the Act: (1) Certification of physicians qualified to interpret and classify X-rays; (2) certification of X-ray facilities; (3) approval of coal mine operator plans for providing chest radiographs; and (4) contracts with independent certified facilities and physicians to take, interpret and classify X-rays at mines not covered by coal mine operator plans. Under the contract arrangement, the mine operators are billed for the cost incurred; the receipts are returned to the U.S. Treasury. In 1971, NIOSH had certified 696 physicians and 265 X-ray facilities, approved 464 coal mine operator plans, and received the first full round of X-rays under the Act.

The NIOSH X-ray Receiving Center, established as a section of the Field Studies Branch of ALFORD in October 1970, receives, proc-

esses, and provides permanent storage for X-rays. It also provides for verification of interpretation and advises the appropriate persons of the findings of chest X-rays made under Section 203 of the Act.

An extensive automatic data processing system was installed at the Receiving Center in January 1971 and became fully operational in mid-1971. The system permits storage and rapid retrieval of information concerning all phases of the taking and interpreting of X-rays under the Act. It also prepares a letter for each miner regarding the final interpretation of his X-ray. The letters are transferred to the Bureau of Mines for mailing, as the Bureau is responsible for making the actual notification to each miner of the X-ray findings and of any corresponding rights the miner has under the Act.

Qualification of Physicians

Chest roentgenograms taken under the Act are read and classified only by qualified physicians who regularly read such films and who have demonstrated proficiency in the use of a

modification of the International Union Against Cancer (UICC) classification system known as the UICC/Cincinnati System for Classification of CWP. To qualify, a physician must submit a completed "Interpreting Physician Certification Document" (ECA-115) (see Appendix H); in addition he must either submit six films from his files to a panel of NIOSH radiologists who review and must concur in his classifications, or have successfully completed a course of instruction on the UICC/Cincinnati System.

In 1970, nearly 700 physicians attended one of five seminars prepared and conducted by the American College of Radiology under contract to NIOSH. An additional 350 physicians attended two seminars in Pittsburgh and Philadelphia in 1971. These seminars were designed to inform physicians about their participation in providing roentgenographic interpretations as a part of the medical examinations of underground coal miners and to refresh and supplement their knowledge in identifying and classifying the radiological characteristics of pneumoconiosis under the UICC/Cincinnati System.

NIOSH has also provided for the development of a home training syllabus, including copies of the X-ray films used in the formal seminars, for use by physicians for informal personal training in the roentgenographic description of the pneumoconioses. The syllabus program was enthusiastically received by the medical profession, and the waiting time for use of these materials ran as much as 2 months behind the requests for such use.

In addition to meeting the needs of NIOSH for physicians trained in the UICC/Cincinnati System of roentgenographic interpretation, these seminars provide benefits to the attending physician and to the physician's community. The physician returns to his community from the seminar better prepared to diagnose pneumoconiotic conditions. Preliminary plans for two additional seminars in 1972 have been made. These seminars will cover essentially the same subject matter as the previous seven seminars with the addition of subject matter covering a broader range of the pneumoconioses plus lectures on the pathology of the dust retention diseases.

A total of 696 physicians had been approved by the end of 1971 to read chest radiographs through the program.

Training of Technologists

One significant problem encountered in the X-ray program was the poor quality of the X-ray films received from the certified facilities. Even using minimal criteria for acceptability, the NIOSH readers found many of the films submitted to be technically unreadable. Recognizing this problem, NIOSH provided for seminars to improve the competency of X-ray technologists.

The basic purpose of the technologists seminars was to improve the quality of chest radiographs obtained on miners examined under the Act. In carrying out this purpose, it was necessary to deal with the broader subject of X-ray technique for chest examination. Two such seminars for technologists were held in 1971 for a total of 295 technologists, and two more seminars are planned for early 1972.

Certification of X-ray Facilities

To provide X-ray services under the Act, firms desiring certification must follow established procedures. X-ray equipment, its use, and the facilities in which such equipment is to be employed must conform to recommendations contained in the National Council on Radiation Protection and Measurements Report 33, *Medical X-ray and Gamma-ray Protection for Energies up to 10 MeV*. The basis for certification is a completed "X-ray Facility Certification Document" (ECA-114) (see Appendix H) which describes the participating X-ray technicians and the exact equipment to be used, and six sample chest roentgenograms which are acceptable for quality to a panel of NIOSH radiologists.

By the end of 1971, 265 X-ray facilities had been approved to take chest roentgenograms through the program.

Coal Mine Operator Plans

The general provisions of the Act have been supplemented by the specifications published in the *Federal Register* on August 19, 1970 (42CFR87), and amended on September 2, 1971 (see Appendix E), to list the specific items required in coal mine operator plans for pro-

viding the X-rays required by the Act. These specifications have been incorporated in the form entitled "Coal Mine Operator's Plan" (ECA-113) (see Appendix H). In those instances where operators could not comply with the requirements, contractual arrangements were made for the production and interpretation of chest roentgenograms through independent, certified X-ray facilities and physicians. Similar arrangements were made for those mines for which operator plans were not received.

Approved coal mine operator's plans totaled 464 at the end of 1971.

Participation in First Round of Examinations

Approximately 100,000 underground coal miners were afforded the opportunity to have chest roentgenograms at no cost to them in the first round of medical examinations under the Act. Participation in the examinations, which concluded December 31, 1971, was not as high as anticipated. Among the reasons for the less than complete participation was the limited boycott (February through April) of the program by the United Mine Workers of America (UMWA). The UMWA had reservations about the confidentiality provisions and the regulations were subsequently amended to improve assurance of confidentiality. Since X-rays were taken at the mine sites, the October-November UMWA strike must also be considered as another cause of reduced participation. The initial round of examinations had been scheduled to end on June 30, 1971; however, this deadline was administratively extended to October 31 because of the UMWA boycott and then further extended to December 31 because of the UMWA strike.

By the end of 1971, NIOSH had received 48,568 X-rays taken under the Act and final interpretation was achieved on 21,049 of these X-rays. (These figures do not include the 9077 X-rays taken in the National Study of Coal Workers' Pneumoconiosis.) Each chest roentgenogram is classified for CWP independently by two experienced readers using the UICC/Cincinnati System. If the two readings are in agreement, the classification for CWP of that chest roentgenogram is complete. If the two

readings are in disagreement, a third expert radiologist classifies the chest roentgenogram and his reading is final. It is anticipated that approximately 8000 more X-rays will be received as part of the first round of examinations under the Act.

Miners Eligible to Transfer to a Less Dusty Atmosphere

The Act presently requires that any coal miner whose medical examination produces "evidence of the development of pneumoconiosis shall be afforded the option of transferring . . . to another position . . . in the mine . . . where the concentration of respirable dust in the mine atmosphere is not more than 2.0 milligrams of dust per cubic meter of air," unless he is presently working in such an atmosphere. Regulations published in the *Federal Register* on August 19, 1970 (42CFR37), (Appendix E) defined this right of transfer as applying to any miner with categories 2 or 3 CWP or complicated CWP. It applies as well to any miner developing category 1 CWP in less than 10 years of work in underground mining. Regulations published October 27, 1971, in the *Federal Register* (30CFR90) (Appendix E) require the coal mine operator to transfer an eligible employee within 45 days of notification to the operator that the employee requests a transfer.

Of the 9077 miners taking part in the National Study of Coal Workers' Pneumoconiosis, 809 men, or 8.8 percent of the study group, were notified of their eligibility to transfer in 1971. Of that group, only 29 men, or 3.6 percent of those eligible, requested transfer (Table 3-3).

By December 31, 1971, NIOSH had completely processed 21,049 of the 48,568 X-rays received under the Act. Of those completely processed, 994 (or 4.7 percent) had evidence of CWP sufficient to establish the right of transfer and had been notified by the Bureau of Mines of their eligibility for transfer under the Act. Of those notified, 100 or 10.1 percent elected to transfer. Therefore, under both the Act and the National Study of Coal Workers' Pneumoconiosis 129 men requested transfer.

The percentage of those examined under the Act who were eligible for transfer is somewhat lower than the percentage eligible from the

TABLE 3-3.—TRANSFER TO A LESS DUSTY ATMOSPHERE, ELIGIBILITY AND REQUEST DATA

Category CWP	Miners eligible for transfer, number		Eligible miners requesting transfer, number	
	Act	Study	Act	Study
Simple:				
1.....	156	47	13	1
2.....	523	475	69	23
3.....	87	56	3	0
Complicated	150	231	15	5
Total.....	866	809	100	29

NOTE: Figures presented are based on final data from the National Study of Coal Workers' Pneumoconiosis (Table 3-2) and on the 21,919 completely processed X-rays from examinations under the Act.

Study (4.1 percent compared to 8.8 percent). At the end of 1971, 7209 films were being reviewed by a third radiologist, and it is expected that a large number of these films will be interpreted as showing categories 2 or 3 simple CWP or complicated CWP; this will, therefore, increase the number of miners eligible for transfer under the Act and under the Study.

In addition, the screening of all X-rays at the earliest possible stage in the review process has resulted in the identification of 6085 cases of chest pathology other than CWP which have been reported to the appropriate physician for the 4579 miners involved; some miners were notified of more than one abnormal chest condition. NIOSH is conducting a study by contract to determine whether miners are, following through on the recommendations to seek medical advice for the nonpneumoconiotic chest problems revealed in chest X-rays.

NIOSH has also initiated a study by contract to appraise the effectiveness of medical and physical rehabilitation for coal miners with respiratory disability. Very little documented work has been conducted in this area. An aggressive program of medical management and physical measures has been shown to improve the pulmonary function and general well-being of noncoal workers with chronic emphysema and bronchitis. Similar investigations are needed to appraise the effectiveness of various rehabilitative measures in improving the health

and well-being of coal miners. This study will involve establishing treatment plans for three study groups of patients with symptoms of disabling respiratory diseases, treating the patients, and comparing the results of the three treatment plans.

MEDICAL EXAMINATIONS IN 1972

National Study of Coal Workers' Pneumoconiosis

In the latter half of 1972 the National Study of Coal Workers' Pneumoconiosis will move into its second phase; miners examined in the first phase will be reexamined at 3- to 5-year intervals for the next 10 to 15 years in order to determine the progression of CWP. The Bureau of Mines will provide respirable dust information on the mines included for the duration of the Study. The second round of examinations is scheduled to begin in July 1972 and to continue for about 2 years. Several mines will be added to the study group to maintain a sufficiently large data base for CWP progression studies. It is expected that about 25 percent of the miners in the original study group will be lost through employee attrition. The medical protocol used in the first round will be followed in the second.

Study of Surface Coal Miners

In March 1972, NIOSH will begin examinations of miners at strip and auger mines. These examinations will be conducted to assess the possible respiratory impairment and other occupational diseases associated with surface coal mining. The sample has been chosen to include mines in the Appalachian Coal Fields (Pennsylvania, Ohio, West Virginia, Virginia, eastern Kentucky, Tennessee, and Alabama) and the Lower Ohio River Valley Coal Fields (western Kentucky, Illinois, and Indiana) where 90 to 95 percent of the nation's strip mines are located. A few western mines also may be included. Approximately 1200 miners will be examined in this study. The protocol used in the National Study of Coal Workers' Pneumoconio-

sis will be followed with one addition: blood samples will be collected from a selected group for multiphasic screening.

NATIONAL COAL WORKERS' AUTOPSY STUDY

An autopsy program was developed in 1971 to aid survivors of coal miners in establishing claims for Black Lung Benefits under the Act. The National Coal Workers' Autopsy Study is designed to compensate local pathologists for autopsies performed on deceased coal miners when data and tissue, as specified in the *Federal Register* on May 14, 1971 (42CFR37), (Appendix E) are submitted to ALFORD. Virtually all practicing pathologists in the United States

were informed of the Study in mid-June when approximately 10,000 information packets describing the program were mailed to pathologists listed by the American Medical Association, the American Board of Pathology, and the American Osteopathic Board of Pathology.

In late 1971, an average of seven autopsies per week was being submitted to ALFORD; all autopsy information received is to be filed and furnished to the Social Security Administration upon receipt of a properly signed request for release of medical information.

The autopsy information, tissue specimens, and when available, chest X-rays made in life are being studied to learn more about the correlation of diseases and X-ray findings, the sequestering in the lungs of coal mine dust, and the composition of the dust retained in the lungs.

4. COAL MINE HEALTH RESEARCH

The focal point of the NIOSH coal mine health research program is the Appalachian Laboratory for Occupational Respiratory Diseases (ALFORD) in Morgantown, West Virginia. Research at ALFORD concentrates on revealing the mechanisms whereby CWP develops and on devising more effective methods for early diagnosis of the disease. In 1971, the ALFORD research program included: (1) biochemical investigations to detect the earliest effects of CWP, (2) pathological examinations of diseased lungs in order to relate changes in structure to radiographic changes, (3) investigations of the role of infectious disease in the development and progression of CWP, and (4) clinical and physiological investigations of cardiopulmonary function to more exactly delineate the symptoms of CWP and to devise diagnostic methods more relevant to CWP.

ALFORD was created in 1966 and since 1968 has been housed in the West Virginia University Medical Center in Morgantown, West Virginia. On November 27, 1971, however, NIOSH's new Appalachian Center for Occupational Safety and Health was dedicated (Figure 4-1). In a special message for the dedication, Secretary Richardson said, "the research conducted here will be the basis for new mandatory national standards which will help to assure all of us a safe and healthful working environment."

By the end of the year, approximately 40 members of ALFORD's staff occupied offices in the new center, which is adjacent to the West Virginia University Medical Center on land donated to the Federal Government by the State of West Virginia. ALFORD's relocation is expected to be completed in the spring of 1972 upon transfer of its laboratories to the new facility. The ALFORD research program is discussed on pages 13-24.

NIOSH also conducts limited coal mine health research at its Cincinnati, Ohio, Laboratories where it calls upon the unique collection of facilities and scientific expertise it has developed primarily for activities now covered under the Occupational Safety and Health Act of 1970. These activities are in the fields of Animal Inhalation Exposures, Physical and Analytical Chemistry, Ergonomics, and Control and Protection. They are discussed on pages 24-28.

CARDIOPULMONARY RESEARCH

Clinical Investigations

Lung Mechanics. The long-term goal of this project is to define, characterize, and quantify the alterations in lung mechanics associated with CWP and other occupational respiratory diseases. Studies are conducted on the pressure, flow, and volume behavior of the lungs under dynamic and static conditions in healthy subjects and in subjects with occupationally induced respiratory diseases. Through comparison of the results from the two groups, the type and degree of abnormal function may be estimated.

Studies completed in 1971 included an investigation of static and dynamic lung mechanics in 62 coal miners with CWP symptoms, without airway obstruction. The results indicate that abnormalities, where present, tend to reflect emphysema rather than fibrosis in simple CWP, and fibrosis more than emphysema in advanced, complicated CWP.

In a separate study, dynamic compliance of the lung was shown to be frequency dependent



FIGURE 4-1—Senator Robert C. Byrd of West Virginia (left) was principal speaker and Dr. Marcus M. Key, Director of the National Institute for Occupational Safety and Health, moderator at the dedication of NIOSH's new Appalachian Center for Occupational Safety and Health (below), November 27, 1971, in Morgantown, West Virginia.



in 17 of 25 working miners with no major airway obstruction. This finding, unrelated to the presence of bronchitis, is suggestive of increased resistance to flow in small peripheral airways.

Several technical difficulties in the technique of measuring the frequency dependence of lung compliance, including repeatability and the range of normal variation, are being evaluated in studies to be continued in 1972.

Steady State Diffusion. The long-term goal of this study is to determine what abnormalities, if any, occurred in the gas transferability of the lungs as determined by the steady state carbon monoxide diffusing capacity test.

The steady state diffusing capacity in 145 miners was measured in a study completed with the testing of 58 men in 1971. Subjects were selected on the basis of number of years underground, rather than solely on the basis of CWP, and detailed smoking histories were taken. It was possible, therefore, to look independently at the effects of pneumoconiosis, smoking, and years underground on the diffusing capacity of the lungs. The general conclusions of the study are that diffusing capacity measurements in coal miners are far more affected by smoking than by the early effects of coal mine dust exposure as determined by the degree of CWP revealed by chest X-rays.

Vectorcardiograms. A project to determine whether the vectorcardiogram is an effective tool for the early detection of heart strain of the heart's right ventricle in subjects with CWP was continued in 1971. Recent advances in the analysis of vectorcardiograms have led to a reexamination of data obtained from a group of miners and controls. Preliminary analyses using these new techniques of pattern recognition suggest that more information about right ventricular hypertrophy may be present in the vectorcardiographic tracing than has been thought.

Sputum Cytology. The goal of the sputum cytology project initiated in 1971 is to identify and quantitate the type and number of cells found in the sputum of normal subjects, subjects with CWP, and subjects with other re-

spiratory conditions. This project is in an early stage; therefore, no finding can be reported.

Lung Scans With Radioactive Xenon¹³³. The long-term goal of this project is to determine and characterize the ventilation-perfusion relationships for the lungs in subjects with CWP. CWP first appears as a regional distribution of accumulated dust on the chest X-ray. It would appear, therefore, that a method of detecting lung areas with altered ventilation-perfusion ratios (air- and blood-flow ratios) would be an earlier and more sensitive technique for detecting CWP. In a project begun in 1971, radioactive Xenon¹³³, an inert gas, is used to study the distribution of ventilation during a single breath and multiple breath wash-in/wash-out of the lungs. Regional areas of uneven distribution of the gas are thereby identified. (The precise mechanisms resulting in the uneven distribution of gas are subsequently determined by standard methods.) An intravenous injection of Xenon¹³³ dissolved in saline is used to measure the regional distribution of blood flow to the lungs and, by relating regional ventilation to blood flow, a series of ventilation-perfusion ratios for the lungs are calculated. At the end of 1971, studies were underway to define precisely the minimum abnormal area reliably detected by this technique.

Six Xenon¹³³ lung scans were performed in 1971; two on normal subjects, and four on miners with CWP and concomitant rheumatoid arthritis, i.e. Caplan's syndrome. The latter subjects were chosen because in a previous study (Seaton, Lapp, and Chang, *American Review of Respiratory Diseases*, 1971, 103:388) subjects with early Caplan's syndrome were found to have regional areas of decreased perfusion related to dust accumulations present, but often barely visible on chest X-ray. (Related animal studies are discussed under Physiology Investigations.) It is too early to present any conclusions based upon the small number of subjects studied.

Instrumentation

NIOSH's investigations of the cardiopulmonary abnormalities associated with CWP include a program to devise, develop, construct, test, and

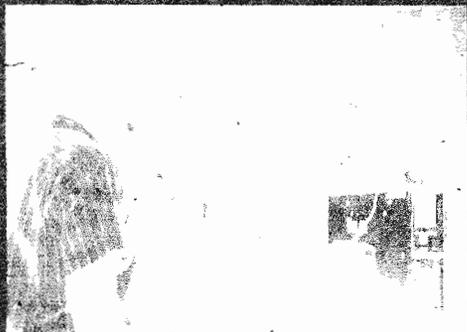


FIGURE 4-2.—The devices pictured are some of the instruments used in ALFORD's cardiopulmonary laboratories. The oscillator, above, is a simplified method of measuring airway resistance. Steady-state diffusion capacity is determined using the apparatus pictured below. Forced vital capacity is measured using the spirometer, top left. The plethysmograph, bottom left, measures total lung capacity.



perfect instrumentation for detecting and quantifying cardiopulmonary functions in subjects with occupational respiratory diseases.

During the fall of 1971, programming of a newly installed laboratory computer data handling system was begun. When completed, the system will provide automated analysis of pulmonary function data collected during the second round of medical examinations in the National Study of Coal Workers' Pneumoconiosis which will begin in 1972. The system will also be interfaced with a variety of analytical instruments and will perform many time-saving conversions and measurements.

In 1971 the electronics engineers and technicians at ALFORD utilized commercially available instruments as well as specially constructed items of equipment in the studies described below.

Airflow Resistance Measurement. An instrument for measuring airflow resistance by the superimposition of a forced oscillation onto the normal breathing pattern was calibrated and tested during 1971. Measurements comparing the results of this method with the standard body plethysmograph were performed on approximately 25 subjects and preliminary analyses indicate this method compares favorably with the plethysmograph. If the instrument performs well in field tests, it will be considered applicable for epidemiological studies. Such testing is comparatively passive as the subject is not required to forcibly ventilate.

Aerosol Persistence Study. In a study begun in 1971, 0.5-micron monodisperse aerosol is used to estimate the size of intrapulmonary air spaces by the persistence of aerosol particles during varied periods of breath holding. (The device used in this study was developed and provided by the New York University.) Data collected on approximately 60 subjects were correlated with other measurements of pulmonary function. The data analyzed thus far suggest that estimates of the size and configuration of airways based on aerosol persistence are less homogeneous between subjects than are estimates based on gas distribution within the lungs.

Sequential Controller for Diffusion Tests. An electronic sequencer which controls and times the breath-holding phase of the single-breath, carbon-monoxide diffusion capacity test for estimating gas transfer within the lungs was developed, constructed, and tested in 1971. The device not only improves the accuracy of the test, but also makes it possible for relatively less experienced technicians to perform it reproducibly.

Pathology Investigations

The major project of NIOSH pathologists in 1971 was implementing the National Coal Workers' Autopsy Study. By the end of 1971, however, a thorough autopsy research program was also being developed. The program will include fluid inflation of exised postmortem lungs to fixed pressures, Gough sections, and a variety of lung mechanics studies. Also being developed are a capacity for cytology studies on living miners, a complete microscopy laboratory including capability for electron microscopy, and methods for the preservation and study of diseased tissue associated with CWP. Plans are also being made for statistical analysis of the data being collected in the National Coal Workers' Autopsy Study.

Physiology Investigations

Physiological studies of the cardiopulmonary abnormalities associated with CWP were initiated in 1971; one project was completed while five were started during the year.

Alveolar Surface Area and Surface Tension in Cat Lungs. In studies completed in 1971, cats were subjected to intratracheal injections of papain for the purpose of producing a bullous type of emphysema. Significant differences were found in physiological measurements, whereas in pathological measurements little disease was found. This seems to indicate at least two important possibilities: (1) that physiological changes had occurred before pathological changes (which may be of some value when determining cause and effect relationships), or (2) that the cats were highly resistant to the

production of emphysema (which could be caused by some excess in a part of the immune complement of the cats).

The results of the experiments with intratracheal injections of papain will be available in 1972.

Lung Scans in Animals With Airway Disease.

As part of studies of the regional changes in lung ventilation and perfusion in CWP, regional changes in lung ventilation and perfusion during simulated obstructive airway disease are being studied in dogs. The shifts in lung ventilation and/or perfusion with airway obstruction could be due to changing of resistance in the pulmonary vascular system, i.e. mechanical factors, or to changing of composition of the bases in alveoli and/or blood. In an attempt to understand the underlying mechanisms which cause the changes of ventilation and perfusion, NIOSH physiologists use cardiac catheters to measure the pulmonary arterial pressure, right and left pulmonary wedge pressure, and intrapleural pressure; alveolar and arterial gas tensions are also analyzed.

Changes in Intrapleural Pressures in the Presence of Airways Obstruction.

Due to limitations in the techniques and sensitivity of most pulmonary function tests the early effects of CWP on lung function are still not fully understood, but it is probable that the peripheral airways and possibly the pulmonary capillaries are affected to some extent. In order to separate these effects, it is necessary to determine the effect that changes in the peripheral airways have on vascular resistance and vice versa.

Studies were begun in 1971 in which pulmonary venous (wedge), carotid artery, intrapleural (esophageal), intratracheal, and systemic arterial pressures are simultaneously recorded while the expiratory airway resistance of the lung is varied and Xenon ¹³³ lung scans are being made. The cardiac output and flow to each lung will also be measured, and alveolar oxygen and carbon dioxide will be determined at each level of airway resistance.

Respiratory Mechanics of Excised Lungs. Residual volume of excised lungs has been shown to be a function of (1) the postmortem history of the lung, that is the number of inflation-defla-

tion cycles it has undergone from an initial degassed state, and (2) the length of time the lung has been stored in a cool environment awaiting study. Investigations were begun by NIOSH physiologists in 1971 to determine the underlying cause of the progressive increase in residual volume as the lung undergoes successive inflation-deflation cycles and to determine how the storage time specifically affects residual volume. This project will contribute to the development of a method for storing postmortem excised lungs from miners with CWP which will preserve the physiological properties of the lungs.

Electrical and Transport Properties of Bronchial Smooth Muscles.

Data collected in the cardiopulmonary and pathology laboratories at ALFORD and in other studies indicate that the bronchial smooth muscles are probably damaged, or at least change their gross mechanical properties, during the progression of CWP. Since it is difficult to determine what is happening to these cells from studies on the whole lung, a cellular technique, a method by which a group of individual muscle cells can be studied, is being developed to investigate how toxic materials affect bronchial smooth muscle function and how drugs might be used to reverse these changes.

This project was begun in June 1971, and in the last 6 months of the year all major equipment was received and installed. Some preliminary experiments have been performed with a simple tissue, frog sartorius muscle. The only procedure still to be worked out for these experiments is a method for controlling the temperature of the tissue. This procedural problem should be overcome early in 1972, and investigation will begin on the ionic mechanisms underlying action potentials and contraction in bronchial smooth muscle.

Cellular Aspects of Particle Rejection or Assimilation in the Lung.

Since alveolar macrophage cells play a vital role in the removal of particles from the lung, they could be an important factor in CWP. These cells engulf foreign particles and bacteria which enter the lungs and either detoxify them or carry them away via the lymphatics or by swallowing them. CWP develops only after long exposure to coal

dust and probably because the clearing mechanism, the alveolar macrophage, is overwhelmed. A project to study the mechanisms by which alveolar macrophage cells are involved in particle rejection or assimilation in the lungs was begun by NIOSH physiologists in 1971. The cells are washed from the lungs and studied in vitro. Using this technique, the cell's biochemical and membrane transport properties (such as the transport of sodium and potassium ions and, eventually, the transport of various dust particles) will be studied using radioactive tracers. Once the basic mechanisms have been studied, an attempt will be made to modify them by the use of various drugs or other agents, and the possible changes in the basic mechanisms associated with CWP will be evaluated.

In preliminary experiments, techniques for isolating and counting alveolar macrophage cells from rat lungs were developed in 1971, and some histological preparations of the cells were made.

Cardiopulmonary Research in 1972

Lung mechanics studies designed to detect and quantify the presence and severity of "small airway disease" in CWP will be continued, especially those studies involving the frequency dependence of dynamic compliance and maximal expiratory flow versus static recoil pressure. Lung mechanics studies on postmortem excised lungs will be initiated; these studies will be followed by fixation of the lung in the inflated state and quantitative gross morphological and histological examinations correlated with a history of dust exposure and pre-mortem X-rays where possible. In a study using radioactive gas, regional alterations of lung function will be measured in order to assess the localization of the disease processes in the lungs of coal miners. Studies of the immunological mechanisms whereby simple CWP changes into the complicated stage will be initiated. The role of the pulmonary macrophage system in the deposition, transport, and clearance of inhaled dust will be investigated. Efforts will be continued to develop and perfect tests of pulmonary function that relate more specifically to the disease produced by the inhalation and

deposition of coal mine dust than those currently in use.

IMMUNOLOGY AND INFECTIOUS DISEASE RESEARCH

The possible role of viral respiratory infections in the development of CWP and on the health of the coal miner with CWP is being studied by NIOSH. In 1971, investigations of the role of viral infection in CWP were directed toward developing techniques for demonstrating the adverse lung processes and altered immune responses associated with infectious agents.

Research Projects

Enhancement of Hemagglutination-Inhibition Titers. Influenza viruses, the group of respiratory viruses most responsible for mortality and severe illness among miners and others with chronic lung disease, are most readily detected by their hemagglutination properties. The standard test of the host's response to these viruses, measurement of antibodies which inhibit the hemagglutination reaction, has been easy to perform but the results have lacked the sensitivity of other tests. In 1971, a means to enhance the sensitivity of this antibody measurement test by the application of species-specific antiglobulin G or anti-whole serum was developed. No loss of specificity occurred, and the variables within the test system were measured to provide a standardized method for universal use requiring minimal expense in time and materials.

Enhancement of Neutralizing Antibody Titers to Influenza Viruses. Influenza virus disease periodically sweeps through the coal mining population and other industrial populations. Residua not yet identified are left behind by the disease, and precise assay systems are needed for the early detection and possible identification of such residua.

The neutralization or the inactivation of influenza virus by the host's humoral antibody is one of many defense mechanisms against

this disease. Its measurement is considered sensitive but is difficult to achieve in the laboratory because, although proportionate increases in antibody are capable of destroying virus infectivity, there is a point after which even great excesses of antibody will no longer destroy the infectivity of the virus completely. In preliminary experiments, this problem has been overcome by the addition of species-specific immunoglobulin G to the neutralization test. The sensitivity of the neutralization test has also been enhanced by the development in 1971 of a high-infectivity modification of the standard technique for innoculating host cells with virus. A full report on these techniques was in preparation at the end of the year.

Detection of Host Cell Membrane Antigen to Influenza Viruses. The host cell membrane is no longer considered a passive structure whose function is limited to the retention of cellular size and shape. It is well known that within the cell membrane active enzymatic processes effect the transport of vitally needed nutrients and metabolic excrements. The cell membrane is also essential, after infection and replication of influenza viruses in the cytoplasm, for the coating and final assembly of complete and incomplete virus particles which release for further damage to the lung.

In 1971 it was determined that, after initial infection, a 10-hour period must elapse before influenza virus antigen is first detected in the cytoplasm of a cell, but that within a 4- to 6-hour period the cell membrane actively produces an antigen serologically specific to the infectious agent. By the addition, at various time intervals, of ingredients known to inhibit the developmental process of the virus, the surface antigen phenomenon will be elucidated more clearly.

Techniques will also be devised to refine an easily performed identification test that may not only be applicable to those suffering from early stages of chronic lung afflictions, but also to the investigation of cancers.

Detection and Analysis of Antigliobulin and Anti-Nuclear Antibodies in Coal Workers. Under certain conditions, the human host produces a complex mixture of humoral antibodies, the rheumatoid factor (RF), against an equally complex mixture of human globulins known as

Cohn Fraction II. Such antibodies have been found in coal miners with rheumatoid disease and complicated CWP, i.e. Caplan's syndrome. The human host is also capable, for causes unknown, of making a complex humoral antibody, the anti-nuclear antibody (ANA), which has avidity for the cell nucleus. This mixture of antibodies is attracted to the nuclei of any animal species, but its presence is almost uniformly associated with a slowly deteriorating, fatal disease, disseminated lupus erythematosus.

In 1971, tests for RF and the subcomponents of the antibodies comprising ANA were performed on serum samples from three groups of coal miners: one group with Caplan's syndrome, one group with simple pneumoconiosis, and a control group with normal or nearly normal X-rays.

A large proportion of the samples contained ANA, but not always the same subcomponents of ANA. A much lesser proportion demonstrated RF. A modified ANA determination method which compared favorably with known standards was developed for this study. By the end of 1971, the procedure was being evaluated in conjunction with the West Virginia Hospital Clinical Laboratories, and a public patent application was being considered.

The final analysis of this study can imply only association among its determinants and must account for any bias in the sampling techniques by which the study groups were selected. However, should immunologic activity in the plasma cells in the vicinity of lung defects be demonstrated in this study, an attempt will be made to identify plasma cell activity in human lung sections for type of antibody production and to determine the relationship to specific viral agents.

Development of a Method for Rapid Diagnosis of Viral Infections. The etiology of acute respiratory disease by viral agents requires a long time for isolation and identification of the offending agent, provided the agent could indeed be isolated. Immunofluorescent techniques on direct smears obtained from patients to provide a rapid identification procedure frequently produce false or noninterpretable results caused by nonspecific background fluorescence and the presence of cross-reactive fluorescing substances.

In 1971, initial steps were taken toward a rapid virus identification system. Thus far, patients with the clinical appearance of infectious croup and persons from the control group are being sampled for the application of this identification technique.

A virus identification technique which can accurately detect virus respiratory agents within 16 hours after the initial sampling could be quite beneficial to high-risk populations, coal miners, and others with compromised ventilatory function.

Immunology and Infectious Disease Research in 1972

In 1972, immunology and infectious disease research by NIOSH will further develop the investigations in progress at the end of 1971 and will initiate several new projects. Techniques to elucidate the cell membrane antigen phenomenon for influenza virus will be developed. The phenomenon will be demonstrated for other viral agents commonly afflicting coal miners and other industrial workers, and identification tests for the antigens will be developed. Sera collected in 1971 for RF and ANA determinations will be used for measurements of various influenza antibodies in order to evaluate the influenza-exposure histories of coal miners with CWP. An investigation of the altered function of pulmonary macrophage caused by acute viral respiratory disease will be initiated in 1972; of particular interest will be the possible effect of viral infection upon the clearance of coal dust particles from the distal portions of the lungs, which is the location of the primary lesion of simple CWP.

BIOCHEMISTRY RESEARCH

In 1971, biochemistry research at ALFORD concentrated on the following areas: (1) the screening of serum protein fractions (immunoglobulins and complement titers) as indices of bronchopulmonary disorders; (2) serum levels of genetically related proteinase inhibitors—factors related to the possible genetic "predisposition" of individuals to pulmonary diseases,

such as CWP; (3) variations in the chemical composition of biological constituents (fibrous proteins and mucopolysaccharides) found in the excised lungs of coal miners with complicated CWP; and (4) the binding of metabolites and anti-metabolites to connective tissue components resulting in possible conformational and structural changes which may affect the physiological integrity of an organ such as the lung.

Research Projects

Blood Profile Studies. The use of selected blood profile studies in detecting chronic respiratory diseases is being evaluated. These multiphasic serum analyses, it is hoped, may reveal early chemical indices of a disease process—as an aid in early diagnosis. An analysis of this type may be applicable to the early detection of CWP and other possible physiological disturbances. Hopefully, therefore, these studies may provide indices of a disease state long before any overt manifestations are noted from the usual clinical history and/or physical examination.

In 1971, serum specimens were obtained from 235 presumably healthy coal miners and, for relevancy, from five miners with progressive massive fibrosis (complicated CWP). On all specimens, serum protein and immunoglobulin assays were performed; with a few selected samples, anti-tryptic activity was also determined. By the end of the year, assays for complement fractions were also initiated on those specimens whose "profiles" (serum proteins and immunoglobulins) indicated relatively high values. Analysis of complement titers were begun because they have been shown to be clinically related to acute and chronic diseases, genetic disorders, immediate and delayed hypersensitivity and other immunologically related disorders. At this date, the complement titers have not been completed and therefore no conclusions can be drawn; results should be available by the end of 1972. More specimens from diagnosed individuals with both CWP and progressive massive fibrosis will also be evaluated.

Proteinase Inhibitor Studies. Genetically related protein factors in serum from miners and other individuals with obstructive airway dis-

eases are being assayed. The levels of anti-proteolytic and anti-esterolytic serum proteins have been associated with different pathologies and also appear to fluctuate as a result of external stimuli. In this respect it should also be noted that some individuals are genetically deficient in these factors and therefore cannot respond either to the stimuli or show some predisposition to various disease states. It is with respect to the latter condition, predisposition due to lack of a genetic trait, that the serum of individuals with related bronchopulmonary disorders is being examined.

Serum samples obtained from the general population of a coal mining community have been assayed for anti-tryptic factors. An attempt has been made to statistically correlate the titers of these individuals with those having some form of pulmonary disorders. By the end of the year, other anti-proteolytic factors are also to be assayed, viz., anti-elastase, anti-chymotrypsin, and in selected cases anti-colagenolytic activities.

The specificity and sensitivity of some assay procedures are being evaluated; more satisfactory assay protocols are also being developed. However, well over 500 specimens have been examined using the presently available assay procedures. The data thus obtained would seem to indicate a linear relationship between the levels of the various anti-proteolytic and anti-esterolytic factors found in the blood. To what extent this correlation can reflect or be used as an index of bronchopulmonary disease or susceptibility to various pathologies is still open to question and will require further screening.

Biological Constituents of Lung Tissue With Progressive Massive Fibrosis. In a study begun in 1971, an attempt is being made to extrapolate to an *in vivo* system the information previously gained from an *in vitro* system. Essentially the study is concerned with the levels of various mucopolysaccharides and fibrous proteins in lung tissue obtained upon autopsy from coal miners who have died with progressive massive fibrosis (complicated CWP). It is well recognized that the levels of different mucopolysaccharides varies as an individual ages. It is also known that, in different disease states, the levels of these connective tissues constitu-

ents will also vary. The changes in the relative concentrations of these carbohydrate fractions also affect the functional integrity of a particular tissue (this is quite obvious in aging). Therefore, the primary purpose of this study is to determine the relative concentrations of these biological constituents in lung specimens obtained from progressive massive fibrosis patients; for comparison, autopsied normal specimens are also being studied.

Specimens have been obtained from two lungs with progressive massive fibrosis and one normal lung sample. This investigation is also being correlated with analyses of histological sections. At the end of 1971, although the data is limited due to scarcity of specimens, preliminary results look quite promising; at least a variation appears to exist in the concentrations of several biological constituents.

Metabolite and Anti-metabolite Binding Studies.

The data obtained in this project will be used in tissue culture studies in 1972. Much of the information gathered thus far in this investigation requires further analyses using living cells, e.g., lung tissue fibroblasts. The binding of various metabolites (amines and dicarboxylic acids) and anti-metabolites (quinones, anthroquinones, and phenolic derivatives found in coal dust) must be evaluated in terms of cellular metabolic function. The reasons thus obtained may be expected to greatly enhance the data obtained through the *in vitro* studies.

Biochemistry Research in 1972

Biochemistry research in 1972 will be concentrating in four areas, much of which is a continuation of work already in progress. These areas include: (1) the development of a biochemical profile as indices of bronchopulmonary disorders; (2) serum titers of genetically related factors in association with individuals who may be predisposed to a particular disease; (3) the determination of biological constituents (mucopolysaccharides and fibrous proteins) of lung tissue obtained from coal miners with complicated CWP; and (4) the relationship between the binding of various metabolites and anti-metabolites in living cells

with reference to metabolic and physiological functioning of these cells and production of connective tissue components.

EPIDEMIOLOGICAL RESEARCH

Research Projects

Coal Workers' Pneumoconiosis and Respiratory Impairment in Pennsylvania Anthracite and Bituminous Miners. As part of the larger National Study of Coal Workers' Pneumoconiosis, the prevalence of X-ray evidence of CWP and of respiratory impairment in a group of 1461 bituminous coal miners from six underground mines was compared to that present in a group of 523 anthracite miners from two underground mines. The bituminous mines were located in central and western Pennsylvania; the anthracite mines were in eastern Pennsylvania. The prevalence of CWP (60 percent) and progressive massive fibrosis (14.3 percent) in the anthracite miners was significantly higher than in the bituminous miners (46.9 percent and 2.3 percent, respectively). These data are presented in Table 3-2. Furthermore, a higher prevalence of bronchitis occurred in the anthracite miners; their residual volume, the amount of air remaining in the lungs after maximal expiration, was likewise significantly increased. These differences could not be explained by differences in years spent underground or in

smoking habits. It was concluded that an unidentified agent is present in the working environment of the anthracite miner which puts him at a greater risk than his bituminous counterpart.

Model Progression Study. A small preliminary study of the progression of CWP was undertaken in 1971. The study is designed to assess thoroughly the X-ray reading techniques available to determine progression of CWP and to provide an epidemiological model for use in the second phase of the National Study of Coal Workers' Pneumoconiosis. Several mines included in the first round of examinations under the National Study, which was completed in 1971, were among those sampled between 1963 and 1965 in the Public Health Service Prevalence Study of Coal Workers' Pneumoconiosis. Therefore, two films, taken about 5 years apart, are available for each of approximately 500 miners from mines in eastern, southern, and midwestern states. The duplicate X-rays for this small sample group are being read by a panel of radiologists employing the UICC/Cincinnati Classification System for CWP. Each set of films is read twice—once side by side and once at random.

By the end of 1971, approximately 75 percent of the X-rays had been completely processed. Preliminary results indicate that the approximate progression of the disease over a 5-year period between 1963 and 1971 has been about 1 increment on the UICC/Cincinnati scale (for example, a progression from 0/1 to 1/0). The disease seems to have progressed statistically at a constant rate until complicated CWP, progressive massive fibrosis, is reached. Such factors as age, smoking, and years underground appear to have had no influence on the progression.

It is emphasized that these data are preliminary; it is entirely possible for the results of this small model study to be altered when all data are available.

Epidemiology Research in 1972

The second round of examinations in the National Study of Coal Workers' Pneumoconiosis and the Study of Surface Coal Miners discussed

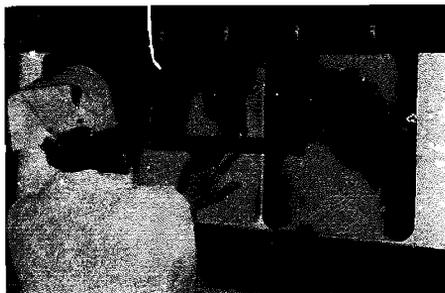


FIGURE 4-3.—A nurse of the ALFORD field team is pictured determining total lung capacity from chest X-rays.

previously are the major epidemiological projects to be undertaken by NIOSH in 1972; however, ALFORD field teams will be making examinations in two other studies during the year.

Study of Health Hazards in Activated Charcoal Production. In 1963, the Public Health Service conducted a survey at the West Virginia Pulp and Paper Company mill in Covington, Virginia; particular attention was given at that time to employees exposed to activated charcoal in the carbon black plant. Approximately 11 percent of the workers with significant histories of carbon dust exposure were found by chest X-ray to have simple CWP. A follow-up study in 1966 did not demonstrate any progression of the disease. In early 1972, NIOSH will conduct a similar study at the carbon black plant to assess the progression of the disease over the intervening 5 years.

Follow-Up Study of Miners in Raleigh County, West Virginia. From 1960 to 1962, studies were made of a randomly selected group of 267 working, retired, and disabled Raleigh County coal miners aged 47 to 57. Included in the studies were chest X-rays, pulmonary function testing, and occupational and respiratory function questionnaires. NIOSH has obtained the raw data from this study and expects to restudy this group in 1972. It is anticipated that significant morbidity and mortality data will be forthcoming.

CHRONIC ANIMAL INHALATION EXPOSURES

The experimental animal inhalation toxicology studies of coal dusts have been designed with three major objectives: (1) to determine comparative toxicologic activity of coal dusts of high and low disease incidences (CWP); (2) to determine the toxicologic effect of superimposed, repeated, intermittent peak levels on constant exposure levels from high disease incidence coal dust; and (3) to develop criteria applicable to the validation of the tentative Threshold Limit Value (TLV) for bituminous coal.

An understanding of CWP recognizes that certain unknown factors influence the onset

and progression of the disease other than daily repeated exposures to dust at varying concentrations. Identification of as many of these factors as possible by selection of proper animal species, conditions of exposure, selection of response criteria, and possible modification of host factors (infection) are a means of accomplishing the objectives.

Animal Inhalation Exposure Study. Chronic coal dust inhalation studies initiated in July 1970 have progressed into the 18th month of a programmed 2-year study. Multiple species of laboratory animals including monkeys and a pulmonary tumor-susceptible strain of mice are undergoing exposures to two bituminous coal dust samples—a Pennsylvania high disease incidence coal and a Utah low disease incidence coal. In one large, dynamic-type inhalation chamber animals are exposed to the Pennsylvania coal at a 2 mg/m³ concentration of respirable dust. A second chamber contains animals undergoing similar exposure parameters to the Utah coal. A third group is being exposed to the Pennsylvania coal at 2 mg/m³, with the addition of a superimposed peak concentration of 60 mg/m³ for 10 minutes per hour. A separate chamber is used for unexposed control animals.

Toxicologic evaluation underway on these chronic exposures is based on the following criteria: (1) critical chemical and physical analyses of the coal samples; (2) pulmonary function studies determining lung mechanical properties, ventilation, gas distribution, and lung volumes; (3) biochemical determinations of lung and lymph node collagen content, lung and blood alkaline phosphatase, succinic dehydrogenase, anti-trypsin, glucose-6-phosphate-dehydrogenase, and lactic dehydrogenase enzyme activities, gross pathology and histologic evaluation of animal tissues from all species following mortality of serial sacrifice, and chemical analyses of appropriate tissues particularly lung and lymph nodes; and (4) body-weight data, hematologic evaluations, and the incidence of mouse pulmonary tumorigenesis.

Chemical analysis of the coal samples has identified significant amounts of several substances—nickel, chromium, manganese, and quartz—that are of interest as possible factors associated with CWP.

Mass median diameter determinations of the coal dusts, by electron microscopy, have insured the respirability of the samples generated for the inhalation chamber exposures. Collection of pulmonary function data from monkeys, for establishing a base line of comparison for pre-exposure versus exposure changes, has been completed. With the exception of a significant decrease in red blood cell glucose-6-phosphate dehydrogenase activity in exposed versus control rats, no other biochemical parameters demonstrated significant change following 12 months of exposure. Histopathology of rats exposed for 1 year presented dense aggregates of coal dust particles in lung alveoli but without metaplasia.

PHYSICAL AND ANALYTICAL CHEMISTRY RESEARCH

Laboratory Analysis of Human Lungs. One hundred "normal" human lungs have been obtained from a local hospital and are being analyzed chemically to provide base line information on the chemical composition of lung tissue. The cases were selected to exclude subjects with known occupational dust exposures. It must be noted, however, that these 100 cases represent deaths from disease and/or aging and are therefore normal only in the sense that there is an absence of the coal dust inhalation factor.

Several hundred lungs from deceased coal miners have been under study within NIOSH for several years. The study is now being expanded to include cases from other mining communities and will include specimens from nonminer residents. In all instances, medical, occupational, residential, and smoking histories complement the tissue specimens.

The aforementioned human lungs, after homogenization and freeze-drying, are analyzed for coal and total dust, free-silica, hydroxyproline and trace metal concentrations by various analytical methods. Concentrations of the following trace metals are determined: beryllium, magnesium, titanium, vanadium, chromium, manganese, iron, nickel, copper, zinc, lead, sodium, potassium, and calcium.

Definitive evaluation of analytical data will not be available until statistical studies are

completed. For the present, only general observations can be made. Free-silica has been determined on 53 of the 100 normal lungs; concentrations are significantly higher in the coal miners' lungs. In tissues analyzed so far, no correlation appears to exist between silicon dioxide and hydroxyproline concentrations. Dust and elemental analyses have not yet been performed on the normal lungs.

Factors Affecting Removal of Coal Dust From the Lungs. This project, being done by contract, has the following objectives: (1) to determine the number and functional integrity of alveolar macrophages in rats exposed to certain dusts of bituminous coals (Pennsylvania and Utah) at a concentration of 2 mg/m³; (2) to correlate alterations in number and function with physical and chemical characteristics of the selected samples of dust and with biological availability of certain constituents in the dust; and (3) to evaluate the influence of age on the disposition of a pulmonary load of dust by the rat.

It was observed that the Pennsylvania coal sample, responsible for producing more disease in humans, contains larger quantities of nickel, chromium, lead, and free-silica. The contribution of these elements to the disease potential remains obscure. It was also observed that the numbers of alveolar macrophages available in lung lavage from young rats (3 to 6 months of age) exposed via inhalation to the two samples of coal appear to be significantly different at approximately the ratio of 4 to 1, Pennsylvania to Utah, expressed as millions of macrophages per gram of lung, during the initial weeks of exposure. Subsequent weeks of exposure to either coal sample suggest a decrease in the macrophage pool size as compared with levels in unexposed control animals. No significant differences were observed between the 24-month-old exposed rats.

Isoenzyme esterase activity in alveolar macrophages washed from coal dust exposed rats indicates differences in the quality and quantity of esterases in the cells and their release or solubilization into the lavage fluid. Most activity was in the Pennsylvania dust exposed animals. Attempts will be made to correlate this phenomenon with the difference in disease observed with inhalation of the two

dusts. Elution of metals and other components from coal by human serum has been initiated. A qualitative atomic absorption spectra showed only extraction of nickel (780 parts per million after 14 days). The serum was analyzed specifically for lead, chromium, and nickel.

Immunological Aspects of Experimental Pneumoconioses. Lung-reactive antibodies have been demonstrated in humans with a variety of chronic pulmonary disorders including CWP. In this project, being done by contract, an attempt is being made to: (1) provide information from experimental animals as to the time of onset of lung-reactive antibodies during chronic inhalation exposure to certain coal dusts (Pennsylvania bituminous coal samples), (2) correlate these data with the onset of pathology arising from the dust exposures, (3) assess the role of lung-reactive antibodies in the evolution of the disease process, and (4) develop a method for quantitating lung-reactive secretory immunoglobulin. Preliminary results show the production of distinct pulmonary lesions in coal dust exposed rats. Isolation and quantitation of lung antibodies and IgA are in progress on collected fresh and frozen sera and tissue samples. Lung density studies with lung connective tissue immunized mice and rats are indicative of a pathologic-immunologic process related to the genesis of collagen fibers in the alveolar septa of injected animals. Assessment of this response will require additional and repeated study.

ERGONOMICS RESEARCH

Heat Stress Studies. In 1971 NIOSH developed recommendations for permissible heat exposure limits for surface coal mining operations. This was adopted in 1971 by the American Conference of Governmental Industrial Hygienists as a tentative Threshold Limit Value for heat stress. This recommendation was based on laboratory studies and field studies performed in other industries; it was therefore necessary to confirm its validity in surface mines.

A field study was conducted in a Kentucky surface coal mine in July 1971. The observations consisted of measuring the climatic condi-

tions of the working environment and the physiological responses of the workers. Evaluation of the data obtained in this field study is not complete; nevertheless, the following tentative conclusions can be drawn:

1. The recommended standards can be monitored by available industrial hygiene personnel after a simple briefing consisting of demonstration and explanation of the technique. The required instruments can be purchased or fabricated in any mechanical shop.

2. Compliance with the recommended standards would give the workers satisfactory protection from health hazards due to heat stress.

3. Compliance with the recommended standard would occasionally require change in the customary work procedures by allowing additional rest time in some of the jobs.

CONTROL AND PROTECTION RESEARCH

Development of High-Expansion Foam Systems for the Suppression of Respirable Coal Dust. Although development of new mining equipment with advanced and more effective means of dust suppression is anticipated, the coal industry will continue to use its present equipment for a considerable time. Thus, there is a need for some method which can be used with current equipment to reduce the concentration of respirable dust in underground coal mining.

A potential means of reducing airborne dust is the application of high-expansion detergent foam to the coal face at the point where the mining equipment is cutting. It is reasoned that dust will be entrapped by the foam and carried to the floor as the foam collapses. Thus, dust will be prevented from becoming airborne.

NIOSH, in coordination with the Bureau of Mines, is examining such foam systems through the contract mechanism. Various foaming agents have been tested and one has been selected for extensive testing. This foaming agent consists of equal parts of ammonium lauryl sulfate and a sulfonated hydrocarbon used at a rate of 0.4 to 0.5 percent. These substances are considered nontoxic; however, only

actual underground testing will determine whether they have irritative properties. Foam generation equipment has been designed for use with the three basic types of continuous miners: oscillating head ripper, fixed head ripper, and auger miner.

Underground testing will be performed to determine the effectiveness of this equipment in reducing respirable dust concentration in the work environment. The testing will also indicate whether significant dust reduction is possible and economically feasible with this system.

Design of Protective Knee Pads for Coal Miners.

In coal seams less than 48 inches high, miners must often crawl on their knees while performing their job tasks. Miners find present knee pads to be uncomfortable and inadequate in wear resistance. The high occurrence of knee problems, especially chronic bursitis, among low-coal miners is evidence of the inadequate protection afforded by these pads. The goal of this project is to develop knee pads which will adequately protect coal miners and mine inspectors from chronic knee conditions and knee injuries.

Presently used knee pads and the miners' adaptations of them have been studied by a NIOSH contractor in visits to regions where low coal is mined. Potential materials for fabrication of new pads were investigated and contacts were made with British researchers in this field.

Prototypes of the new pads and design specifications will be completed in early 1972; a testing program for the new pads is planned for 1972.

Design of Head Protective Devices for Coal Miners.

Coal miners' helmets, which have traditionally followed the design of helmets worn by industrial workers, do not afford adequate protection to the sides and back of the head. Because of the unique hazards of the coal mine environment, research into the frequency and types of head injuries was initiated so that design criteria for an improved miners' helmet could be developed.

This project, which is being done by contract, includes an investigation of industrial and coal mine accident reports, an investigation of current helmet research, the gathering of anthro-

pometric measurements of the head, and the collecting of information on energy-absorbing materials. Subsequent tasks will involve the development of design criteria, selection of an improved design, and production of three prototype helmets.

The data gathering phase is being completed and the development of design criteria is now beginning. Need for greater protection has been established and models are being fabricated according to the preliminary design requirements. The prototypes developed will then be tested to determine their acceptability as protective devices.

NON-COAL MINER HEALTH RESEARCH

Section 501 (d) of the Act requires the Secretary of HEW to conduct studies and research into matters involving the protection of life and the prevention of diseases in connection with persons, who although not miners, work with, or around the products of, coal mines in areas outside of such mines and under conditions which may adversely affect the health and well-being of such persons.

An important sampling study undertaken by NIOSH has been the steel mill coke oven study for coal tar pitch volatiles. This has involved five steel mills in various parts of the country to achieve diversity in such variables as coal, coking procedures, and weather. Both personal sampling and fixed station sampling have been conducted by a variety of simultaneously operated instruments.

Scheduled for early completion is a contract study on factors affecting coal tar pitch volatiles emissions in a pilot-plant coke oven. Another contract study involves sampling of exposure to coal dust and silica among coal handlers (power plant workers, etc.) and medical examinations for pneumoconiosis.

GRANTS

NIOSH conducts a program of grants for support of research at universities, state and local agencies, and other public and nonprofit insti-

tutions on problems related to its areas of responsibility. NIOSH grants related to coal mine health research are listed in Appendix F.

In awarding grants, NIOSH makes use of consultative groups of distinguished scientists. These groups, organized as study sections, review proposals submitted by eligible institutions on behalf of named investigations and provide objective appraisals of their scientific merit. These appraisals are then reviewed by NIOSH for a final determination of funding, within available budgets.

In addition to the research grants supported in 1971, NIOSH and the National Institute of Environmental Health Sciences jointly funded a research conference on CWP in which a number of outstanding scientists from the United States, Great Britain, Australia, and other countries participated.

SPECIAL FOREIGN CURRENCY PROGRAM

The Special Foreign Currency Program (P.L. 83-480) operates under authority of the President in Section 104 (b) (3) of the Agricultural Trade Development and Assistance Act as amended (P.L. 83-480), and other appropriate authority in the Public Health Service Act (P.L. 78-410). The program is supported by U.S. owned foreign currencies which have been determined by the Treasury Department to be in excess of normal U.S. needs in certain designated countries. These excess currencies were obtained through the sale of agricultural products and must be used in the foreign countries involved. There is no appropriated NIOSH dollar outflow from the United States in connection with this program. The NIOSH P.L. 480 coal mine health research program includes three projects in Yugoslavia.

Evaluation of Isoniazid. The extent to which the administration of isoniazid can prevent progressive massive fibrosis (complicated CWP) in coal miners with X-rays negative for tuberculosis is being determined in a 5-year study now in its final year. This project is being conducted at the Serbian Institute of Occupational and Radiological Health, Belgrade, Yugoslavia.

A group of 526 miners with categories 2 and 3 CWP and without X-ray evidence of tuberculosis were divided into two equal subgroups. One group received 5 mg/kg body weight of isoniazid daily for 1 year; the other group received placebos. Each year complete medical examinations, histories, and chest X-rays were taken. The scope of the project was enlarged to include a series of pulmonary function tests during the final 2 years of the study. Of the original 526 miners, three have died from causes unrelated to CWP, and five have shown progression of their pneumoconiosis. Analysis of the X-ray data awaits the completion of the study in 1972.

Studies of Nonsiliceous Mineral Dusts. The objective of this project is to determine the effects of nonsiliceous mineral dusts on the development of CWP and nonspecific respiratory disease in coal miners and cement plant workers. This 5-year study is being conducted at the Institute for Medical Research, Zagreb, Yugoslavia. Suitable groups of 300 to 500 coal miners, cement plant workers, and controls are being studied to determine the possible interactions between the presence of CWP and nonspecific respiratory disease and the substances present in the working and nonworking environments of the men. Occupational and medical histories, physical examinations, pulmonary function tests, and chest X-rays are conducted on each person selected.

Observations based on data collected through 1971 indicate that respiratory symptoms are more frequent in the coal miners than in the controls. The rate of chronic bronchitis in the miners is associated with the length of time spent working in the mines (age corrected). Cough, phlegm, shortness of breath, and wheezing are most frequent in the miners with the longest work records; in addition, the pulmonary function parameters of forced expiratory volume in 1 second and forced vital capacity show a reduction with length of work in the mines and frequency of symptoms.

In the cement workers, the frequency of respiratory symptoms is also higher than in the controls; however, the frequency of symptoms did not increase continuously with increase in years of exposure. In fact, only 1 year of exposure to cement dust was enough to result in

respiratory symptoms. Spirometric tests indicate that a ventilatory impairment of the obstructive type is more frequent than restrictive disease. The study will be completed in 1972.

Cardiopulmonary Functions. The third Yugoslavian project is underway at the Serbian Institute of Occupational and Radiological Health, Belgrade. In a 5-year study now in its fourth year, the cardiopulmonary function and work capacity of coal miners exposed to different amounts and compositions of coal dust are being determined and related to impairments such as pulmonary emphysema, chronic bronchitis, and CWP. Two groups of approximately 150 coal miners, matched for age and years of exposure, were selected for the study. One group was from a hard coal mine with low free-silica and the other from a "brown" or soft coal mine

with no silica. Medical and occupational histories, clinical examinations, tests of pulmonary function, and chest X-rays were taken once a year of the two groups of miners and of a control group matched for age. Morbidity and mortality experiences of the subject groups are also being compared with each other and the general population.

A preliminary comparison of the annual data between the control experimental groups and also between the two experimental groups shows some pulmonary function abnormalities in workers who were "normal" on the first examination and some worsening of function in a few of those who originally had problems. However, preliminary comparison of X-rays of miners and controls through 1971 shows no differences which would account for the alterations in pulmonary function.

5. COOPERATIVE COAL MINE HEALTH ACTIVITIES

BUREAU OF MINES

National Study of Coal Workers' Pneumoconiosis

The National Study of Coal Workers' Pneumoconiosis initiated by NIOSH in 1969 is a cooperative project with the Bureau of Mines, U.S. Department of the Interior. The Bureau is providing information on past respirable dust levels in the 31 mines included in the Study and will continue to supply current data collected under the Act for the duration of the Study. (The National Study of Coal Workers' Pneumoconiosis is discussed in detail in Chapter 3.)

Liaison Activities

The Public Health Service has traditionally provided professional assistance in health matters to other Federal agencies. The first formal agreement to supply medical consultation services to the Bureau of Mines was signed by both agencies in 1911. Similar agreements have maintained this working relationship almost continuously since that time.

Because of the broad scope of the Act in health protection of the coal miner, a full-time physician was assigned by NIOSH to the Bureau of Mines to serve as advisor in health matters and as liaison representative at the technical level. This assignment serves to maintain close contact between program technical staff of the two agencies and to expedite the exchange of program information in areas of joint responsibility.

Professional advice to Bureau of Mines staff included professional opinions on the health implications of various conditions in the coal

mines, interpretations of health provisions in the Act, and recommendation of an appropriate time allowance (45 days) for mandatory transfer of miners eligible under the Act. Advisory action was issued based on interpretation of accident reports and medical records including, on one occasion, an expert outside consultation for a medical-legal precedent case.

Assistance was provided the Bureau in preparing final regulations for transfer of eligible coal miners to low-dust positions as provided in the Act. When this was accomplished, a system for monitoring the transfers was established. By the end of 1971, additional efforts were underway to encourage the Bureau to expand its requirements for coal mine operator plans in emergency medical assistance and communications.

SOCIAL SECURITY ADMINISTRATION

The feasibility and efficacy of an exercise test to determine respiratory disability in former coal miners is being evaluated in a cooperative project between NIOSH and the Social Security Administration. A protocol has been developed by the Social Security Administration for the selection and testing of former coal miners who have been disallowed Social Security disability compensation under the Act, because they did not meet the ventilatory criteria set out in Social Security Administration regulations. Three laboratories in the State of West Virginia have been enlisted in this project: the Beckley Appalachian Regional Hospital Laboratory, a laboratory at the Charleston General Hospital, and NIOSH's ALFORD. The subjects are directed to any one of the laboratories for study. An exercise test is prescribed

in the protocol, as well as arterial blood gas studies, measurements of the volume of ventilation, and the gas exchange aspects of lung function.

In 1971 more than 25 men were studied at ALFORD under this project. In addition to the testing outlined in the protocol, the men tested at ALFORD underwent other tests of their lung

volume, diffusion capacity, and distribution of ventilation. These procedures are possible in the ALFORD laboratories because of the presence of research-type equipment. The results of this project are expected to assist the Social Security Administration make an equitable decision in the cases of miners who have reapplied after being turned down for benefits.

6. DUST SAMPLING

Dust sampling has generally followed the concepts, recommendations, and hardware proposals given in some detail in NIOSH's *Coal Mine Health Program 1970 Annual Report*. As a result of the multiple needs shown, a considerable number of studies or instrument developments are proceeding simultaneously, with the majority to be completed prior to the end of 1972.

ACCOMPLISHMENTS

Improved Coal Mine Dust Personal Sampler. The pump-motor combination for an improved coal mine dust personal sampler is nearing completion. It will have twice the flow rate of present devices, indicator light and automatic shutoff for "tilt" (as when lying horizontally on coal cart in low coal), extremely low silica and ash filter for accuracy in quartz determination (as for roof bolters), elimination of flowmeter, air hose, and underground flowrate adjustments, as well as other features.

Coal Mine Dust Exposure Statistics. A study was completed for simultaneous Mining Research Establishment (Great Britain) personal sampler evaluation in coal mines in Virginia, West Virginia, and Kentucky. Partial data analysis indicates a Mining Research Establishment to personal sampler equivalence much lower than the presently used 1.6 when employing the Mine Safety Appliances Model G pump and field sampling head with a Cassella pulsation dampener between the pump and sampling head.

Quartz Exposure Monitoring. The new sampler pump-motor combination is expected to allow

single-shift (rather than combined-sample) capability for monitoring quartz exposure. A 1-hour capability may be expected from medium-volume respirable quartz sampler for surface mines, although it may not be approved for use underground.

INSTRUMENT DEVELOPMENT

Studies are being conducted both on present instruments to determine how equipment changes might be beneficial and on direct development of instrument prototypes.

—A contract study is underway on an evaluation of the existing coal mine dust personal sampler, employing both coal dust and monodisperse (uniform size) particles. A chamber, particle generator, and the equipment to be evaluated have been set up, and data are now being gathered.

—The coal mine dust instantaneous mass monitor (Figure 6-1) capable of direct readout of 1-minute samples has been developed under contract procurement and is now on the market. Preliminary evaluation by NIOSH indicates it to be responsive to changing coal dust concentrations and to give reasonable values.

—The coal mine dust mass distribution instrument (Figure 6-2) capable of six size-selective separations of coal dust is being developed under contract.

NIOSH studies have also been made on sampling pump pulsations, flowrate consistency, lift testing, humidity effects, and other factors.

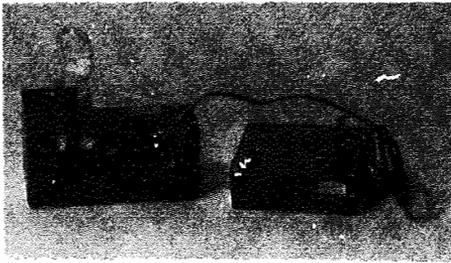


FIGURE 6-1.—GCA Technology Division. Coal Mine Dust Instantaneous Mass Monitor (left) and Charging Unit (right).

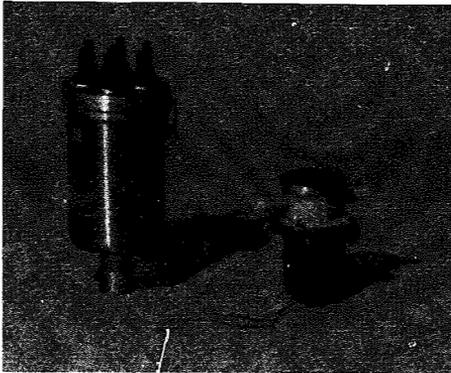


FIGURE 6-2.—New York University. Coal Mine Dust Mass Distributor. Instrument. Development components include multi-cyclones (left) and pump-motor combination (right). Manifold connecting pump and cyclones, rechargeable battery, and other components are still being developed.

INSTRUMENT TESTING AND CERTIFICATION

New approvals in 1971 included the Mine Safety Appliances Company, Model G coal mine dust sampling pump with cap lamp battery (Figure 6-3) and the Unico Environmental Instruments, Inc. (later consolidated with Bendix Corporation) Model C 110 coal mine dust personal sampler (Figure 6-4). Approval letters

were given to the Bendix Corporation for the Koehler 10-unit coal mine dust personal sampler battery charger and to the Mine Safety Appliances Company for its filter paper for use in the coal mine dust personal sampler. The Coal Technology Company sampling head for the Unico 3900 and Mine Safety Appliances Company personal sampling pumps was also tested. Coal mine dust personal samplers approved in previous years are shown in Figures 6-5 through 6-7.

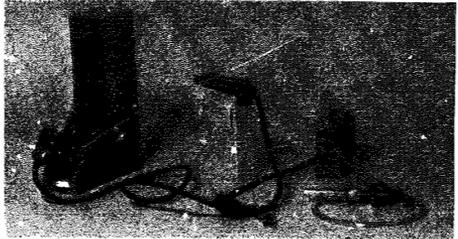


FIGURE 6-3.—Mine Safety Appliances Company. Coal Mine Dust Personal Sampler (Approval No. 1A-104). Approval includes the pump unit (upper right), cap lamp battery (center), sampling head assembly (lower right) and cassette (inserted in sampling head assembly and containing filter on which respirable dust is deposited). The single unit cap lamp battery charger (left) is not part of the approval but is included in picture to show all necessary items.



FIGURE 6-4.—Bendix Environmental Science Division. Coal Mine Dust Personal Sampler (Approval No. 1A-105). Approval includes the pump unit (center), sampling head assembly (left), single battery charger (right), and cassette/capsule assembly (contained in sampling head assembly).

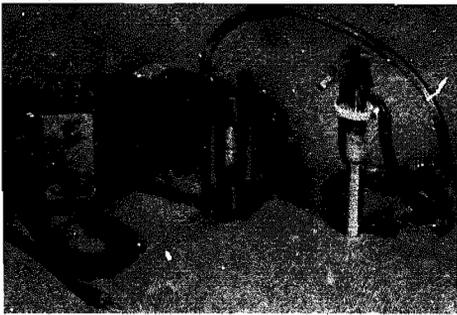


FIGURE 6-5.—Mine Safety Appliances Company. Coal Mine Dust Personal Sampler (Approval No. 1A-101).



FIGURE 6-6.—Unico Environmental Instruments, Inc. Coal Mine Dust Personal Sampler (Approval No. 1A-102).

NIOSH development has also covered informal testing of manufacturer's prototype de-

vices, including coal chamber studies, pulsation effects, leak testing, filter loading, and air resistance. Publication of standardized test procedures should minimize similar work which could be done by the manufacturer himself and would probably be a good deal more convenient for him.

Analysis and assessment of the implications and interrelationships of the multiple studies to be terminating soon will be made with a view to identifying omissions and conflicts in the data. The information gained will be utilized as soon as practical in *Federal Register* changes in conjunction with the Bureau of Mines, and in other appropriate standards, criteria, Department of Labor recommendations.

Laboratory and in-mine testing and evaluation of NIOSH developed and independently developed coal mine dust samplers and other equipment is essential and will be continued.

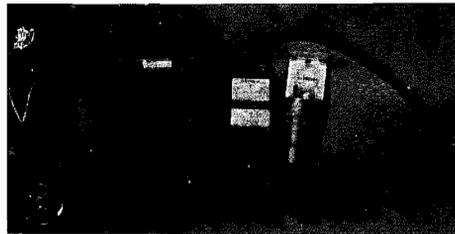


FIGURE 6-7.—Unico Environmental Instruments, Inc. Coal Mine Dust Personal Sampler (Approval No. 1A-103).

7. RESPIRATORY PROTECTIVE DEVICES

Section 202 of the Act creates a statutory requirement that mine operators provide respirators for miners exposed to coal mine dust whenever the dust exceeds the established standard. Section 204 of the Act requires miners to be provided respirators when they are exposed for short periods to inhalation hazards from gas, dusts, fumes, or mist. When the exposure is for prolonged periods, other measures to protect such persons or to reduce the hazard shall be taken.

A concentrated research and development effort has been initiated for the express purpose of developing new respiratory protective devices based on innovative techniques which will improve worker acceptance, thereby ensuring the adequacy of respiratory devices as a protective health mechanism.

RESPIRATOR DEVELOPMENT

The following NIOSH-funded research and development efforts are underway:

—A study by contract to evaluate current respirator use in underground coal mines and to determine the effectiveness of respirators by in-mine tests.

—A study by contract to develop a prototype air-supplied respirator system for use by underground coal mining equipment operators.

—A study by contract to develop anthropometric specifications which will be used to develop respirator sizing requirements, certification testing methods, and standards for industrial respirator programs.

STANDARDS

NIOSH has participated in the preparation of a new American National Standard Institute standard, soon to be published, which covers recommended procedures for respiratory protection from inhalation of coal mine dust. This standard is intended to serve as a guide for the use of respiratory protective devices to reduce the potential for damage to health from inhaling coal mine dust. Included in this standard are recommended procedures for conducting a respirator program with guidance on the selection, use, and maintenance of respirators.

CERTIFICATION

A respirator testing and approval regulation has been prepared jointly by the Bureau of Mines and NIOSH. This regulation consolidates the separate Bureau of Mines Schedules into a single respirator testing and approval regulation covering all types of respirators. The new regulation imposes more stringent performance requirements on respirator manufacturers for approval of respirators. As a part of each approval application, the manufacturers will be required to submit a quality control plan. This plan must include a procedure for the selection of a sample of respirators and the components thereof for testing in accordance with the standards to ensure control of product quality through the manufacturing cycle.

8. SURFACE SANITATION SURVEY AND STANDARDS

In accordance with Title I of the Act, Section 101(d), and for the purpose of establishing surface coal mine regulations for the protection of the health of surface workers according to Section 101(i), investigations have been made of surface coal mine sanitary facilities. A survey of the sanitary facilities of surface coal mines was conducted for the purpose of establishing information for use in hearings held by the Secretary of HEW to review proposed regulations for surface coal mines published in the *Federal Register* on January 7, 1971 (see Appendix E).

The survey of sanitary facilities was designed to document the existing sanitary conditions of surface coal mines.

The items surveyed were drawn from the proposed regulations as published in the *Federal Register* (Part 7, sub-parts D, E, and F) and included the availability of bath houses, change rooms, toilets, and drinking water. The survey questions were selected in detail from the proposed regulations to provide a complete study of the degree to which the mines visited meet the regulations. The scope of mines visited included a wide variety of surface coal mining conditions in order to reflect as much of the industry as possible. In all, 34 mines were visited in five states.

The general relationship of surface coal mining sanitary facilities to the proposed regulations was found to be limited compliance. The industry seldom provides toilets at the work sites, although toilets are found at the office areas. Bath houses, when available, are provided primarily at the shop, office, or cleaning plant. Drinking water was found to be provided according to the custom of the mining area but was usually provided by the miners.

At the hearings on the proposed regulations on August 17, 1971, comments on the proposed regulations were submitted by representatives of the National Independent Coal Operators Association, the United Mine Workers of America, the Bituminous Coal Operators Association, and the Bureau of Mines. Based on evidence presented at the hearings and on other available evidence, a findings of fact was published in the October 15, 1971, *Federal Register* (see Appendix E). A draft of revised standards was subsequently developed and is pending.

Current regulations pertaining to sanitary facilities and drinking water in coal mines were developed from data applicable to other types of workplaces and may not be entirely suitable for setting sanitation standards for mines. In order to have more specific data on which to base new or revised regulations regarding these facilities, a study is being developed to identify and characterize the sanitary conditions of the mine environment.

The proposed regulations for sanitary facilities for surface mines provide for waivers to certain requirements granted by the Bureau of Mines' District Coal Mine Health and Safety Director after consultation with the NIOSH Regional Program Director. To assure a greater degree of uniformity in evaluating waiver applications and in granting waivers, guidelines setting forth criteria under which waivers may be issued are being developed. Such guidelines will take into account the technical and physical limitations encountered, giving consideration to geographical variations, size of mines, practicability, and availability of equivalent facilities.

9. NOISE STANDARD AND RESEARCH

ADOPTION OF A HEALTH STANDARD FOR NOISE

NIOSH, recognizing the limited amount of information on the effects of exposure to intermittent noise, which is the predominant type of exposure in underground coal mines, sought the advice of the Committee on Hearing, Bioacoustics and Biomechanics (CHABA) of the National Academy of Science—National Research Council. Their recommended limits of exposure to noise were published in the *Federal Register* on December 9, 1970.

By the end of the period for comment, January 9, 1971, 30 statements had been received from professional and trade associations, and State health departments. The comments may be summarized as follows:

—The recommendations are complicated, and the noise surveys would require too much manpower.

—The American Conference of Governmental Industrial Hygienists Threshold Limit Values for Noise, which are less complicated, were preferred by 18 of the 20 respondents.

—A survey of the less noisy occupations (those well below the limits of the standard on each survey) should not be required.

The Bureau of Mines conducted a study of 100 job operations, and analysis indicated the recommendations of CHABA to be less restrictive than those of the Walsh-Healey regulations which were to apply until recommendations were made by the Secretary of HEW.

Studies, conducted in the NIOSH labora-

tory, in which measurements of temporary threshold shift indicated that exposures to noise supposedly of equal hazard according to the CHABA recommendation did not produce equal threshold shifts.

A laboratory study to evaluate the CHABA recommendations for intermittent noise exposure limits was begun in 1970 and completed in 1971. The CHABA recommendations were based on laboratory data which indicate that with interruptions in noise exposure, or "rest periods", an individual can tolerate larger amounts of noise energy without damage to his hearing mechanism. The laboratory study was designed to determine whether different patterns of noise exposure supposedly of equal hazard produce equal temporary threshold shift. Measurements of shift varied by as much as a factor of 2, which indicates that these patterns of exposure were not of equal hazard.

The CHABA recommendations also placed an upper limit of 80 decibels on the A scale (dBA) on noise levels during the rest period. A limited amount of data from the above studies indicate that a noise level of 80 dBA does not permit the maximum rate of recovery from temporary hearing loss. A study was made in which the subjects were exposed to equal high-level noise with different levels of noise during the rest periods. The data from this study indicate that the lower the noise level is during the rest period, the greater is the rate of recovery. Data from these two studies indicate that it would be extremely difficult to set limits for intermittent noise exposure which would take into account differences in noise exposure hazard and the noise limitation recommended for rest periods.

Based on the comments received and studies by the Bureau of Mines and NIOSH, the American Conference of Governmental Industrial Hygienists Threshold Limit Values for Noise were recommended as the Coal Mine Underground Noise Standard. This Standard was published in the *Federal Register* on July 7, 1971 (see Appendix E).

The health standard for noise requires that when noise exposure is in excess of the Standard, the mine operator must develop a plan for a hearing conservation program and submit it to an HEW-Department of the Interior committee for approval. The program must include plans for regulation of exposure through engineering and administrative control. If such regulation is not possible, the mine operator must provide personnel protectors and audiometric testing for all miners with excessive exposure. The committee is preparing a set of guidelines to assist the mine operators in developing hearing conservation program plans.

FIELD RESEARCH

Plans have been completed for a field study which will (1) determine the prevalence of hearing impairment among coal miners, (2) obtain data to be used in developing a more reliable health standard for noise, and (3) evaluate methods of measuring noise exposure to obtain possibly a better and easier method of measuring the noise hazard.

The 15 mines to be studied have been selected randomly; all miners in the mines will be studied. In addition, exminers and nonworking miners will be selected for examination; the sample size for this group is to be equal to 25 percent of the working miners examined in each district in which a mine is located.

The study plans have been reviewed by representatives of the United Mine Workers of America and the Bituminous Coal Operators' Association. This study is to be completed during 1972.

10. INTERIM COMPLIANCE PANEL

The Act sets forth standards for respirable coal dust in the atmosphere of underground coal mines. Generally, it requires the amount of dust to which underground coal mine workers are exposed to be reduced so that by December 30, 1972 (3 years after enactment of the Act), the average concentration of respirable dust in active workings is no more than 2.0 milligrams respirable dust per cubic meter of air (mg/M³).

Certain mines prevented by technological difficulties from attaining this level may be granted a Noncompliance Permit by the Interim Compliance Panel. The maximal respirable dust level authorized under a Noncompliance Permit is also required to be reduced to 3.0 mg/M³ by December 30, 1972. In addition to direct support by positions and operating funds, NIOSH has provided professional and technical specialists to advise the Interim Compliance Panel from time to time.

The Panel has issued initial Permits for Noncompliance with the 3.0 mg/M³ respirable coal dust standard to 443 mines for 1147 active working sections. The permits consisted of certificates which listed in sequence by number and name the working sections in the mine which were covered by the permit. During the last quarter of 1970 and the first quarter of 1971 the Panel received requests from mines for renewal of some of the initial permits which had generally been limited to 5 or 6 months. Because of the design of the permit system which listed for a specific mine the working sections and their individual expiration dates of noncompliance on the permit, it is difficult to relate the sequence of renewal permits to individual mines or sections, but a general summary is presented in Table 10-1. The activities of the Panel associated with issuing permits and renewals for noncompliance with the 3.0 mg/M³ respirable coal dust standard ended on June 30,

1971, under the terms of the Act, which specifies that no exceptions to the interim standard of 3.0 mg/M³ are to be provided after that date.

TABLE 10-1.—Action on Permits for Noncompliance With Interim Respirable Coal Dust Standard of 3.0 mg/M³

Action taken	Mines, number	Working sections, number
Initial permits issued.....	443	1147
First renewal permits:		
Applications	268	648
Issued	181	350
Second renewal permits:		
Applications	68	152
Issued	47	96
Third renewal permits:		
Applications	3	8
Issued	3	8

In December 1971 the Panel conducted informal conferences with representatives from State agencies responsible for coal mine health and safety, from the Bureau of Mines, NIOSH coal mine operators' associations, and from the United Mine Workers of America. The purpose of the conferences was to assess the technology for repressing and controlling respirable coal dust which could reasonably be expected to be available in 1973, when the respirable coal dust interim standard is reduced from 3.0 mg/M³ to 2.0 mg/M³, and for which noncompliance permits may be approved by the Panel. The conferences were also directed toward estimating the number of mines and

working sections that would apply for permits.

The following working estimate has been developed: About 1700 active underground coal mines with about 3000 working sections will be in existence when the standard is reduced and

about 50 to 60 percent of those mines representing 60 to 75 percent of the working sections will apply for permits of noncompliance with the 2.0 mg/M³ standard.

11. PROGRAM COSTS AND PROJECTIONS

The funding levels for FY 1970 and FY 1971 were \$2,925,000 and \$5,689,000 respectively.¹ During 1971 NIOSH began to move into the newly constructed Appalachian Center for Occupational Safety and Health in Morgantown, which permitted a limited expansion of the coal mine health research effort.

The 1972 appropriation for NIOSH contained an increase of \$449,000 for implementing the health aspects of the Federal Coal Mine Health and Safety Act of 1969. The projected program areas for funding are as follows:

¹ This is \$175,000 for FY 1970 and \$508,000 for FY 1971 above the amounts reported in the 1970 Annual Report. Both increases were for grants subsequently identified as relating to coal mine health research.

Support of Interim Compliance Panel and Advisory Council.	\$ 560,000
Medical examination and autopsy program.....	1,800,000
Engineering research and standard setting....	1,325,000
Medical and rehabilitation research.....	2,453,000
Total.....	<u>\$6,138,000</u>

In 1973 the budget request includes an increase of \$60,000 for pay costs for a total program of \$6,198,000.

Support of Interim Compliance Panel and Advisory Council.	\$ 571,000
Medical examination and autopsy program.....	1,834,000
Engineering research and standard setting....	1,335,000
Medical and rehabilitation research.....	2,458,000
Total.....	<u>\$6,198,000</u>

APPENDIXES

Appendix A.—NIOSH ORGANIZATION AND FUNCTION STATEMENTS

Federal Register, June 30, 1971, Notices

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of the Secretary

PUBLIC HEALTH SERVICE

Statement of Organization, Functions
and Delegations of Authority

As of May 17, 1971, the organizational elements of the Environmental Health Service that remained within HEW after the creation of the Independent Environmental Protection Agency on December 2, 1970, were transferred—

To the Food and Drug Administration:

The Bureau of Radiological Health.

To the Health Services and Mental Health Administration:

The National Institute for Occupational Safety and Health.

The Bureau of Community Environmental Management.

The changes in organization that are indicated below show how the latter two units are being incorporated into HSMHA.

Part 3 (Health Services and Mental Health Administration) of the Statement of Organization, Functions, and Delegations of Authority for the Department of Health, Education, and Welfare (33 F.R. 15953, October 30, 1968), as amended, and former Part 3 (33 F.R. 19050, December 20, 1968) are further amended as follows:

Under former Part 3, which was entitled Consumer Protection and Environmental Health Service, delete paragraph (g) Bureau of Community Environmental Management and succeeding paragraphs (g-1) through (g-3), and delete paragraph (h) Bureau of Occupational Safety and Health and succeeding paragraphs (h-1) through (h-3).

Part 3, which now is the part assigned to the Health Services and Mental Health Administration, is hereby amended with regard to section 3-B, Organization, as follows:

Following the paragraph entitled "St. Elizabeths Hospital—Division of Clinical and Com-

munity Services (3J71)" under the center head National Institute of Mental Health (3J00), insert a new center head and succeeding paragraphs reading:

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (3K00)

Plans, directs, and coordinates the national program effort to develop and establish recommended occupational safety and health standards and to conduct research, training, and related activities to assure safe and healthful working conditions for every working man and woman:

(1) Administers research in the field of occupational safety and health, including the psychological factors involved; (2) develops innovative methods and approaches for dealing with occupational safety and health problems; (3) provides medical criteria which will ensure, insofar as practicable, that no employee will suffer diminished health, functional capacity, or life expectancy, as a result of his work experience, with emphasis on ways to discover latent disease, establishing casual relationship between diseases and work conditions; (4) serves as a principal focus for training programs to increase the number and competence of personnel engaged in the practice of occupational safety and health; (5) develops and coordinates the appropriate reporting procedures which assist in accurately describing the nature of the national occupational safety and health problems; and (6) consults with the U.S. Department of Labor, other Federal agencies, State and local government agencies, industry and employee organizations, and other appropriate individuals, institutes, and organizations with regard to promotion of occupational safety and health.

Office of the Director (3K01). (1) Plans, directs, coordinates, and evaluates the operations

of the institute; (2) maintains liaison with, and provides advice and assistance to, the U.S. Department of Labor, the U.S. Department of the Interior, other Federal agencies, State and local government agencies, international health organizations, and outside groups; (3) provides coordination with the Federal Health Programs Service's occupational health activities for Federal employees; and (4) provides policy guidance and coordination to occupational safety and health activities in the Regional Offices.

Office of Public Information (3K17). (1) Assists and advises the Institute Director and the Divisions on public information policies and activities; (2) provides information materials for response to public inquiries; (3) coordinates printing, publication, and clearance procedures for the Institute; and (4) assists in developing displays, exhibits, and illustrations.

Office of Extramural Activities (3K18). (1) Advises the Institute Director on matters relating to the development and progress of Institute-supported external research; (2) in cooperation with the offices and operating divisions of the Institute, stimulates research, training, and demonstration grants in relevant priority areas; and (3) administers the management aspects of the Institute's grants programs by receiving, reviewing, analyzing, and evaluating all grant applications.

Office of Administrative Management (3K19). (1) Provides management information, advice, and guidance to the Institute Director; (2) coordinates all management activities in the conduct of finance, personnel, and procurement functions; (3) relates administrative management activities to programs; and (4) develops necessary policies, procedures, and operations, and provides such special reports and studies as may be required in the management area.

Office of Planning and Resource Management (3K21). (1) Plans and coordinates the strategy and philosophy of operation of the Institute regarding mission and objectives; (2) conducts or participates in special studies for program planning and evaluation; (3) conducts the necessary control functions to assure operational compliance toward program objectives

within the Institute; and (4) provides management systems consultation and analyses.

Office of Research and Standards Development (3K23). (1) Reviews existing scientific criteria for health and safety standards and assesses through priority systems the needs for additional research program areas for criteria development; and (2) coordinates and maintains an overview of research activities in the operating divisions of the Institute with the ultimate aim toward finalization of criteria and standards.

Office of Manpower Development (3K25). (1) Provides policy guidance and evaluates the Institute's manpower development and training activities; (2) advises the Institute Director on national health manpower needs related to occupational safety and health, and relates to other Federal agencies regarding occupational safety and health manpower needs; and (3) conducts equal employment opportunity activities of the Institute as part of the total HSMHA-EEO program.

Office of Health Surveillance and Biometrics (3K27). (1) Operates as the principal statistical and data research unit in the Institute; (2) monitors new as well as existing occupational hazards, and maintains surveillance on the incidence of occupational illness and disease; (3) in coordination with the U.S. Department of Labor, establishes a priority list for the conduct of research and the development of standards; (4) develops and conducts record studies of work population groups to determine the national trends and problem areas related to job health and safety, and provides health policy guidance in epidemiology; and (5) coordinates the Institute's electronic data processing requirements, to ensure that adequate computer facilities and services are available.

Division of Laboratories and Criteria Development (3K43). (1) Develops criteria for standards for the control of chemical, biological, and physical hazards to the health and safety of the working population, and initiates standard methodology and instrumentation for the detection, evaluation, and control of such hazards; (2) evaluates the toxicity, health, and safety hazards of industrial substances, proc-

esses, and other agents, as well as current research requirements and regulations; (3) conducts methodology studies for evaluating the varying capacity of workers to withstand physical and psychological responses; (4) provides for equipment development, analytical service, and calibration needs of other operating divisions within the Institute, and maintains an analytical and calibrations service for the U.S. Department of Labor; and (5) evaluates and certifies the performance of safety and health equipment.

Division of Field Studies and Clinical Investigations (3K47). (1) Conducts nationwide studies, surveys, and comprehensive analyses to determine the health status of the working population, including the incidence and prevalence of disease and injury; and (2) initiates studies to determine chronic and long-term effects of work-related exposures to toxic and hazardous substances.

Division of Technical Services (3K53). (1) Provides demonstrations, technical assistance, and consultation to public and private agencies responsible for the control of occupational diseases and accidental work injuries; (2) through the Regional Offices and its central staff serves as the focal point for the review of State plans and grants with the U.S. Department of Labor and makes the initial responses to requests for hazards evaluations; (3) in cooperation with the Office of Extramural Activities, stimulates,

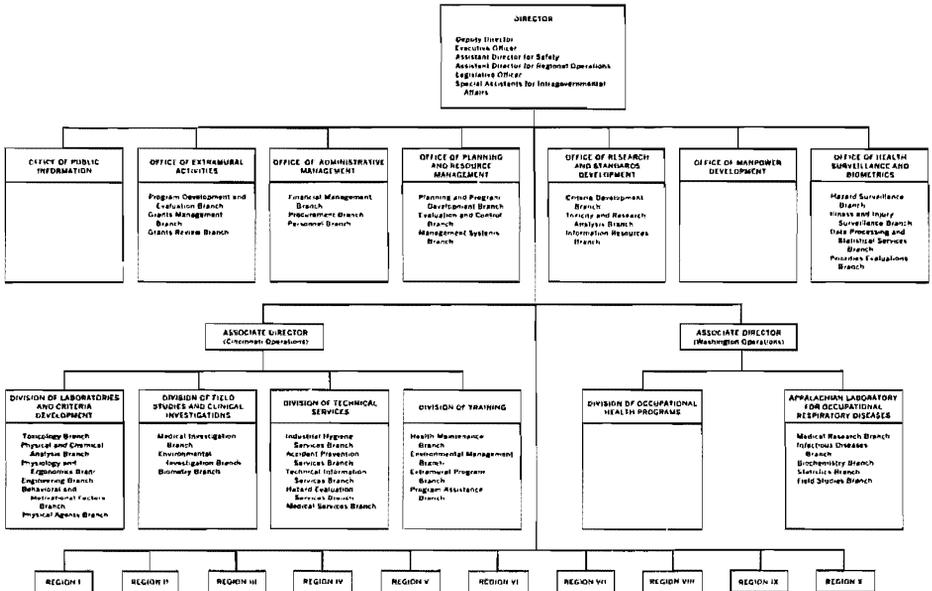
programs, and monitors demonstration grants for new and innovative methods of recognizing, evaluating, and controlling occupational hazards; (4) prepares manuals of good practice for safe work procedures; and (5) operates the technical information inquiry service of the institute.

Division of Occupational Health Programs (3K57). (1) Promotes occupational health programs at the State and local governmental levels as well as in industry and agriculture; (2) provides technical guidance in the development of occupational health programs; and (3) correlates the practice of occupational medicine in industry with the total delivery of health services.

Division of Training (3K63). (1) Develops and plans short-term training activities for Federal, State, and local governments, industry, and other appropriate organizations in the field of occupational safety and health; and (2) conducts such short-term training.

Appalachian Laboratory for Occupational Respiratory Diseases (3K67). (1) Conducts studies of the incidences and prevalence of occupational respiratory diseases in specific work groups with particular emphasis on coal workers' pneumoconiosis; and (2) provides medical and engineering research and service to fulfill the Institute's responsibilities under the Federal Coal Mine Health and Safety Act of 1969.

Appendix B.—NIOSH ORGANIZATION CHART



Appendix C.—COAL MINE HEALTH RESEARCH ADVISORY COUNCIL MEMBERS¹

Dr. Paul N. Yu (73), *Chairman*
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¹ Numbers in parenthesis indicate end of terms.

Appendix D.—UICC/CINCINNATI CLASSIFICATION OF RADIOGRAPHIC APPEARANCE OF PNEUMOCONIOSES

		Codes	Definitions	
SMALL OPACITIES	Rounded			
	Profusion	0/- 0/0 0/1 1/0 1/1 1/2 2/1 2/2 2/3 3/2 3/3 3/4	<p>The category of profusion is based on assessment of the concentration of opacities in the affected zones. The standard films define the mid categories.</p> <p>Category 0 - small rounded opacities absent or less profuse than in category 1</p> <p>Category 1 - small rounded opacities distinctly present but relatively few in number. The normal lung markings are usually still visible.</p> <p>Category 2 - small rounded opacities numerous. The normal lung markings are usually still visible.</p> <p>Category 3 - small rounded opacities very numerous. The normal lung markings are partly or totally obscured.</p>	
	Type	p q r	<p>The nodules are classified according to the approximate diameter of the predominant nodules:</p> <p>p - rounded opacities up to about 1.5 mm diameter.</p> <p>q - rounded opacities no more than 1.5 mm and up to about 3 mm diameter.</p> <p>r - rounded opacities exceeding about 3 mm and up to about 15 mm diameter.</p>	
	Extent	Lung zones	The zones in which the opacities are seen are recorded. Each lung is divided into thirds - upper, middle, lower zones. Thus a maximum of 6 zones can be affected.	
	Irregular			
	Profusion	0/- 0/0 0/1 1/0 1/1 1/2 2/1 2/2 2/3 3/2 3/3 3/4	<p>The category of profusion is based on assessment of the concentration of opacities in the affected zones. The standard films define the mid categories.</p> <p>Category 0 - small irregular opacities absent or less profuse than in category 1</p> <p>Category 1 - small irregular opacities distinctly present but relatively few in number. The normal lung markings are usually visible.</p> <p>Category 2 - small irregular opacities numerous. The normal lung markings are usually partly obscured.</p> <p>Category 3 - small irregular opacities very numerous. The normal lung markings are usually totally obscured.</p>	
	Type	s l u	<p>As the opacities are irregular, the dimensions used for rounded opacities cannot be used. They may be roughly divided into three types:</p> <p>s - fine irregular or linear opacities.</p> <p>l - medium irregular opacities.</p> <p>u - coarse radiating irregular opacities.</p>	
	Extent	Lung zones	The zones in which the opacities are seen are recorded. Each lung is divided into thirds - upper, middle, lower zones - as for rounded opacities.	
	LARGE OPACITIES	Site	A B C	<p>Category 'A' - an opacity with greatest diameter between 1 cm and 5 cm, or several such opacities the sum of whose greatest diameters does not exceed 3 cm.</p> <p>Category 'B' - one or more opacities larger or more numerous than those in category 'A', whose combined area does not exceed one third of the area of the right lung.</p> <p>Category 'C' - one or more large opacities whose combined area exceeds one third of the area of the right lung.</p> <p>As well as the letter 'A', 'B' or 'C', the abbreviation 'wt' or 'td' should be used to indicate whether the opacities are well defined or ill defined.</p>
		Type	wd id	
OTHER FEATURES	Pleural thickening			
	Costophrenic angle	Right Left	<p>Distortion of the costophrenic angle is recorded separately from increasing over other sites. A lower limit standard film is provided.</p> <p>Grade 0 - not present or less than grade 1.</p> <p>Grade 1 - up to 3 mm thick and not exceeding one half of the projection of one lateral chest wall. A lower limit standard film is provided.</p> <p>Grade 2 - more than 3 mm thick and up to one half of the projection of one lateral chest wall.</p> <p>Grade 3 - more than 3 mm thick and exceeding one half of the projection of one lateral chest wall.</p> <p>Grade 4 - more than 3 mm thick and exceeding more than one half of the projection of one lateral chest wall.</p>	
	Other sites	1 2 3		
	Diaphragm			
	Ill defined	Right Left	The lower limit is one third of the affected hemidiaphragm. A lower limit standard film is provided.	
	Cardiac outline			
	Ill defined (shagreened)	1 2 3	<p>Grade 0 - up to one third of the length of the left cardiac border or equivalent.</p> <p>Grade 1 - above one third and up to two thirds of the length of the left cardiac border or equivalent.</p> <p>Grade 2 - above two thirds and up to the whole length of the left cardiac border or equivalent.</p> <p>Grade 3 - more than the whole length of the left cardiac border or equivalent.</p>	
	Pleural calcification			
	Diaphragm	1 2 3	Grade 0 - no pleural calcification seen.	
	Walls		Grade 1 - one or more areas of pleural calcification. The sum of whose greatest diameter does not exceed 3 cm.	
Other sites		Grade 2 - one or more areas of pleural calcification. The sum of whose greatest diameter exceeds 3 cm but does not exceed 10 cm. <p>Grade 3 - one or more areas of pleural calcification. The sum of whose greatest diameter exceeds 10 cm.</p>		

OTHER SYMBOLS

OBLIGATORY

- cc - suspect cause of lung or pleura.
- rs - abnormality of ribbed size or shape.
- cp - suspect rib abnormality.
- ea - significant calcification of aortic or mediastinal lymph nodes.
- im - opacities suggestive of active (locally significant) tuberculosis.
- od - other significant disease. This includes disease not related to dust exposure, e.g. malignancy or traumatic damage to chest walls, bronchioles, etc.

OPTIONAL

- as - coexistence of small rounded pneumoconiotic opacities
- bu - bullae
- ca - calcification in small parenchymal opacities
- cv - cavity
- di - marked distortion of the intra-thoracic organs
- em - emphysema
- hl - marked enlargement of hilar shadows
- ho - honeycombed lung
- h - hilar (enlarged) nodes
- pa - pneumothorax
- pl - pneumoconiosis complicated by rheumatoid process
- tl - inactive tuberculosis.

**Appendix E.—REGULATIONS AND OTHER FEDERAL REGISTER
PUBLICATIONS IN 1971**

Date	Description	Page
January 7	Health standards for surface areas, proposed rule making	61
February 27	X-ray examinations, general policy	71
March 5	Grants for advancement of health in coal mines	73
March 16	Respirable dust formula when quartz is present	79
May 14	Autopsies, specifications	81
July 7	Noise standard	85
July 15	Health standards for surface areas, public hearing	91
July 17	Single shift measurements of respirable dust, notice of finding	93
September 2	X-ray examinations, specifications	95
October 15	Health standards for surface areas, findings of fact	97
October 27	Transfer of miners	101
December 3	X-ray examinations, extension of time	107
December 29	Approval of coal mine dust personal sampler units	109

HEALTH STANDARDS FOR SURFACE AREAS

Federal Register, January 7, 1971, Proposed Rule Making.

DEPARTMENT OF THE INTERIOR

Bureau of Mines

[30 CFR Part 71]

COAL MINE HEALTH AND SAFETY

Notice of Proposed Rule Making

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior under section 101 (a) of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173) to promulgate mandatory health standards transmitted to him by the Secretary of Health, Education, and Welfare, and in accordance with the provisions of section 101 (i) of the Act which direct the Secretary to publish proposed mandatory health standards for surface coal mines and for surface work areas of underground coal mines not later than December 30, 1970, it is proposed that Part 71, as set forth below, be added to Subchapter O of Chapter I, Title 30, Code of Federal Regulations. This proposed Part 71 sets forth mandatory health standards prescribed by the Secretary of Health, Education, and Welfare which must be complied with in the surface work areas of each underground coal mine and at each surface coal mine.

Interested persons may submit written comments, suggestions, or objections to the Director, Bureau of Mines, Washington, D.C. 20240, no later than 45 days following publication of this notice in the FEDERAL REGISTER.

FRED J. RUSSELL,

Under Secretary of the Interior.

DECEMBER 29, 1970.

Subchapter O of Chapter I, Title 30, Code of Federal Regulations would be amended by adding the following:

PART 71—MANDATORY HEALTH STANDARDS—SURFACE WORK AREAS OF UNDERGROUND COAL MINES AND SURFACE COAL MINES

Subpart A—General

Sec.

- 71.1 Scope.
- 71.2 Definitions.

Subpart B—Dust Standards

- 71.100 Dust standards; respirable dust; quartz.
- 71.101 Sampling; general requirements.
- 71.102 Sampling; by whom done.
- 71.103 Approved sampling devices.
- 71.104 Approved sampling devices; operation, rates of flow.
- 71.105 Approved sampling devices; equivalent concentrations.
- 71.106 Initial sampling cycle; establishment of basic sample; notice of violation.
- 71.107 Initial sampling cycle; basic; sampling cycle; subsequent samples; semi-annual sampling requirements.
- 71.108 Initial sampling cycle; basic sampling cycle; subsequent samples; annual sampling requirements.
- 71.109 Subsequent semiannual and annual samples; establishment of basic sample.
- 71.110 Partial sampling; initial samples; basic samples; additional samples required.
- 71.111 Respirable dust samples; transmission.
- 71.112 Respirable dust samples; analysis by the Secretary; report to the operator.
- 71.113 Report of data.
- 71.114 Spot health inspections.

Subpart C—Airborne Contaminants

- 71.200 Inhalation hazards; gas, dusts, fumes, mists, and vapors; threshold limit values.
- 71.201 Sampling; general requirements.

Subpart D—Noise Standard

- 71.300 Noise standard; general requirements.
- 71.301 Measurements of noise levels.

Subpart E—Surface Bathing Facilities, Change Rooms and Sanitary Toilet Facilities

- 71.400 Bathing facilities; change rooms; adjacent sanitary toilet facilities.
- 71.401 Location of surface facilities.
- 71.402 Minimum requirements for bathing facilities, change rooms and adjacent sanitary toilet facilities.
- 71.403 Waiver of surface facilities requirements.
- 71.404 Application for waiver of surface facilities requirements.

Subpart F—Sanitary Toilet Facilities at Surface Work Sites

- 71.500 Sanitary toilet facilities at surface work sites; approved sanitary toilets; installation requirements.
- 71.501 Sanitary toilet facilities; maintenance.

Subpart G—Drinking Water

- 71.600 Drinking water; general.
- 71.601 Drinking water; quality.
- 71.602 Drinking water; quantity; location.
- 71.603 Drinking water; distribution.
- 71.604 Drinking water; dispensing requirements.

AUTHORITY: The provisions of this Part 71 are issued under sec. 101(i) of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).

Subpart A—General

§ 71.1 Scope.

This Part 71 sets forth health standards, compliance with which shall be mandatory, in the surface work areas of each underground coal mine and at each surface coal mine subject to the Federal Coal Mine Health and Safety Act of 1969. This Part 71 also prescribes cer-

tain actions, conditions, and requirements which must be met by each coal mine operator in carrying out the health standards set forth herein.

§ 71.2 Definitions.

(a) "Act" means the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173).

(b) "Secretary" means Secretary of the Interior.

(c) "Average concentration" means a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active working of a mine is exposed (1) as measured, during the period ending June 30, 1971, over a number of continuous production shifts to be determined by the Secretary and the Secretary of Health, Education, and Welfare and (2) as measured thereafter, over a single shift only, unless the Secretary and the Secretary of Health, Education, and Welfare find, in accordance with the provisions of § 101 of the Act, that such single shift measurement will not, after applying valid statistical techniques to such measurement, accurately represent such atmospheric conditions during such shift.

(d) "Concentrations of respirable dust" means the average concentration of respirable dust if measured with an MRE instrument or such equivalent concentrations if measured with another device approved by the Secretary and the Secretary of Health, Education, and Welfare.

(e) "MRE Instrument" means the gravimetric dust sampler with four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

(f) "Respirable dust" means only dust particulates 5 microns or less in size.

(g) "Certified" or "registered" as applied to any person means a person certified or registered by the State in which the coal mine is located to perform duties prescribed by title II and title III of the Federal Coal Mine Health and Safety Act of 1969, except that, in a State where no program of certification or registration is provided or where the program does not

meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary.

(h) "Qualified person" means, as the context requires, an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by the Act.

(i) "Miner" means any individual working in a coal mine.

(j) "Surface coal mine" means an area of land and all structures, facilities, machinery, tools, equipment, excavations, and other property, real or personal, placed upon or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting in such area bituminous coal, lignite, or anthracite from its natural deposits in the earth by any means or method, and the work of preparing the coal so extracted, and includes custom coal preparation facilities.

(k) "Surface work areas of an underground coal mine" means an area of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, tunnels, excavations, and other property, real or personal, placed upon or above the surface of such land by any person, used in, or to be used in, or resulting from, the work of extracting bituminous coal, lignite, or anthracite from its natural deposits underground by any means or method, and the work of preparing the coal so extracted, and includes custom coal preparation facilities.

(l) "Surface installation" means any structure in the surface work areas of an underground coal mine or at a surface coal mine in which miners are regularly employed.

(m) "Surface work site" means any area in the surface work areas of an underground coal mine or any area of a surface coal mine within which miners are regularly employed.

(n) "Work of preparing the coal" means the breaking, crushing, sizing, cleaning, washing, drying, mixture, storing, and loading of bituminous coal, lignite, or anthracite, and such other work of preparing such coal as is usually done by the operator of the coal mine.

Subpart B—Dust Standards

§ 71.100 Dust standards; respirable dust; quartz.

(a) On and after June 30, 1971, each operator of an underground coal mine and each operator of a surface coal mine shall continuously maintain the average concentration of respirable dust in the atmosphere of each surface installation and at each surface work site during each shift to which each miner in such mine is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air.

(b) Notwithstanding the provisions of paragraph (a) of this section, where the average concentration of respirable dust in samples taken in a surface installation or at a surface work site pursuant to this Subpart B contains more than 5 per centum quartz, the operator shall continuously maintain an average concentration of respirable dust in such installation or at such work site at or below a level, expressed in milligrams per cubic meter of air, which shall be determined by dividing the per centum of quartz present in such concentration into the number 10.

§ 71.101 Sampling; general requirement.

Each operator of an underground coal mine and each operator of a surface coal mine shall, as prescribed in this Subpart B, take accurate samples of the amount of respirable dust in the atmosphere to which each miner employed in a surface installation or at a surface work site is exposed.

§ 71.102 Sampling; by whom done.

The dust sampling required by this Subpart B shall be done by, or as directed by, a person—

(a) Who has had practical experience in a coal mine;

(b) Who has a working knowledge of the mining equipment employed in the mine in which samples are taken;

(c) Who has a working knowledge of the operation and care of the sampling devices mentioned in § 71.103 and the filters employed in such devices; and,

(d) Who has satisfactorily completed a course approved by the Secretary in the sampling and evaluation of respirable coal mine dust concentration with the sampling devices mentioned in § 71.103.

§ 71.103 Approved sampling devices.

The samples which this Subpart B requires

to be taken shall be taken only with a coal mine dust personal sampler unit approved under Part 74 of this chapter or with an MRE instrument.

§ 71.104 Approved sampling devices; operation, rates of flow.

An approved coal mine dust personal sampler unit shall be operated at a flow rate of 2.0 liters of air per minute. An MRE instrument shall be operated at a flow rate of 2.5 liters of air per minute.

§ 71.105 Approved sampling devices; equivalent concentrations.

The concentration of respirable dust expressed in milligrams per cubic meter of air shall be determined by dividing the weight of dust in milligrams collected on the filter by the volume of air in cubic meters passing through the filter. To convert a concentration of respirable dust as measured with an approved coal mine dust personal sampler unit to an equivalent concentration of respirable dust as measured with an MRE instrument, the concentration of respirable dust measured with an approved coal mine dust personal sampler unit shall be multiplied by a constant factor of 1.6 and the product shall be the equivalent concentration as measured with an MRE instrument.

§ 71.106 Initial sampling cycle; establishment of basic sample; notice of violation.

(a) On or before December 30, 1971, one respirable dust sample shall be taken with respect to each miner employed in a surface installation and with respect to each miner employed at a surface work site.

(b) If the data recorded pursuant to § 71.112 for an initial sample establish a concentration of respirable dust in excess of 2.0 milligrams per cubic meter of air in the normal work position of the miner to be sampled, the Secretary shall advise the operator that additional samples will be required to determine compliance with the respirable dust standard set forth in this Subpart B.

(c) Upon receipt of advice pursuant to paragraph (b) of this section, the operator shall take samples of respirable dust in the normal work position of the miner to be sampled on 10 consecutive shifts, each of which is worked

on a separate calendar day beginning with the first shift worked by such miner following receipt of such advice. This series of 10 samples shall constitute the basic sample with respect to that miner.

(d) If the data recorded pursuant to § 71.112 for a basic sample establish a cumulative concentration in excess of 20 milligrams per cubic meter of air in the normal work position of the miner initially sampled without regard to the number of samples analyzed, the Secretary shall issue a notice to the operator that he is in violation of the respirable dust standard set forth in this Subpart B. Upon receipt of a Notice of Violation, the operator shall take continuous samples with respect to the normal work position of the miner initially sampled as required under Section 104(i) of the Act.

§ 71.107 Initial sampling cycle; basic sampling cycle; subsequent samples; semi-annual sampling requirements.

(a) Where the data recorded pursuant to § 71.112 for an initial sample taken in accordance with § 71.106(a), a basic sample taken in accordance with § 71.106(c), or a subsequent sample taken in accordance with § 71.108 establish a concentration of respirable dust which falls within a range of more than 0.5 milligrams per cubic meter of air and no more than 2.0 milligrams per cubic meter of air with respect to the miner sampled, the operator shall, during each succeeding six-month period, take one sample of the mine atmosphere to which each such miner sampled is exposed.

§ 71.108 Initial sampling cycle; basic sampling cycle; subsequent samples; annual sampling requirements.

The data recorded pursuant to § 71.112 for an initial sample (same as in § 71.107), a basic sample or a subsequent sample, establish a concentration of respirable dust which is 0.5 milligrams or less per cubic meter of air, the operator shall, during each succeeding 12-month period, take one sample of the mine atmosphere to which each miner sampled is exposed.

§ 71.109 Subsequent semiannual and annual samples; establishment of basic sample.

HEALTH STANDARDS FOR SURFACE AREAS, PROPOSED—Continued

(a) Where the data recorded pursuant to § 71.112 for any subsequent semiannual sample taken in accordance with the provisions of § 71.107 or for any annual sample taken in accordance with § 71.108 establish a concentration of respirable dust in excess of 2.0 milligrams per cubic meter of air, the Secretary shall advise the operator pursuant to paragraph (b) of § 71.106 and the operator shall be required to establish a basic sample with respect to the miner sampled in accordance with the provisions of paragraph (c) of § 71.106.

(b) Where the data recorded pursuant to § 71.112 for any subsequent semiannual sample taken in accordance with the provisions of § 71.107 or for any annual sample taken in accordance with § 71.108 establish a concentration of respirable dust of 0.5 milligrams or less per cubic meter of air, the operator shall, during each succeeding 12-month period, take one sample for the mine atmosphere of each such miner sampled.

§ 71.110 Partial sampling; initial samples; basic samples; additional samples required.

(a) If the Secretary fails to receive the number of valid samples required under the provisions of § 71.106 or if samples have been rejected by the Secretary as invalid samples, the Secretary shall, in accordance with the provisions of § 71.112 analyze the valid samples received to determine whether the concentration of respirable dust is in compliance with the respirable dust limit.

(b) If the Secretary receives less than the required number of valid samples with respect to a miner, and has determined in accordance with the provisions of paragraph (a) of this section that the cumulative concentration of respirable dust does not exceed the limit set forth in this Subpart B, the Secretary shall advise the operator to take a specified number of additional samples. Upon receipt of advice that additional sampling is required the operator shall commence such sampling on the first day on which the miner is employed in his regular duties following the day upon which he receives such advice from the Secretary.

(c) Where additional sampling is required

under the provisions of paragraph (b) of this section to establish a basic sample and the Secretary receives more than the number of samples required, such additional samples shall be combined with the samples previously received and the most recent valid sample or more recent valid 10 samples shall, where appropriate, constitute the initial sample or the basic sample.

(d) Where additional samples are received by the Secretary in accordance with paragraph (b) of this section and combined with the valid samples already received pursuant to § 71.106 (c), a daily determination of compliance or noncompliance shall be made with respect to the miner sampled. If the data recorded pursuant to § 71.112 with respect to the miner sampled establish a cumulative concentration of respirable dust in excess of 20 milligrams, the Secretary shall issue a notice to the operator that he is in violation of the respirable dust limit.

§ 71.111 Respirable dust samples; transmission.

(a) At the conclusion of each production shift, the operator shall promptly collect and transmit all samples in a container provided by the manufacturer of the cassette to:

Pittsburgh Field Health Group, Bureau of Mines, Department of the Interior, Pittsburgh, PA 15213.

(b) Each sample shall be accompanied by a completed 3- x 5-inch white data card provided for this purpose by the cassette manufacturer. The card shall have an identification number identical to that on the cassette used to take the sample, and only the name, Social Security number, and the normal work position of the miner whose environment was being sampled shall be provided. The data card shall be initialed by the miner whose environment was sampled and the representative of the company responsible for the dust sampling program.

§ 71.112 Respirable dust samples; analysis by the Secretary; report to the operator.

Upon receipt by the Secretary of respirable dust samples taken with respect to a miner,

each sample shall be analyzed and the following data shall be recorded:

- (a) The mine identification number;
- (b) The surface installation or surface work site within the mine where the sample was taken;
- (c) The dust concentration, expressed in milligrams per cubic meter of air, for each sample;
- (d) The cumulative total of respirable dust for all valid samples with respect to the miner sampled, expressed in milligrams per cubic meter of air; and
- (e) The Social Security number of the individual miner whose atmosphere was sampled.

§ 71.113 Report of data.

The Secretary shall provide the operator with a report of the data recorded pursuant to § 71.112 as soon as practicable.

§ 71.114 Spot health inspections.

In order to obtain compliance with the provisions of this Subpart B, the Secretary shall conduct frequent spot health inspections in surface installations and at the surface work sites of each underground coal mine and each surface coal mine.

Subpart C—Airborne Contaminants

§ 71.200 Inhalation hazards; threshold limit values for gases, dust, fumes, mists, and vapors.

On and after June 30, 1971, each operator of an underground coal mine and each operator of a surface coal mine shall not permit concentrations of noxious or poisonous gases, dusts, fumes, mists, and vapors, other than respirable coal dust and respirable dust containing quartz, in surface installations and at surface work sites to exceed the recommendations of the American Conference of Governmental Industrial Hygienists in "Threshold Limit Values of Airborne Contaminants" and any revisions or any amendments to this document which is hereby incorporated by reference and made a part hereof. This document is available for examination at the Bureau of Mines, 18th and C Streets NW., Washington, DC; and at the Bureau of Occupational Safety and Health, 5600 Fishers Lane, Rockville, MD; and at the

Public Health Service Information Centers as listed in 45 CFR 5.31. Copies of the document may be purchased for \$0.50 from the Secretary-Treasurer, American Conference of Governmental Industrial Hygienists, Post Office Box 1937, Cincinnati, OH 45202. An official historic file of Threshold Limit Values of Airborne Contaminants will be maintained at the Bureau of Occupational Safety and Health, 5600 Fishers Lane, Rockville, MD.

§ 71.201 Sampling; general requirements.

(a) Air samples shall be taken periodically and analyzed by the Secretary to determine the concentration of noxious or poisonous gases, dusts, fumes, mists, and vapors in surface installations and at surface work sites.

(b) Upon written notification by the Secretary, each operator of an underground coal mine and each operator of a surface coal mine shall conduct such additional air sampling tests and analyses as the Secretary may from time to time require in order to ensure compliance with the standard set forth in this section in each surface installation and at each surface work site.

(c) Where inhalation hazards are known by the operator to exist in a surface installation or at a surface work site, he shall immediately institute control measures and take appropriate air sampling tests to determine the concentration of any noxious or poisonous gas, dust, fume, mist, or vapor which may be present.

(d) Where potential inhalation hazards are known by the operator to exist in a surface installation or at a surface work site, he shall institute appropriate air sampling tests and immediately provide control measures where the standards set forth in this section are exceeded.

Subpart D—Noise Standard

§ 71.300 Noise standard; general requirements.

(a) On and after June 30, 1971, each operator of an underground coal mine and each operator of a surface coal mine shall comply with the minimum standard for noise exposure prescribed in Subpart F, Part 70, of this Subchapter O.

(b) Each operator shall maintain the noise level in each surface installation and at each surface work site at or below the maximum noise exposure allowed under paragraph (a) of this section.

§ 71.301 Measurement of noise levels.

Each operator shall measure the noise levels in each surface installation and at each surface work site in the manner prescribed in Subpart F, Part 70, of this Subchapter O.

Subpart E—Surface Bathing Facilities,
Change Rooms and Sanitary Toilet
Facilities

§ 71.400 Bathing Facilities; change rooms;
adjacent sanitary toilet facilities.

On and after June 30, 1971, each operator of an underground coal mine and each operator of a surface coal mine shall provide bathing facilities, clothing change rooms, and adjacent sanitary facilities, as hereinafter prescribed, for the use of miners employed in the surface installations and at the surface work sites of such mines.

§ 71.401 Location of surface facilities.

Bathhouses, change rooms, and adjacent sanitary toilet facilities shall be in a location convenient for the use of the miners. Where such facilities are designed to serve both an underground mine and the surface work areas of an underground mine or more than one mine, they shall be centrally located so as to be as convenient for the use of all miners served by such facilities.

§ 71.402 Minimum requirements for bathing
facilities, change rooms, and adjacent sani-
tary toilet facilities.

(a) All bathing facilities, change rooms, and adjacent sanitary toilet facilities shall be provided with adequate, light, heat, and ventilation so as to maintain a comfortable air temperature and to minimize the accumulation of moisture and odors, and such facilities shall be maintained in a clean and sanitary condition.

(b) Bathing facilities, change rooms, and adjacent sanitary facilities shall be constructed and equipped so as to comply with applicable State and local building codes: *Provided, however,* That where no State or local building

codes apply to such facilities, or where no State or local building codes exist, such facilities shall be constructed and equipped so as to meet the minimum construction requirements in the National Building Code (1967 edition) and the plumbing requirements in the National Plumbing Code (ASA A 40.8-1955) which documents are hereby incorporated by reference and made a part hereof. These documents are available for examination at the Bureau of Mines, 18th and C Streets, NW., Washington, DC; at the Bureau of Occupational Safety and Health, 5600 Fishers Lane, Rockville, MD; and at the Public Health Service Information Centers as listed in 45 CFR 5.31. Copies of the National Building Code (1967 edition) may be purchased from the American Insurance Association, 85 John Street, New York, NY 10038, for \$2.50 per copy and copies of the National Plumbing Code (ASA A 40.8-1955) may be purchased from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018, for \$6 per copy. An official historic file of the National Building Code (1967 edition) and of the National Plumbing Code (ASA A 40.8-1955) will be maintained at the Bureau of Occupational Safety and Health, 5600 Fishers Lane, Rockville, MD.

(c) In addition to the minimum requirements specified in paragraphs (a) and (b) of this § 71.402, facilities maintained in accordance with § 71.400 shall include the following:

(1) *Bathing facilities.* (i) Showers shall be provided with both hot and cold water.

(ii) At least one shower head shall be provided where five or less miners use such showers.

(iii) Where five or more miners use such showers, sufficient showers shall be furnished to provide approximately one shower head for five miners.

(iv) A suitable cleansing agent shall be provided for use at each shower.

(2) *Sanitary toilet facilities.* (i) At least one sanitary flush toilet shall be provided where 10 or less miners use such bathing, change rooms and sanitary facilities.

(ii) Where 10 or more miners use such sanitary toilet facilities, sufficient toilets shall be

furnished to provide approximately one sanitary flush toilet for each 10 miners.

(iii) Where 30 or more miners use sanitary toilet facilities, one urinal may be substituted for one sanitary flush toilet, however, where such substitutions are made they shall not reduce the number of toilets below a ratio of two toilets to one urinal.

(iv) An adequate supply of toilet paper shall be provided with each toilet.

(v) Adequate handwashing facilities or hand lavatories shall be provided in or adjacent to each toilet facility.

(3) *Change rooms.* (i) Individual clothes storage containers or lockers shall be provided for storage of miners clothing and other incidental personal belongings during and between shifts.

(ii) Change rooms shall be provided with ample space to permit the use of such facilities by all members changing clothes prior to and after each shift.

§ 71.403 Waiver of surface facilities requirements.

The Coal Mine Health and Safety District Manager for the district in which the mine is located may, upon written application by the operator, waive any or all of the requirements for §§ 71.400 through 71.402 if he determines that the operator of the mine cannot or need not meet any part or all of such requirements, and upon issuance of such waiver, he shall set forth the facilities which will not be required and the specific reason or reasons for such waiver.

§ 71.404 Application for waiver of surface facilities requirements.

Applications for waivers of the requirements of §§ 71.400 through 71.402 shall be filed with the Coal Mine Health and Safety District Manager and shall contain the following information:

(a) The name and address of the mine operator;

(b) The name and location of the mine;

(c) A statement explaining why, in the opinion of the operator, the installation or maintenance of surface facilities is impractical or unnecessary.

Subpart F—Sanitary Toilet Facilities at Surface Work Sites

§ 71.500 Sanitary toilet facilities at surface work sites; approved sanitary toilets; installation requirements.

(a) On and after June 30, 1971, each operator of a surface coal mine shall provide and install one approved sanitary toilet, together with an adequate supply of toilet tissue, within 1,000 feet of each surface work site where miners are regularly employed. A single approved sanitary toilet may serve two or more surface work sites in the same surface mine where the sanitary toilet is located within 1,000 feet of each such work site.

(b) Only sanitary toilets approved by the Health Division, Coal Mine Health and Safety, Bureau of Mines shall meet the requirements of this section.

(c) Applications for approval of sanitary toilets shall be submitted to:

Health Division, Coal Mine Health and Safety, Bureau of Mines, U.S. Department of the Interior, Washington, DC 20240.

§ 71.501 Sanitary toilet facilities; maintenance.

Sanitary toilets provided in accordance with the provision of § 71.500 shall be regularly maintained in a clean and sanitary condition. Holding tanks shall be serviced and cleaned when full and in no case less than once each week by draining or pumping or by removing them for cleaning or recharging. Transfer tanks and transfer equipment shall be equipped with suitable fittings to permit complete drainage and allow for the sanitary transportation of wastes. Waste shall be disposed of in accordance with State and local laws and regulations.

Subpart G—Drinking Water

§ 71.600 Drinking water; general.

On and after June 30, 1971, an adequate supply of potable water shall be provided for drinking purposes in each surface installation and at each surface work site of the mine, and such water shall be carried, stored, and otherwise protected in sanitary containers.

HEALTH STANDARDS FOR SURFACE AREAS, PROPOSED—Continued

§ 71.601 Drinking water; quality.

(a) Potable water provided in accordance with the provisions of § 71.600 shall meet the applicable minimum health requirements for drinking water established by the State or community in which the mine is located.

(b) Where no State or local health requirements apply to drinking water or where no State or local minimum health requirements exist, drinking water provided in accordance with the provisions of § 71.600 shall contain a minimum of 0.2 milligrams of free chlorine per liter of water, and otherwise conform to the Public Health Service Drinking Water Standards, 42 CFR Part 72 Subpart J.

§ 71.602 Drinking water; quantity; location.

(a) Each operator shall provide an adequate supply of potable water for drinking purposes in the surface work areas of each underground coal mine and at each work site of a surface coal mine.

(b) A minimum of 4 quarts of potable water shall be provided for each person employed in the surface work areas of each underground coal mine and at each work site of a surface coal mine and such water shall be located within 500 feet of each work site on the surface.

§ 71.603 Drinking water; distribution.

(a) Water shall be piped to each work site or transported to each work site in sanitary containers. Water pipes shall be constructed of

smooth, nontoxic material, fixtures and appurtenances to the water supply system shall be constructed and maintained in accordance with state and local requirements, and the water supply system shall be adequately protected against cross-connections.

(b) Water transported to the site shall be carried, stored and otherwise protected in sanitary containers constructed of smooth, impervious heavy gauge, unbreakable, corrosion resistant materials.

§ 71.604 Drinking water; dispensing requirements.

(a) Water shall be dispensed through a drinking fountain or from a water storage container with an adequate supply of single service cups stored in a clean, sanitary manner. Water shall not be dipped from inside water storage containers.

(b) Water containers shall remain sealed at all times during use and shall not be refilled with water for reuse without first being disinfected with the use of heat or sanitizers.

(c) Drink fountains from which water is dispensed shall be thoroughly cleaned and disinfected once each week.

(d) Ice used for cooling drinking water shall not be immersed or in direct contact with the water to be cooled.

[F.R. Doc. 71-15; Filed, Jan. 6, 1971; 8:45 a.m.]

X-RAY EXAMINATIONS, GENERAL POLICY

Federal Register, February 27, 1971, Proposed Rule Making

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

[42 CFR Part 37]

ROENTGENOGRAPHIC EXAMINATIONS OF COAL MINERS

Proposed Statements of General Policy

Pursuant to section 203 of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 843), the Secretary proposes establishment of the following policies regarding chest roentgenograms not submitted pursuant to an approved plan. It is proposed to publish the policies as new §§ 37.40 and 37.41.

Any interested person may, within 30 days from the date of publication of this notice in the FEDERAL REGISTER, submit comments, views, and arguments concerning the proposal.

Part 37 would be amended by adding the following center heading and sections immediately following § 37.33:

STATEMENTS OF POLICY OR INTERPRETATIONS

§ 37.40 Roentgenograms provided by operator where no plan has been approved.

(a) Part 37 provides that unless operators conduct their chest roentgenogram programs pursuant to an approved plan, the Secretary will either give or make arrangements with an appropriate person, agency or institution to give the chest roentgenograms or supplemental examinations required under this subpart. The Department has contracted with appropriate persons, agencies, and institutions to give initial roentgenograms by June 30, 1971, and operators of mines are required to reimburse the Secretary for the actual cost of conducting each examination made at their respective mines.

(b) It has come to the attention of the Department that certain operators who have not submitted an approvable plan have nevertheless conducted a chest roentgenographic examination program in which the roentgenograms have been submitted to ALFORD.

(c) Where such roentgenograms have been taken, read, classified, and submitted in accordance with the applicable specifications and in the same manner as those under an approved operator's plan, the roentgenograms will be accepted for consideration by ALFORD, thereby avoiding additional radiation exposure to the miners. However, any operator who causes acceptable roentgenograms to be submitted but is not operating under an approved plan will be required to reimburse the Secretary for any damages sustained under the contract the Secretary has with the person, agency, or institution to give such roentgenograms at the operator's mine, plus any additional administrative expenses caused the Department by the submission.

§ 37.41 Roentgenographic examination at miner's expense.

(a) In implementing section 203 of the Act by the adoption of this subpart, the Department of Health, Education, and Welfare has established what it considers to be a reasonable procedure for assuring that every underground miner has the opportunity for an initial chest roentgenogram by June 30, 1971. In accordance with section 203(c) of the Act, the regulations provide that no payment may be required of any miner in connection with any examination or test given him under this subpart.

(b) It has come to the attention of the Department that a number of individual miners desire to obtain roentgenographic examinations at their own expense and have the roentgenograms submitted to ALFORD for its consideration and classification. The Act does not prohibit this activity, and the Department finds no justification for refusing to accept such roentgenograms provided they comply with the applicable specifications of this subpart.

(c) Accordingly, the Department will accept roentgenograms obtained at the expense of individual miners provided such roentgenograms are given in conformity with the specifications

X-RAY EXAMINATIONS, GENERAL POLICY—Continued

set forth in § 37.20 (b), (c), (d), and (e) and § 37.22; and are read, classified, and submitted in conformity with the specifications set forth in §§ 37.30 and 37.32. To assure confidentiality, forms ECA 108 and 116 shall bear in the upper right corner of each form submit-

ted the notation "Taken at miner's expense".

Dated: February 22, 1971.

ELLIOTT L. RICHARDSON,
Secretary

[FR Doc. 71-2705 Filed 2-26-71; 8:48 a.m.]

GRANTS FOR ADVANCEMENT OF HEALTH IN COAL MINES

Federal Register, March, 1971, Proposed Rule Making

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service
[42 CFR Part 55]

GRANTS FOR ADVANCEMENT OF HEALTH IN COAL MINES

Notice of Proposed Rule Making

Notice is hereby given that the Secretary of Health, Education, and Welfare proposes to amend Title 42, Code of Federal Regulations, by adding a new Part 55, which sets forth the conditions and procedures for awarding grants for the advancement of health in coal mines under section 501 of the Federal Coal Mine Health and Safety Act (30 U.S.C. 951). This Act authorizes grants to be made for studies, research, experiments, demonstrations, and other activities.

It is proposed that these regulations be effective on the date of their republication in the FEDERAL REGISTER. The Secretary has determined that the purposes of the Act will be achieved in a more effective and expeditious manner if grants under this part are limited to public and private nonprofit agencies and institutions.

Interested persons may submit comments concerning the proposed regulations to the Bureau of Occupational Safety and Health, Park-lawn Building, 5600 Fishers Lane, Rockville, MD 20852. All relevant material received within 30 days after publication of this notice will be considered.

Part 55 would be added as follows:

PART 55—GRANTS FOR ADVANCEMENT OF HEALTH IN COAL MINES

Subpart A—General

- Sec.
- 55.1 Applicability.
- 55.2 Definitions.
- 55.3 Nature and purpose.
- 55.4 Application for grant.
- 55.5 Compliance with the Civil Rights Act.

Subpart B—Evaluation and Disposition of Applications

- Sec.
- 55.10 Evaluation.
- 55.11 Disposition.

Subpart C—Grant Awards, Payments, Termination

- 55.20 Grant awards and payments.
- 55.21 Supplemental and continuation grants.
- 55.22 Termination.

Subpart D—Grant Conditions: Obligation of Grantee

- 55.30 Use of funds, changes.
- 55.31 Project director.
- 55.32 Inventions and discoveries.
- 55.33 Other conditions.

Subpart E—Reports, Records and Inspections

- 55.40 Reports and records.
- 55.41 Inspections and audits.

Subpart F—Expenditures

- 55.50 Allocation of costs.
- 55.51 Particular direct costs.

Subpart G—Grantee Accountability

- 55.60 Accounting for grant payments.
- 55.61 Accounting for equipment, materials, and supplies.
- 55.62 Interest.
- 55.63 Project net income.
- 55.64 Final settlement.

AUTHORITY: The provisions of this Part 55 issued under sec. 508, 83 Stat. 803; 30 U.S.C. 957.

Subpart A—General

§ 55.1 Applicability.

The regulations of this part apply to project grants for studies, research, experiments, demonstrations, and other activities relating to coal mine health as set forth in § 55.3.

§ 55.2 Definitions.

As used in this part all terms not defined herein shall have the meaning given them in the Act.

(a) "Act" means the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 801 et. seq.)

(b) "Secretary" means the Secretary of Health, Education, and Welfare and any other officer or employee of the Department of Health, Education, and Welfare to whom the authority involved may be delegated.

(c) "Bureau" means the Bureau of Occupational Safety and Health.

(d) "Director" means the Director of the Bureau of Occupational Safety and Health or his authorized representative.

(e) "Fiscal year" means the year period beginning July 1 and ending on June 30 following.

(f) "Project Period" means the period of time, not exceeding 5 years, which the Secretary finds is reasonably required to initiate and conduct a project meriting support of one or more project grants within the scope of § 55.3, except that such period may be extended by the Secretary beyond 5 years solely to permit continuation or completion of the same approved project by use of funds previously awarded but remaining unencumbered by the grantee at the end of such 5 years. The approval and support of a project for the maximum project period shall not preclude additional support of that project beyond such period if such support of the continued project is requested, evaluated, and approved on the same basis as a new or initial application.

(g) "Applicant" means any public or nonprofit agency or institution which files an application for a grant under section 501 of the Act.

(h) "Project Director" means a single individual designated by the grantee in the grant application and approved by the Secretary, who is responsible for the scientific and technical direction of the project.

(i) "Nonprofit" as applied to institution means a corporation or association no part of the net earnings of which inures or may lawfully inure to the benefit of any shareholder or individual.

§ 55.3 Purpose of project grant.

The Secretary is authorized under section

501 of the Act to make grants for studies, research, experiments, and demonstration (a) to improve working conditions and practices in coal mines affecting health and to prevent occupational diseases originating in the coal mining industry, (b) to develop and revise improved mandatory health standards for the protection of life and the prevention of occupational diseases of miners, (c) to protect life and prevent diseases in persons who, although not miners, work with and around the products of coal mines in areas outside mines and under conditions which may adversely affect the health and well-being of such persons, (d) to develop new or improved means and methods of reducing concentrations of respirable dust in the mine atmosphere of active workings of the coal mine, (e) to develop epidemiological information, (f) to develop techniques for the prevention and control of occupational disease of miners, including tests for hypersusceptibility and early detection, (g) to evaluate the effect of bodily impairment and occupational disability of miners afflicted with an occupational disease, (h) to develop effective respiratory equipment, (i) to prepare and publish from time to time reports on all significant aspects of occupational diseases of miners, (j) to study the relationship between coal mine environments and occupational diseases of miners, and (k) for such other purposes as the Secretary deems necessary to carry out the purposes of the Act.

§ 55.4 Application for grants.

(a) An application for a grant shall be submitted on such forms and in such manner as the Secretary may prescribe.

(b) The application shall be executed by an individual authorized to act for the institution or other applicant, and to assume on behalf of the applicant the obligations imposed by the terms and conditions of any award, including the regulations of this part.

(c) In addition to any other pertinent information which the Secretary may require, each applicant shall submit as part of the application a description of the project in sufficient detail to indicate the nature, duration, purpose, justification, and proposed method of conduct

of the project; the qualifications of the principal staff members to be responsible for the project; the total facilities and resources that will be available, and a justification of the amount of funds requested.

§ 55.5 Compliance with the Civil Rights Act.

The applicant shall comply with the requirements of title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), which provides that no person in the United States shall on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits, or be subjected to discrimination under any program or activity receiving Federal financial assistance (section 601), and to the implementing regulation issued by the Secretary with the approval of the President (45 CFR Part 80).

Subpart B—Evaluation and Disposition of Applications

§ 55.10 Evaluation.

(a) All applications filed in accordance with this part shall be evaluated by the Secretary through such officers and employees and such experts or consultants engaged for this purpose as he determines are specially qualified in the area involved.

(b) The Secretary's evaluation shall take into account, among other pertinent factors, the scientific merit and significance of the project, the competency of the proposed staff in relation to the type and scope of the project involved, the feasibility of the project, the likelihood of its producing meaningful results, the proposed project period, and the adequacy of the applicant's resources available for the project and the amount of grant funds necessary for completion, and where appropriate, the recommendations of the Advisory Council on Coal Mine Health Research.

§ 55.11 Disposition.

On the basis of his evaluation of an application, pursuant to § 55.10, the Secretary shall either (a) approve, (b) defer because of lack of funds or a need for further evaluation, or (c) disapprove support of the proposed project in whole or in part. With respect to approved projects, the Secretary shall determine the

project period during which the project may be supported. Applicants shall be advised of the reason an application has been deferred and upon request the reason it has been disapproved. Any deferral or disapproval of an application shall not preclude its reconsideration or a reapplication.

Subpart C—Grant Awards, Payments, Termination

§ 55.20 Grant awards and payments.

(a) Within the limits of funds available for approved projects, the Secretary shall award a grant to those applicants whose approved projects will in his judgment best promote the purposes of § 55.3. All grant awards shall be in writing and shall set forth the amount of funds granted. All amounts awarded are subject to accountability for the sum total of all amounts paid.

(b) A grant award shall be made by the Secretary for either the project period or for such lesser period as he may prescribe in making the award.

(c) Neither the approval of any project nor a grant award shall commit or obligate the United States in any way to make any additional, supplemental or continuation award with respect to any approved project or portion thereof.

(d) Payments with respect to an approved project shall be made periodically, either in advance or by way of reimbursement, as the Secretary may determine, based on the estimated requirements or actual expenditures, respectively, for such period.

(e) No payment shall be paid for any period so long as the applicant fails to comply substantially as determined by the Secretary with any requirement or condition imposed by or pursuant to these regulations.

§ 55.21 Supplemental and continuation grants.

The Secretary may from time to time within the project period, on the basis of an application therefor, make additional grant awards with respect to any approved project where he finds on the basis of such progress, fiscal or other reports as he may require that (a) the amount of any prior award was less than the

amount necessary to carry out the approved project within the period with respect to which the prior award was made (a supplemental grant), or (b) the progress made within the period with respect to which any prior awards were made justifies support for an additional specified portion of the project period (a continuation grant).

§ 55.22 Termination.

(a) Whenever, in the judgment of the Secretary, or the grantee continuation of an approved project would produce results of insufficient value in furthering the purposes of § 55.3, grant support may be terminated.

(b) The Secretary may revoke or terminate any grant award, in whole or in part, at any time after affording the grantee reasonable notice and opportunity to present his views and evidence whenever the Secretary finds that in his judgment the grantee has failed in a substantial respect to comply with the condition of the grant or the regulations of this part.

(1) The views and evidence of the grantee shall be presented in writing unless the Secretary determines that an oral presentation is desirable.

(2) Such views and evidence shall be confined to matters relevant to whether the grantee has failed in a substantial respect to comply with a condition of the grant or the regulation of this part.

(c) Upon termination pursuant to this section, the grantee shall render an accounting and final statement as provided in this part. The Secretary may allow credit for the amount required to settle at minimum costs any non-cancellable Federal obligations properly incurred by the grantee prior to receipt of notice of termination if he finds that the grantee had good cause for the failure.

**Subpart D—Grant Conditions:
Obligations of Grantee**

§ 55.30 Use of funds, changes.

(a) Any funds granted pursuant to § 55.20 shall be expended by the grantee solely for carrying out the approved project in accordance with regulations of this part. The grantee may not, in whole or in part, delegate or trans-

fer this responsibility for the use of such funds to any other person.

(b) Changes in project: Permissible changes by the project director in the approved project shall be limited to changes in methodology, approach, or other aspect of the project that would expedite achievement of the project objectives. Whenever the grantee or the project director is uncertain as to whether a change complies with the provisions, the question should be referred to the Secretary for a final determination.

(c) Changes in project period: The project period may be extended by the Secretary, with or without additional funds, for such an additional period as he determines may be required to complete the objectives. The total period as extended must not exceed 7 years.

§ 55.31 Project Director.

The project director shall be responsible for the conduct of the project for the duration of the project period. Should he become unavailable to discharge his responsibility, the grant shall be terminated unless the grantee replaces the project director with another person found by the Secretary to be qualified to direct and conduct the project.

§ 55.32 Inventions and discoveries.

Any grant award pursuant to this part shall be subject to the regulations of the Department of Health, Education, and Welfare as set forth in Title 45 CFR, Parts 6 and 8, as amended, relating to inventions and patents. Such regulations shall apply to any activity for which grant funds are used. Appropriate measures shall be taken by the grantee and the Secretary to assure that no contracts, assignments or other arrangements inconsistent with the great obligation are continued or entered into, and that all personnel involved in the supported activity are aware of and comply with such obligation. Laboratory notes, related technical data, and information pertaining to inventions or discoveries shall be maintained for such periods, and filed with or otherwise made available to the Secretary or those he may designate at such times and in such manner as he may determine necessary to carry out such Department regulations.

§ 55.32 Other conditions.

The Secretary may impose additional conditions prior to, or at the time of any award when in his judgment such conditions are necessary to assure project advancement, the interest of the public health, or the conservation of grant funds.

Subpart E—Reports, Records and Inspections

§ 55.40 Reports and records.

In addition to such other reports as the Secretary may require, each grantee shall maintain and file with the Secretary the following:

(a) A report of expenditures for each budget period;

(b) Interim progress reports with all applications for continued support;

(c) Terminal progress reports at the end of the project period which shall include a summary statement of progress toward the achievement of the originally stated aims, a list of results, positive and negative, considered significant by the program director, and a list of publications resulting from the grant; and

(d) Immediate and full reporting of all innovations.

§ 55.41 Inspection and audit.

An application for a grant award shall constitute the consent of the applicant to inspections at reasonable times by persons designated by the Secretary, of the facilities, equipment, records, and other resources of the applicant and to interviews with principal staff members. The acceptance of the grant award shall constitute the consent of the grantee to inspections and fiscal audit by persons assigned by the Secretary, of the supported activity and of progress and fiscal records relating to the approved project.

Subpart F—Expenditures

§ 55.50 Allocation of costs.

(a) Funds granted for the direct costs of an approved project may be expended for personal services, rental of space, materials and supplies, and other cost items as shown on the award statement to the extent that such services, materials, supplies and other items are required to carry out the approved project.

(b) Indirect costs: The amount of any award for indirect costs shall be calculated by the Secretary on the basis of his estimate of the actual indirect costs reasonably related to the approved project, or on the basis of a percentage of all, or a portion of the estimated direct costs when there are reasonable assurances that the use of such percentages will not exceed the approximate actual indirect costs.

§ 55.51 Particular direct costs.

Funds granted for the direct costs of an approved project may be expended by the grantee as follows:

(a) *Personal services.* The costs of personal services are payable from grant funds substantially in proportion to the time or effort the individual devotes to carrying out the approved project. Such costs may include all direct costs incident to such services, such as salary during vacations, retirement, workmen's compensation charges, in accordance with the policies and accounting practices consistently applied by the grantee to all its activities.

(b) *Equipment and materials.* The cost of materials or fixed movable equipment not available to the grantee but required for execution of the approved project may be charged to a grant as a direct cost. Such acquisition may be by lease or by outright purchase, subject to accounting as provided in 55.61. Such costs may include those incurred for delivery, installation, and maintenance services.

(c) *Travel costs.* Costs of travel of individuals are payable as a direct cost where required to carry out the project. To the extent that the grantee has not established rules or policies which uniformly apply regardless of source of funds in determining the amounts and types of reimbursable travel expenses, the Standardized Government Travel Regulations shall be applied in determining the amount of grant funds chargeable for travel expenses.

(d) *Alternatives and renovations.* The costs of altering and renovating buildings or other structures in which an approved project is to be conducted may be charged to the grant to the extent that such alternations and renovations are essential to the accomplishment of the specific objective of the project. Such costs may

not include enlarging or adding to such structures or the erection of new structures.

(e) *Publication costs.* Costs required to assure effective publication or other distribution of the project results may be charged as a direct cost.

§ 55.60 Accounting for grant payments.

A grantee shall render, with respect to each grant awarded to it, a full account at the termination date by presenting or otherwise making available vouchers or any other evidence satisfactory to the Secretary of actual expenditures for the project. No such records shall be disposed of within 5 years after termination of the project period or until the grantee has been notified in writing that a final audit has been completed.

§ 55.61 Accounting for equipment, materials and supplies.

Expenditures for movable or fixed equipment, material or supplies, termed in this section "materials", may be charged to grant funds only to the extent that such materials are required for the conduct of the approved project during the period for which Federal support is provided. Any materials on hand on the termination date of the project period (excluding expendable supplies within such limitations as the Secretary may prescribe) shall be accounted for as one or a combination of the following methods:

(a) Materials may be used by the grantee without adjustments of accounts for purposes within the grantee's program to improve the health and safety of the coal miner, and no other accounting for such materials shall be required: *Provided, however,* (1) That during the period of use, no charge for depreciation, amortization, or for other use of the materials shall be made against any existing or future Federal grant or contract, and (2) that, if within the period of their useful life, the materials are transferred by sale or otherwise for use outside the scope of the grantee's program to improve the health or safety of the coal miner, the proportionate fair market value at the time of transfer shall be payable to the United States.

(b) Materials may be sold by the grantee

and the proportion of net proceeds of sale, equal to the proportion of Federal participation in the cost of the material, paid to the United States; or such materials may be used or disposed of in any other manner by the grantee by paying to the United States such proportion of their fair market value on the termination date. To the extent materials purchased from grant funds have been used for credit or "trade-in" on the purchase of new materials, the accounting obligation shall apply to the same extent to such new materials.

(c) *Transfer of equipment:* To the extent the Secretary so requires or approves, title to such materials will be transferred to the United States for such authorized use or disposition as he may direct.

§ 55.62 Interest.

Any interest earned through any deposit or investment by the grantee of the funds paid pursuant to 55.20 shall be paid to the United States as such interest is received by the grantee.

§ 55.63 Project net income.

The Secretary may impose on any grant award or class of grant awards, conditions that will assure return to the United States of its equitable share of any net income derived by the grantee from the activity supported by the grant.

§ 55.64 Final settlement.

There shall be payable to the United States as final settlement with respect to each approved project, the total sum of any amount not accounted for pursuant to 55.60, and of any accounts payable to the United States as provided in 55.61. Such total sums constitute a debt owed by the grantee to the United States and if not paid to the United States shall be recovered from the grantee or its successors by setoff or other action as provided by law.

Dated: February 28, 1971.

Approved: February 28, 1971.

ELLIOT L. RICHARDSON,
Secretary.

[FR Doc.71-3019 Filed 3-4-71;8:47 am]

RESPIRABLE DUST FORMULA WHEN QUARTZ IS PRESENT

Federal Register, March 16, 1971, Rules and Regulations

Title 30—MINERAL RESOURCES

Chapter I—Bureau of Mines,
Department of the Interior

SUBCHAPTER O—COAL MINE HEALTH AND SAFETY

PART 70—MANDATORY HEALTH STANDARDS—UNDERGROUND COAL MINES

Formula for Determining Respirable Dust Standard When Quartz Is Present

On September 17, 1970, notice of proposed rulemaking was published in the FEDERAL REGISTER (35 F.R. 14557) to amend Part 70 by prescribing, pursuant to section 205 of the Federal Coal Mine Health and Safety Act (30 U.S.C. 845), the formula for determining the applicable respirable dust standard where the concentration of respirable dust in the mine atmosphere of any working place contains more than 5 percent quartz.

Interested persons were given the opportunity to participate in the rule making through the submission of comments. Pursuant to the notice, a number of comments have been received from State health departments and other interested persons, and due consideration has been given to all relevant material presented.

The comments presented no evidence contrary to that developed by Public Health Service studies involving the effects of free silica on respiratory health. Accordingly, no change has been made in the formula as originally proposed.

The amendment to Part 70, as set forth below, is hereby adopted effective on the date of its publication in the FEDERAL REGISTER (3-16-71):

§ 70.101 Respirable dust standard when quartz is present.

When the concentration of respirable dust in the mine atmosphere of any working place contains more than 5 percent quartz, the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere to which each miner in such working place is exposed at or below a concentration of respirable dust, expressed in milligrams per cubic meter of air, computed by dividing the percent of quartz into the number 10: *Provided*, That the application of this formula shall not result in a concentration in excess of any standard for respirable dust established pursuant to the Act.

EXAMPLE: Given the respirable dust in a particular working place in a mine contains quartz in the amount of 6.6 percent. The total respirable dust limit in the particular working place must, therefore, be maintained at or below 1.5 milligrams of respirable dust per cubic meter of air ($\frac{10}{6.6} = 1.5 \text{ mg/m.}^3$).

(Sec. 205, 83 Stat. 765; 30 U.S.C. 845)

Approved: March 10, 1971.

ELLIOT L. RICHARDSON,
Secretary.

[FR Doc.71-3602 Filed 3-15-71; 8:47 am]

AUTOPSIES, SPECIFICATIONS

Federal Register, May 14, 1971, Rules and Regulations

Title 42—PUBLIC HEALTH

Chapter I—Public Health Service, Department of Health, Education, and Welfare

SUBCHAPTER C—MEDICAL CARE AND EXAMINATIONS

PART 37—SPECIFICATIONS FOR MEDICAL EXAMINATIONS OF UNDERGROUND COAL MINERS

Autopsies of Coal Miners

On March 5, 1971, notice of proposed rule making was published in the FEDERAL REGISTER (36 F.R. 4420) to amend Part 37 of Title 42, Code of Federal Regulations by adding a new subpart. As proposed, the subpart set forth the conditions under which the Secretary will pay qualified pathologists for autopsies performed on underground miners. Section 203 (d) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 813(d)) provides that upon the death of any active or inactive underground coal miner, the Secretary of Health, Education, and Welfare, after proper consent has been obtained, is authorized to pay for an autopsy to be performed on such a miner.

Interested persons were afforded the opportunity to participate in the rule making through the submission of comments. A number of comments were received and due consideration has been given to all material presented.

In light of the comments, a number of revisions have been made in the rules as proposed. Section 37.203 (a) (2) provides that all measurements shall be in the metric system and specifies the technique for measuring the thickness of the ventricles. In addition, § 37.202 (a) has been revised to provide that the pathologist who performs the autopsy under this program may not receive any payment from the miner's widow, his family, his estate, or from any Federal agency other than this Department. This revision clarifies that pathologists who receive general payment from a hospital for performing routine autopsies, will be permitted to par-

ticipate in the program. Finally, because the "Autopsy Manual" of the Armed Forces Institute of Pathology is out of print and in such limited supply, ALFORD will, on request, lend, rather than supply, pathologists with a copy.

In accordance with the reference to the effective date specified in the notice of proposed rule making, the regulations, as set forth below, are hereby adopted effective on the date of their publication in the FEDERAL REGISTER (5-14-71).

Dated: May 10, 1971.

ELLIOT L. RICHARDSON,
Secretary.

Part 37 is amended by adding a new subpart as follows:

- Sec.
37.200 Scope.
37.201 Definitions.
37.202 Payment for autopsy.
37.203 Autopsy specifications.
37.204 Procedure for obtaining payment.

AUTHORITY: The provisions of this subpart issued under the authority of sec. 503, 88 Stat. 803; 30 U.S.C. 597.

Subpart—Autopsies

§ 37.200 Scope.

The provisions of this subpart set forth the conditions under which the Secretary will pay pathologists to obtain results of autopsies performed by them on miners.

§ 37.201 Definitions.

As used in this subpart:

(a) "Secretary" means the Secretary of Health, Education, and Welfare.

(b) "Miner" means any individual who during his life was employed in any underground coal mine.

(c) "Pathologist" means (1) a physician certified in anatomic pathology or pathology by the American Board of Pathology or the American Osteopathic Board of Pathology, (2) a physician who possesses qualifications which are considered "Board eligible" by the American Board of Pathology or American Osteo-

pathic Board of Pathology, or (3) an intern, resident, or other physician in a training program in pathology who performs the autopsy under the supervision of a pathologist as defined in subparagraph (1) or (2) of this paragraph.

(d) "ALFORD" means the Appalachian Laboratory for Occupational Respiratory Diseases, Public Health Service, Department of Health, Education, and Welfare, Post Office Box 4257, Morgantown, WV 20505.

§ 37.202 Payment for autopsy.

(a) The Secretary will pay up to \$200 to any pathologist who, after the effective date of the regulations in this part and with legal consent.

(1) Performs an autopsy on a miner and submits the findings and other materials to ALFORD in accordance with this subpart; and

(2) Receives no other specific payment, fee, or reimbursement in connection with the autopsy from the miner's widow, his family, his estate, or any other Federal agency.

(b) The Secretary will pay to any pathologist entitled to payment under paragraph (a) of this section and additional \$10 if the pathologist can obtain and submits a good quality copy or original of a chest roentgenogram (posteroanterior view) made of the subject of the autopsy within 5 years prior to his death together with a copy of any interpretation made.

§ 37.203 Autopsy specifications.

(a) Every autopsy for which a claim for payment is submitted pursuant to this part:

(1) Shall be performed consistent with standard autopsy procedures such as those, for example, set forth in the "Autopsy Manual" prepared by the Armed Forces Institute of Pathology, July 1, 1960. (Technical Manual No. 8-300. NAVMED P-5065, Air Force Manual No. 160-19.) Copies of this document may be borrowed from ALFORD.

(2) Shall include:

(i) Gross and microscopic examination of the lungs, pulmonary picura, and tracheobronchial lymph nodes;

(ii) Weights of the heart and each lung (these and all other measurements required

under sec. 37.203 (a) (2) shall be in the metric system);

(iii) Circumference of each cardiac valve when opened;

(iv) Thickness of right and left ventricles; these measurements shall be made perpendicular to the ventricular surface and shall not include trabeculations or pericardial fat. The right ventricle shall be measured at a point midway between the tricuspid valve and the apex, and the left ventricle shall be measured directly above the insertion of the anterior papillary muscle;

(v) Size, number, consistency, location, description and other relevant details of all lesions of the lungs;

(vi) Level of the diaphragm;

(vii) From each type of suspected pneumoconiotic lesion, representative microscopic slides stained with hematoxylin eosin or other appropriate stain, and one formalin fixed, paraffin-impregnated block of tissue; a minimum of three stained slides and three blocks of tissue shall be submitted. When no such lesion is recognized, similar material shall be submitted from three separate areas of the lungs selected at random; a minimum of three stained slides and three formalin fixed, paraffin-impregnated blocks of tissue shall be submitted.

(b) Needle biopsy techniques shall not be used.

§ 37.201 Procedure for obtaining payment.

Every claim for payment under this subpart shall be submitted to ALFORD and shall include:

(a) An invoice (in duplicate) on the pathologist's letterhead or billhead indicating the date of autopsy, the amount of the claim and a signed statement that the pathologist is not receiving any other specific compensation for the autopsy from the miner's widow, his surviving next-of-kin, the estate of the miner, or any other source.

(b) Completed PHS Consent, Release and History Form (See Fig. 1). This form may be completed with the assistance of the pathologist, attending physician, family physician, or any other responsible person who can provide reliable information.

AUTOPSIES, SPECIFICATIONS—Continued

- (c) Report of autopsy:
 - (1) The information, slides, and blocks of tissue required by this subpart.
 - (2) Clinical abstract of terminal illness and other data that the pathologist determines is relevant.
 - (3) Final summary, including final anatomical diagnoses, indicating presence or absence of simple and complicated pneumoconiosis, and correlation with clinical history if indicated.

FIGURE 1

**U.S. DEPARTMENT OF HEALTH,
EDUCATION, AND WELFARE**

**PUBLIC HEALTH SERVICE—NATIONAL COAL
WORKERS' AUTOPSY STUDY**

Consent, Release, and History Form Federal Coal Mine Health and Safety Act of 1969

I,
 (Name) (Relationship)
 of, do hereby
 (Name of deceased miner)
 authorize the performance of an autopsy
 (.....) on said de-
 (Limitation, if any, on autopsy)
 ceased. I understand that the report and cer-
 tain tissues as necessary will be released to the
 United States Public Health Service and to

 (Name of Physician securing autopsy)
 I understand that any claims in regard to the
 deceased for which I may sign a general re-
 lease of medical information will result in the
 release of the information from the Public
 Health Service. I further understand that I
 shall not make any payment for the autopsy.

Occupational and Medical History

- 1. Date of Birth of Deceased.....
 (Month, Day, Year)
- 2. Social Security Number of Deceased

- 3. Date and Place of Death.....
 (Month, Day, Year)

 (City, County, State)

- 4. Place of Last Mining Employment:
 Name of Mine
 Name of Mining Company.....
 Mine Address.....

- 5. Last Job Title at Mine of Last Employ-
 ment
 (e.g., Continuous Miner Operator,
 motorman, foreman, etc.)

- 6. Job Title of Principle Mining Occupation
 (that job to which miner devoted the most
 number of years)
 (e.g., Same as above)

- 7. Smoking History of Miner:
 (a) Did he ever smoke cigarettes? Yes.....
 No.....
 (b) If yes, for how many years?
 Years.
 (c) If yes, how many cigarettes per day did
 he smoke on the average,
 (Number of)
 Cigarettes per day.

- (d) Did he smoke cigarettes up until the
 time of his death? Yes..... No.....
 (e) If no to (d), for how long before he
 died had he not been smoking cigarettes?

- 8. Total Years in Surface and Underground
 Employment in Coal Mining, by State (If
 known)
 (Years) (State)

- 9. Total Years in *Underground* Coal Mining
 Employment, by State (If known)
 (Years)

 (State)

.....
 (Signature)

 (Address)

 (Date)

Interviewer:

NOISE STANDARD

Federal Register, July 7, 1971, Rules and Regulations

Title 30—MINERAL RESOURCES

Chapter I—Bureau of Mines, Department of the Interior

SUBCHAPTER O—COAL MINE HEALTH AND SAFETY

PART 70—MANDATORY HEALTH STANDARDS—UNDERGROUND COAL MINES

Noise Standard

In accordance with the provisions of section 206 of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173), and pursuant to the authority vested in the Secretary of the Interior under section 101 of the Act, there was published in the FEDERAL REGISTER for December 9, 1970 (35 F.R. 18671), a notice of proposed rule making setting forth proposed amendments to Subpart F of Part 70, Subchapter O, Chapter I, Title 30, Code of Federal Regulations, which prescribed maximum noise exposure for all underground coal mines established by the Secretary of Health, Education, and Welfare, the manner of conducting tests of the noise levels at each coal mine, and the minimum requirements which must be met by any person qualified to conduct noise level tests and for the certification of such persons by the Bureau of Mines.

Interested persons were afforded a period of 30 days from the date of publication of the notice in which to submit written comments, suggestions, or objections to the proposed amendments. The comments received from interested persons regarding these proposed amendments were primarily concerned with the complexity of the proposed maximum noise exposure levels and the difficulty of data collection. In view of these comments, revisions have been made so that the maximum noise exposure levels are those prescribed by the Walsh-Healey Public Contracts Act, as amended, in effect on October 1, 1969.

All comments, suggestions, and objections were given careful consideration. The com-

ments and an explanation of the actions taken with respect to them is available for public inspection in the Office of the Director, Room 15-59, Bureau of Occupational Safety and Health, Department of Health, Education, and Welfare, 5600 Fishers Lane, Rockville, MD 20852.

Subpart F of Part 70, Subchapter O, Chapter I, Title 30, Code of Federal Regulations, amended and revised as set forth below is hereby promulgated and shall become effective upon publication in the FEDERAL REGISTER (7-7-71).

W. T. PECORA,
Under Secretary of the Interior.

June 30, 1971.

Subpart F—Noise Standard

Sec.	
70.500	Definitions.
70.501	Requirements.
70.502	Computation of multiple noise exposure.
70.503	Noise level measurements; general.
70.504	Noise level measurements; by whom done.
70.504-1	Persons qualified to measure noise levels; minimum requirements.
70.504-2	Certification of qualified persons by the Bureau of Mines.
70.505	Noise level measurement equipment.
70.506	Noise level measurement procedures.
70.507	Initial noise level survey.
70.508	Periodic noise level survey.
70.509	Supplemental noise level survey; reports and certification.
70.510	Violation of noise standard; notice of violation; action required by operator.

AUTHORITY: The provisions of this Subpart F issued under sections 101 and 206, 83 Stat. 745 and 765; 30 U.S.C. 801 and 846.

Subpart F—Noise Standard

§ 70.500 Definitions.

As used in this Subpart F, the term:

(a) "dBA" means noise level in decibels, as

measured with the A-weighted network of a standard sound level meter using slow response;

(b) "Noise exposure" means a period of time during which the noise level is 90 or more dBA;

(c) "Multiple noise exposure" means the daily noise exposure is composed of two or more different noise levels;

(d) "Noise level" is the average dBA during a noise exposure; and,

(e) "Qualified person" means, as the context requires, an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Act.

§ 70.501 Requirements.

Every operator of an underground coal mine shall maintain the noise levels during each shift to which each miner in the active workings of the mine is exposed at or below the permissible noise levels set forth in Table I of this subpart.

EXAMPLE: If a noise is recorded to be 110 dBA then exposure shall not exceed 30 minutes during an 8-hour shift.

§ 70.502 Computation of multiple noise exposure.

The standard will be considered to have been violated in the case of multiple noise exposure where such exposure totals exceed one as computed by adding the total time of exposure at each specified level (C_1, C_2, C_3 etc.) divided by the total time of exposure permitted at that level (T_1, T_2, T_3). Thus,

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} \text{ must not exceed } 1.$$

EXAMPLE I: Exposure of 2 hours at 92 dBA and 1 hour at 100 dBA during an 8-hour shift. Total minutes of noise exposure at dBA level

Total minutes of permissible noise exposure at dBA level

$$\frac{120 \text{ min.}}{360 \text{ min.}} + \frac{60 \text{ min.}}{120 \text{ min.}} = \frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

The sum of the fractions does not exceed one; hence the exposure for the shift would not violate the standard.

EXAMPLE II: Exposure of 3 hours at 95 dBA and 1 hour at 100 dBA during an 8 hour shift.

$$\frac{1}{4} + \frac{1}{2} = \frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

The sum of the fractions exceeds one; hence the exposure for the shift would violate the standard.

§ 70.503 Noise level measurements; general.

Every coal mine operator shall take accurate readings of the noise levels to which each miner in the active workings of the mine is exposed during the performance of the duties to which he is normally assigned.

§ 70.504 Noise level measurements; by whom done.

The noise level measurements required by this Subpart F shall be taken by, or as directed by, a person who has met the minimum requirements set forth in § 70.504-1, and has been certified by the Director, Bureau of Mines as qualified to take noise level measurements as prescribed in this Subpart F.

§ 70.504-1 Persons qualified to measure noise levels; minimum requirements.

The following persons shall be considered qualified to take noise level measurements as prescribed in this Subpart F;

(a) Any person who has been certified by the Bureau of Mines as an instructor in noise measurement training programs;

(b) Any person who has satisfactorily completed a noise training course conducted by the Bureau of Mines and has been certified by the Bureau as a qualified person; and,

(c) Any person who has satisfactorily completed a noise training course approved by the Bureau of Mines and has been certified by the Bureau as a qualified person.

§ 70.504-2 Certification of qualified persons by the Bureau of Mines.

Upon a satisfactory showing that a person has met the minimum requirements for taking noise level measurements set forth in § 70.504-1, the Bureau of Mines shall certify that such person has the ability and capacity to conduct tests of the noise levels in a coal mine and to report and certify, the results of such tests to the Secretary and the Secretary of Health, Education, and Welfare.

§ 70.505 Noise level measurement equipment.

(a) Noise level measurements shall be taken only with instruments which are approved by the Bureau of Mines as permissible electric face

equipment under the provisions of Part 18 of this chapter (Bureau of Mines, Schedule 2G), and which meet the operational specifications of the American National Standards Institute for Sound Level Meters S1.4-1971 (Type S2A).

(b) Noise level measurement equipment shall be set to operate with the A-weighted network and slow response and shall be acoustically calibrated in accordance with the manufacturer's instructions before, during and after each shift on which such equipment is used.

§ 70.506 Noise level measurement procedures.

(a) Noise level measurements shall be made at locations where the noise is typical of that entering the ears of the miner whose exposure is under consideration.

(b) Five measurements shall be made for each type of noise exposure producing operation to which the miner under consideration is exposed.

(c) Each measurement shall be made by observing the A-scale readings for 30 seconds and recording the noise level.

(d) The average of the five noise level measurements shall be considered as the noise level measurement which is representative of the operation.

(c) Where different and distinct noise levels occur at various phases of an operation, noise level measurements shall be made in accordance with this section for each distinct phase.

(f) The noise levels and the estimated length of time the miner is exposed to each level during a normal work shift shall be reported for the operation. The range of the five noise level measurements used in paragraph (d) of this section shall also be reported.

§ 70.507 Initial noise level survey.

On or before June 30, 1971, each operator shall:

(a) Conduct, in accordance with this subpart, a survey of the noise levels to which each miner in the active workings of the mine is exposed during his normal work shift; and,

(b) Report and certify to the Bureau of Mines, and the Department of Health, Education, and Welfare, the results of such survey using the Coal Mine Noise Data Report, Figure 1. Reports shall be sent to:

Assistant Director, Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

§ 70.508 Periodic noise level survey.

(a) At intervals of at least every 6 months after June 30, 1971, but in no case shall the interval be less than 3 months, each operator shall conduct in accordance with this subpart, periodic surveys of the noise levels to which each miner in the active workings of the mine is exposed and shall report and certify the results of such surveys to the Bureau of Mines, and the Department of Health, Education, and Welfare, using the Coal Mine Noise Data Report Form. Reports shall be sent to:

Assistant Director, Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

(b) Where no A-scale reading recorded for any miner during an initial or periodic noise level survey exceeds 90 dBA, the operator shall not be required to survey such miner during any subsequent periodic noise level survey required by this section: *Provided, however,* That the name and job position of each such miner shall be reported in every periodic survey and the operator shall certify that such miner's job duties and noise exposure levels have not changed substantially during the preceding 6-month period.

§ 70.509 Supplemental noise level surveys; reports and certification.

(a) Where the certified results of an initial noise level survey conducted in accordance with § 70.507, or a periodic noise level survey conducted in accordance with § 70.508, show that any miner in the active workings of the mine is exposed to a noise level in excess of the permissible noise level prescribed in Table I, the operator shall conduct a supplemental noise level survey with respect to each miner whose noise exposure exceeds this standard. This survey shall be conducted within 15 days following notification to the operator by the Bureau of Mines to conduct such survey.

(b) Supplemental noise level surveys shall be conducted by taking noise level measurements in accordance with § 70.506, however, noise level measurements shall be taken during

the entire period of each individual operation to which the miner under consideration is actually exposed during his normal work shift.

(c) Each operator shall report and certify the results of each supplemental noise level survey conducted in accordance with this section to the Bureau of Mines and the Department of Health, Education, and Welfare using the Coal Mine Noise Data Report Form to record noise level readings taken with respect to all operations during which such measurements were taken.

(d) Supplemental noise level surveys shall, upon completion, be mailed to:

Assistant Director, Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

§ 70.510 Violation of noise standard; notice of violation; action required by operator.

(a) Where the results of a supplemental noise level survey conducted in accordance with § 70.509 show that any miner in the active workings of the mine is exposed to noise levels which exceed the permissible noise levels prescribed in Table I, the Secretary shall issue a notice to the operator that he is in violation of this subpart.

(b) Upon receipt of a Notice of Violation issued pursuant to paragraph (a) of this section, the operator shall:

(1) Institute promptly administrative and/or engineering controls necessary to assure compliance with the standard. Such controls may include protective devices other than those devices or systems which the Secretary or his authorized representative finds to be hazardous in such mine.

(2) Within 60 days following the issuance of any Notice of Violation of this subpart, submit for approval to a joint Bureau of Mines-Health, Education, and Welfare committee, a plan for the administration of a continuing, effective hearing conservation program to assure compliance with this subpart, including provision for:

- (i) Reducing environmental noise levels;
- (ii) Personal ear protective devices to be made available to the miners;
- (iii) Preemployment and periodic audiograms.

(3) Plans required under subparagraph (2) of this paragraph shall be submitted to:

Assistant Director, Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

TABLE I—PERMISSIBLE NOISE EXPOSURES

Duration per day (hours)	Noise level (dBA)
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
¾	107
½	110
¼ or less.....	115

Figure 1

(Submit one form for each miner)

COAL MINE NOISE DATA REPORT

Date: Mine ID No.:

Section ID No.: Miner's SSA No.:

Occupation:

Actual production—tons this shift:

Type of mining:

- Development
- Retreat

Method of mining:

- Continuous
- Conventional
- Longwall
- Other

Equipment in operation:

- Electric
- Pneumatic
- Other
- Voltage..... Pressure-p.s.i.....
- a.c. or d.c.

Total horsepower.....

Description of equipment (make, model No., order No., etc.):

.....

Seam conditions: Name of seam:

.....

Coal height—inches:

Average width of place:

Type of roof (sandstone, slate, etc.):

.....

NOISE STANDARD—Continued

Hearing protective device used?

Yes.....No.....

Type and model number of sound level meter:
.....

Check if section will be closed before next sampling: Yes.....No.....

Initial survey Periodic survey supplementary survey

Signature of qualified person:.....
.....

Figure 1
Page 2

Coal Mine Noise Data Report

Date:.....

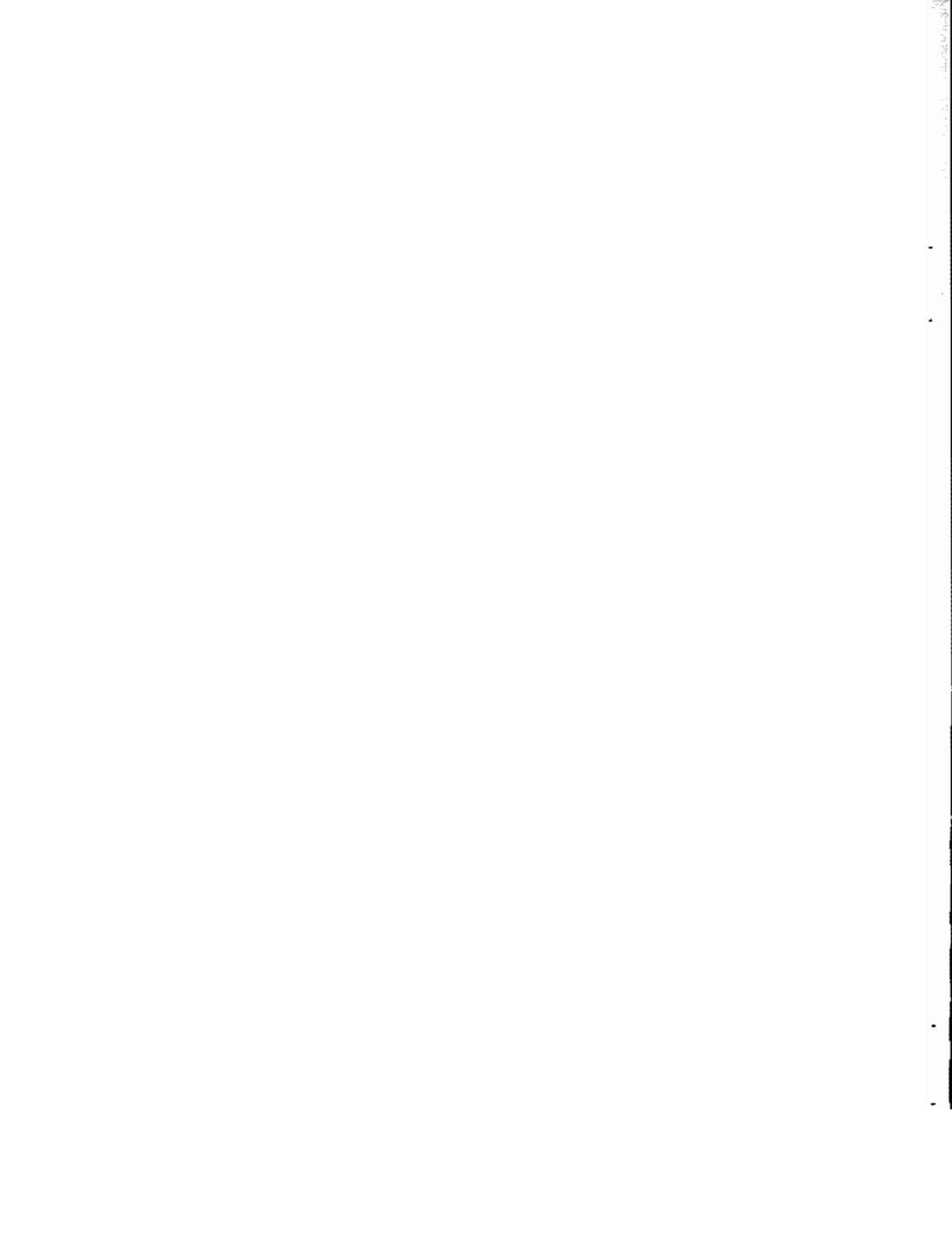
Mine ID No.:.....

List noise level measurements for each level of exposure.

Operation (loading, tramping, etc.	Noise level dBA average	Range (high and low readings)	Cumulative exposure-minutes
Mantrip.....			

Signature of qualified person:

[FR Doc. 71-9501 Filed 7-6-71; 8:84 am]



HEALTH STANDARDS FOR SURFACE AREAS, PUBLIC HEARING

Federal Register, July 15, 1971, Notice

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Health Services and Mental Health
Administration

HEALTH STANDARDS FOR SURFACE WORK AREAS OF UNDERGROUND COAL MINES AND SURFACE MINES

Notice of Public Hearing

Whereas, on January 7, 1971, proposed mandatory health standards for surface coal mines and surface work areas of underground coal mines were published in the FEDERAL REGISTER (30 CFR Part 71, 36 F.R. 252); and

Whereas, the Secretary of the Interior has published a notice specifying that prior to the last day of the period fixed for the submission of comments, he received written objections to the standards, stating the grounds for such objections with sufficient particularity and requesting a public hearing on such objections (36 F.R. 12245).

Now, therefore, pursuant to section 101(g) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 811(g)), a public hearing will begin at 9 a.m., e.d.t., on August 17, 1971, in Room 5169 of the Department of Health, Education, and Welfare, 330 Independence Avenue SW., Washington, DC. for the purpose of receiving relevant evidence on the following issues:

Dust standards. 1. That the proposed 2 mg/m³ respirable dust standard in section 71.100 should not take effect on the effective date of the regulations and that a period of time should be permitted to achieve the standard.

2. That the requirement in § 71.106(d) that upon receipt of a notice of violation an operator shall take continuous samples until advised by the Bureau of Mines that compliance has been achieved be modified to permit the operator, after taking 10 samples, to cease sampling until notified by the Bureau of Mines that sampling is to be resumed.

3. That §§ 71.107 and 71.108 should be revised to permit annual sampling whenever a basic sample or a subsequent sample establishes a concentration or respirable dust which is 1 milligram or less per cubic meter of air.

Airborne Contaminants. That the threshold limit values in the American Conference of Governmental Industrial Hygienists publication be considered guidelines rather than standards.

Surface Bathing Facilities, Change Rooms, and Sanitary Toilet Facilities. That operators not be required to meet specified requirements for above-ground bathing facilities, change rooms, and sanitary toilet facilities.

Sanitary Toilet Facilities at Surface Work Sites. That operators of surface mines be required only to provide one approved sanitary toilet within 1,000 feet of each surface work site where miners are regularly employed.

Drinking Water. That operators be required only to provide an adequate supply of potable water for drinking purposes and that such water be carried, stored, and otherwise protected in sanitary containers.

Stanley J. Reno, Acting Deputy Director, National Institute for Occupational Safety and Health is designated as the Chairman of the hearing.

The hearing shall be conducted in an informal, orderly manner. Persons making statements need not be sworn or make affirmation. Each party shall be given an opportunity to make a statement concerning the issues under consideration, an opportunity to make supplementary statements which may include comments on or rebuttal of other parties' views, and an opportunity to make recommendations concerning the issues in any of his statements. Any party may appear in person or by counsel.

A verbatim transcript of the proceedings of hearing sessions will be maintained. All written statements, charts, tabulations, and other data shall be received in the record. The Chairman

HEALTH STANDARDS FOR SURFACE AREAS, PUBLIC HEARING—Continued

shall submit to the Secretary the verbatim transcript, including all charts, tabulations, and other exhibits that are part of the hearing record, together with recommended findings of fact. Within 60 days after the completion of the hearings, findings of fact concerning the issues presented at the hearing will be made public. Thereafter, mandatory health standards for surface work areas of underground coal mines and surface mines, with such modifications as are appropriate, will be transmitted to the Secretary of the Interior for promulgation.

Interested persons who wish to participate in the hearing shall apply in writing to Stanley J. Reno, Chairman, Room 15-59, 5600 Fishers Lane, Rockville, MD 20852, not later than 10 days preceding the hearing, stating the issues upon which the person wishes to be heard and the time requested.

Dated: July 13, 1971.

VERNON E. WILSON,
Administrator.

[FR Doc. 71-10107 Filed 7-14-71; 8:53 am]

SINGLE SHIFT MEASUREMENTS OF RESPIRABLE DUST, NOTICE OF FINDING

Federal Register, July 17, 1971, Notices¹

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of the Secretary

COAL MINE HEALTH AND SAFETY

Notice of Finding That Single Shift Measurements of Respirable Dust Will Not Accurately Represent Atmospheric Conditions During Such Shift

Section 202(f) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 801; 83 Stat. 742) provides that the term "average concentration" means a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active workings of a mine is exposed (1) as measured, during the period ending June 30, 1971, over a number of continuous production shifts to be determined by the Secretary of the Interior and the Secretary of Health, Education, and Welfare, and (2) as measured thereafter, over a single shift only, unless the Secretary of the Interior and the Secretary of Health, Education, and Welfare find, in accordance with the provisions of section 101 of the Act, that such single shift measurement will not, after applying valid statistical techniques to such measurement, accurately represent such atmospheric conditions during such shift, that is, the shifts during which the miner is continuously exposed to respirable dust.

Notice is hereby given that, in accordance with section 101 of the Act, and based on the data summarized below, the Secretary of the Interior and the Secretary of Health, Education, and Welfare and that single shift measurement of respirable dust will not, after applying valid statistical techniques to such measurement, accurately represent the atmospheric conditions to which the miner is continuously exposed.

In April 1971, a statistical analysis was conducted by the Bureau of Mines, using as a basis the current basic samples for the 2,179 working

sections in compliance with the dust standard on the date of the analysis. In accordance with the sampling procedures set forth in Part 70, Subchapter O, Chapter 1, Title 30, Code of Federal Regulations, these current basic samples were submitted to the Bureau over a period of time prior to the date the analysis was conducted. The average concentration of the current 10 basic samples was compared with the average of the two most recently submitted samples of respirable dust, then to the three most recently submitted samples, then to the four most recently submitted samples, etc. The results of these comparisons showed that the average of the two most recently submitted samples of respirable dust was statistically equivalent to the average concentration of the current basic samples for each working section in only 9.6 percent of the comparisons. Figure 1 lists the results of the comparisons and shows that a single shift measurement would not, after applying valid statistical techniques, accurately represent the atmospheric conditions to which the miner is continuously exposed.

FIGURE 1

Number of samples:	Percent which is statistically equivalent to the average of the 10 basic samples
2	9.6
3	25.1
4	42.3
5	55.7
6	67.2
7	76.5
8	85.2
9	92.7
10	100

The data from which the above summary has been prepared are available upon request from the Chief, Division of Health, Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

Interested persons may submit written comments, suggestions, or objections to the Di-

¹ A Joint HEW/Interior Department notice.

SINGLE SHIFT MEASUREMENTS OF RESPIRABLE DUST, NOTICE OF FINDING—Continued

rector, Bureau of Mines, Washington, D.C.
20240, no later than 80 days following publica-
tion of this notice in the FEDERAL REGISTER.

Dated: July 13, 1971.

ROGERS C. B. MORTON,
Secretary of the Interior.

Dated: July 12, 1971.

ELLIOT L. RICHARDSON,
*Secretary of Health,
Education, and Welfare.*

[FR Doc. 71-10150 Filed 7-16-71; 8:47 am]

Title 42—PUBLIC HEALTH

Chapter 1—Public Health Service, Department of Health, Education, and Welfare.

SUBCHAPTER C—MEDICAL CARE AND EXAMINATIONS

PART 37—SPECIFICATIONS FOR MEDICAL EXAMINATIONS OF UNDERGROUND COAL MINERS

Chest Roentgenograph Examination Specifications

On May 29, 1971, notice of proposed rule making was published in the FEDERAL REGISTER (36 F.R. 9874) to amend Part 37 by strengthening, the provisions assuring confidentiality of X-ray findings.

Interested persons were afforded the opportunity to participate in the rule making through the submission of comments. A number of comments were received, and due consideration has been given to all material presented. In view of the objections by both labor and industry, the amendment providing for the Department's intervention when any operator's plan is ineffective because of the limited participation of eligible miners has been deleted.

While a number of objections were received concerning the remaining amendments, these are adopted without change since the Department seems the necessary to maintain confidentiality, and the Department is committed to maintaining complete confidentiality of these examinations regardless of the manner in which they are provided. Moreover, since adoption of these amendments is intended to remove the doubts concerning the confidentiality of medical findings that some miners may have had and to encourage their participation in the initial round of medical examinations, I find that good cause exists for not delaying the effective date of these amendments which will become effective upon their publication in the FEDERAL REGISTER (9-2-71). Accordingly, within 15 days from the date of publication, operators

who have submitted plans approved by the Department are required to amend such plans to bring them into conformity with § 37.4(a) (6), as amended, by submitting assurances that they have instructed the physicians giving the X-ray examinations not to take or make duplicate X-rays and that they will not solicit a physician's X-ray findings.

To permit operators to fulfill their responsibilities in the initial round of medical examinations, the Department will continue to accept X-rays taken under approved plans until November 1, 1971.

Dated: August 21, 1971.

VERNON E. WILSON,
*Administrator, Health Services
and Mental Health Administration.*

Approved: August 26, 1971.

ELLIOT L. RICHARDSON,
Secretary.

Part 37 is amended as follows:

1. Section 37.4 is revised to read as follows:
§ 37.4 Plans for initial chest roentgenographic examinations.

(a) * * *

(6) Assurances that (i) the operator will not solicit a physician's roentgenographic findings and (ii) instructions have been given to the physician(s) giving the roentgenographic examinations that duplicate roentgenograms will not be taken or made.

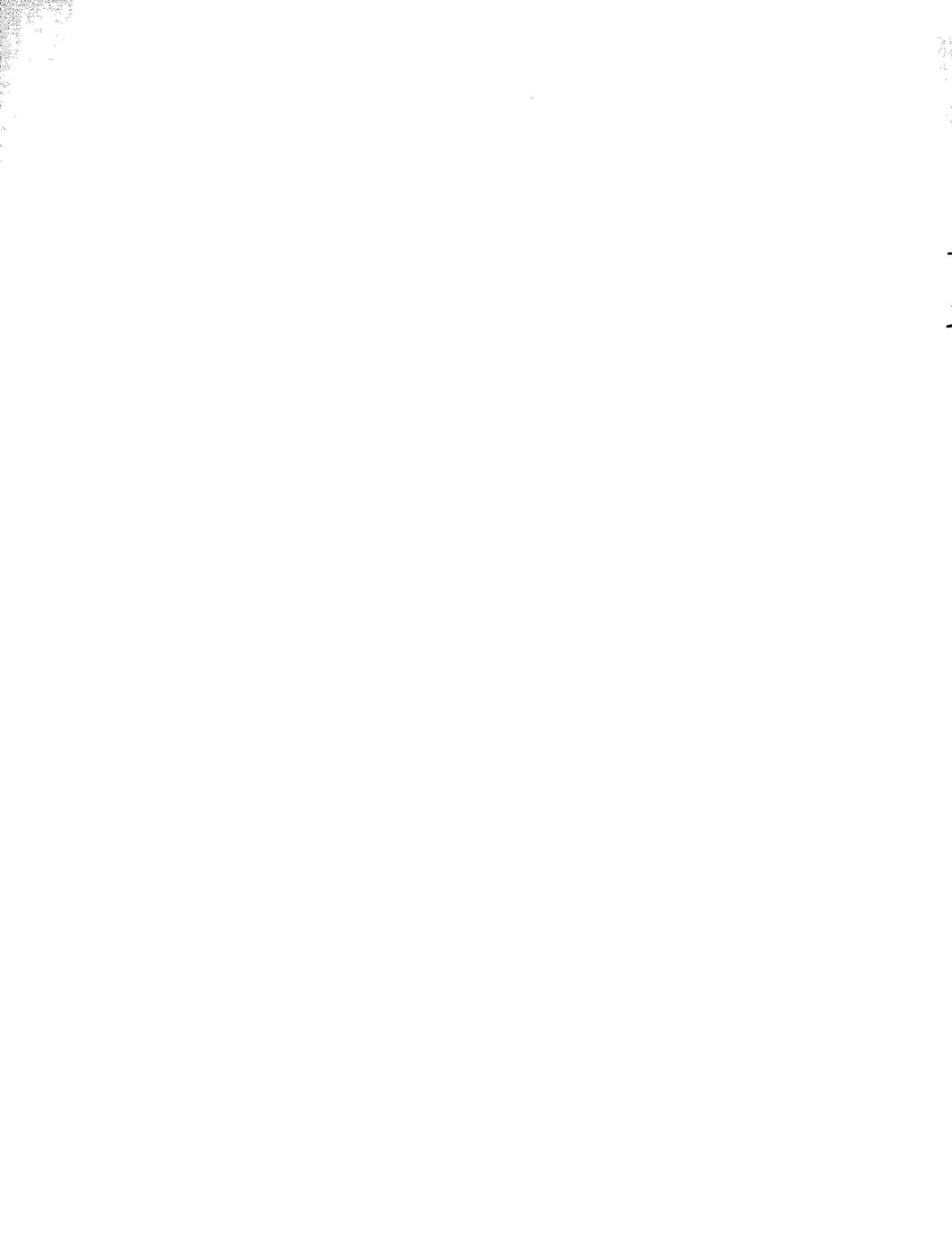
* * * * *

(c) Every operator who has submitted a plan approved by the Department shall amend such plan to bring it into conformity with paragraph (a)(6) of this section, as amended, within 15 days after the effective date of the amendment to said section.

§ 37.20 [Amended]

2. Section 37.20 is amended by adding the following sentence at the end of paragraph (d)(5): "No other identifying information such as the miner's name or clinic number shall be recorded on the film."

[FR Doc. 71-12875 Filed 9-1-71; 8:49 am]



Federal Register, October 15, 1971, Notices

DEPARTMENT OF HEALTH,
EDUCATION, AND WELFARE

National Institute for Occupational
Safety and Health

COAL MINE HEALTH

Health Standards for Surface Coal Mines and
Surface Work Areas of Underground Mines;
Findings of Fact

Section 101(g) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 811(g)), hereinafter referred to as the "Act," provides, in part, that within 60 days after completion of any public hearing on proposed mandatory health or safety standards, the Secretary who held the hearing shall make findings of fact which shall be public.

BACKGROUND

Proposed mandatory health standards for surface work areas of underground coal mines and surface coal mines were developed by the National Institute for Occupational Safety and Health pursuant to section 101 of the Act and transmitted to the Secretary of the Interior for publication in accordance with the Act. The standards were published under a notice of proposed rule making on January 7, 1971, at 36 F.R. 252, and interested persons were afforded a period of 45 days within which to submit written comments, suggestions, and objections and to request a public hearing. On June 29, 1971, the Secretary of the Interior, in accordance with section 101 (f) of the Act, published a notice (36 F.R. 12245) that objections to certain of the standards had been filed stating the grounds for such objections with sufficient particularity and that a public hearing had been requested. Following such notice, the Department of Health, Education, and Welfare published a notice of hearing (36 F.R. 13172) to be held for the purpose of receiving relevant evidence on the following issues:

Dust standards. (1) That the proposed 2 mg/m³ respirable dust standard in section 71.

100 should not take effect on the effective date of the regulations and that a period of time should be permitted to achieve the standard. (2) That the requirement in § 71.106(d) that upon receipt of a notice of violation an operator shall take continuous samples until advised by the Bureau of Mines that compliance has been achieved be modified to permit the operator, after taking 10 samples, to cease sampling until notified by the Bureau of Mines that sampling is to be resumed. (3) That §§ 71.107 and 71.108 should be revised to permit annual sampling whenever a basic sample or a subsequent sample establishes a concentration of respirable dust which is 1 milligram or less per cubic meter of air.

Airborne contaminants. That the threshold limit values in the American Conference of Governmental Industrial Hygienists publication be considered guidelines rather than standards.

Surface bathing facilities, change rooms, and sanitary toilet facilities. That operators not be required to meet specified requirements for above-ground bathing facilities, change rooms, and sanitary toilet facilities.

Sanitary toilet facilities at surface work sites. That operators of surface mines be required only to provide one approved sanitary toilet within 1,000 feet of each surface work site where miners are regularly employed.

Drinking water. That operators be required only to provide an adequate supply of potable water for drinking purposes and that such water be carried, and otherwise protected in sanitary containers.

HEARING

The hearing on surface health standards was held on August 17, 1971, at the Department of Health, Education, and Welfare. Presentations were made by I.E. Buff, M.D., and the following organizations: United Mine Workers of America, U.S. Bureau of Mines, Independent Coal Operators Association, and Bituminous Coal Operators Association. A verbatim transcript of the proceeding is available for public inspection.

tion at the National Institute for Occupational Safety and Health, Room 10-05, Parklawn Building, 5600 Fishers Lane, Rockville, Md.

FINDINGS

On the basis of the evidence presented at the hearing and on other information available to the Department, the Director, National Institute for Occupational Safety and Health, pursuant to authority delegated from the Secretary and the Assistant Secretary (35 F.R. 11150), finds:

1. With respect to the 2.0 mg./m.³ dust standard, that:

(a) There is a causal relationship between exposure over a period of years to concentrations of respirable coal dust in excess of 2.0 milligrams of respirable dust per cubic meter of air (mg./m.³) and the development of coal workers' pneumoconiosis.

(b) Persons exposed over a period of years to concentrations of respirable coal dust of 2.0 mg./m.³ or less are not expected to develop pneumoconiosis.

(c) Technology exists for continuously maintaining the average concentrations of respirable dust at surface work sites and in surface installations of coal mines at or below 2.0 mg./m.³.

(d) A dust standard requiring coal mine operators to continuously maintain the average concentration of respirable dust at each surface work site and in each surface installation at 2.0 mg./m.³ or less is necessary for the prevention of pneumoconiosis and the protection of life of miners and is technically feasible.

2. With respect to continuous sampling, that:

(a) Where a working section of an underground mine fails to comply with the applicable respirable dust standard, the underground coal mine operator, pursuant to 30 CFR Part 70, is required to sample each shift as provided by section 104(j) of the Act until notified that a working section is in compliance with the respirable dust standard; continuous shift sampling is a costly procedure.

(b) There have been a number of delays in notifying operators when sections once in violation have been brought into compliance.

(c) From the experience gained in the under-

ground mine dust sampling program, it is reasonable once a notice of violation is received to permit cessation of sampling in surface mines and surface work areas of underground mines after 15 samples have been taken from the working position in question, until another notice of noncompliance is received from the Bureau of Mines.

3. With respect to permitting annual sampling, that:

(a) In view of the finding that persons exposed over a period of years to concentrations of respirable coal mine dust of 2.0 mg./m.³ or less are not expected to develop pneumoconiosis, use of 0.5 mg./m.³ rather than 1.0 mg./m.³ as the breakpoint for annual sampling pursuant to sections 71.108 and 71.109 and semiannual sampling pursuant to section 71.107 does not afford an appreciable increase in health protection to the miner.

(b) Due to imprecisions in weighing and measuring dust, determinations based upon measurements at the 0.5 milligram level are inadvisable.

4. With respect to airborne contaminants, that:

(a) The threshold limit values of airborne contaminants adopted by the American Conference of Governmental Industrial Hygienists (ACGIH) represent conditions to which nearly all workers may be repeatedly exposed day after day without adverse effect.

(b) Compliance with such values is technically feasible.

(c) Adoption of the threshold limit values as adopted and applied by the ACGIH in "Threshold Limit Values of Airborne Contaminants" is necessary for the protection of life and the prevention of occupational diseases of miners.

5. With respect to surface bathing facilities, change rooms, and sanitary flush toilet facilities, that:

Operators of underground coal mines are presently required by 30 CFR Part 75 to provide surface bathing facilities, change rooms, and sanitary flush toilet facilities for the use of miners.

6. With respect to sanitary toilet facilities at surface work sites and drinking water; that:

(a) While the availability of an adequate

supply of safe drinking water and the availability of sanitary toilet facilities at surface work sites is necessary for the health protection of miners, the evidence presented at the hearing and other evidence available to the Department is insufficient to make a finding concerning the requisite quantity of safe drinking water and distance of sanitary toilet facilities from surface work sites.

(b) In order to assure that mandatory health standards concerning the matters specified in paragraphs 5 and 6 will provide the highest degree of health protection for the miner, research and study is necessary to ascertain the latest scientific data in the field, the technical and physical problems involved in implementing proposed standards, and the experience gained under this Act and other pertinent statutes. Such a study will be undertaken by the National Institute for Occupational Safety and Health and a report of the study will be made, together with recommendations for mandatory health

standards on these matters, not later than December 31, 1972.

(c) Pending the completion of such a study, and the adoption of additional standards, if any, indicated by the study, provision of bathing facilities, change rooms, and sanitary flush toilet facilities comparable to the standards already adopted under 30 CFR Part 75 for surface facilities used by underground miners is necessary to attain the highest degree of health protection for miners at surface mines: *Provided, however,* That due to varying conditions e.g., geographical variations, size of mines, and physical impossibilities) waivers to these requirements may be granted in appropriate cases.

Dated: October 12, 1971.

MARCUS M. KEY,
*Director, National Institute
for Occupational Safety and Health.*

[FR Doc. 71-15084 Filed 10-14-71; 8:51 am]

Title 30—MINERAL RESOURCES

**Chapter 1—Bureau of Mines,
Department of the Interior**

**SUBCHAPTER O—COAL MINE HEALTH
AND SAFETY**

**PART 90—PROCEDURES FOR TRANSFER
OF MINERS WITH EVIDENCE OF PNEU-
MOCONIOSIS**

In accordance with the provisions of section 203 of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173), and pursuant to the authority vested in the Secretary of the Interior under section 508 of the Act, there was published in the **FEDERAL REGISTER** for March 2, 1971 (36 F.R. 3900) a notice of proposed rule making setting forth a new Part 90 to Subchapter O of Chapter I, Title 30, Code of Federal Regulations, which provided procedures to be followed by miners, operators, and the Bureau of Mines, in relation to notification, exercise, and enforcement of the option of a miner with evidence of pneumoconiosis to transfer his position to a less dusty area of the mine.

Interested persons were afforded a period of 30 days following the date of publication of the notice in which to submit written comments, suggestions, or objections to the proposed regulations. In view of the comments, objections, and requests for public hearings received in response to said notice, the Department decided to hold a public hearing in order to receive further comments and testimony relating to Procedures for Transfer of Miners with Evidence of Pneumoconiosis. A notice of public hearing was published in the **FEDERAL REGISTER** for July 14, 1971 (36 F.R. 13097) and a public hearing was held on July 26, 1971 in the Auditorium, Department of the Interior, 19th and C Streets NW., Washington, D.C.

The comments and testimony received at the July 26 public hearing, as well as all other written comments, suggestions, or objections were thoroughly reviewed, and some of the

regulations were revised accordingly. For example, if a miner who shows evidence of the development of pneumoconiosis is already working in a position where the concentration of respirable dust in the mine atmosphere meets the requirements of section 203 (b) of the Act, the operator need not transfer him to another position. In addition a miner who elects to exercise his option of transfer need not inform the operator by whom he is employed of this election, but only must notify the Bureau of Mines, using a form supplied to him for this purpose by the Bureau.

A considerable portion of the comments, suggestions, objections, and testimony was devoted to the conflict between the miner's right to be afforded the option of transfer provided by section 203 (b) of the Act and the seniority and jobbidding provisions of the current National Bituminous Coal Wage Agreement. However, after careful consideration, it is the position of the Department that since section 203 (b) of the Act is a properly enacted Federal statutory provision, it may operate to supersede, in part, provisions of this labor contract. Testimony was also received advocating the use of approved respiratory equipment in order to allow a longer period of time within which to effectuate a transfer. This approach was rejected by Congress, in its consideration of the Federal Coal Mine Health and Safety Act of 1969, and in light of this legislative history the Department has not adopted these suggestions. H.R. Conf. Rep. No. 91-761, 91st Cong., 1st Sess., 77 (1969).

A summary of the comments, suggestions, and objections, and a transcript of the July 26, 1971 public hearing, together with an explanation of actions taken with respect to this data are available for public inspection in the Office of the Deputy Director for Health and Safety, Room 4512, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

Part 90, Subchapter O, Chapter I of Title 30, Code of Federal Regulations is herewith promulgated at set forth below and shall be-

come effective upon publication in the **FEDERAL REGISTER** (10-27-71).

HOLLIS M. DOLE,
*Assistant Secretary
of the Interior.*

OCTOBER 20, 1971.

Subpart A—General

Sec.

90.1 Scope.

90.2 Definitions.

90.10 Notification to Miner
Notification by Director; contents.

**Subpart C—Miner's Election of Option of
Transfer**

90.20 Election of option of transfer; notification to Bureau of Mines.

Subpart D—Operator's Transfer of Miner

90.30 Notification of option of transfer.

90.31 Operator's transfer of miner; requirements.

90.32 Transfer of miner; time requirement.

90.33 Notification to District Manager.

90.34 Compensation of transferred miner.

**Subpart E—Enforcement of Miner's Option
of Transfer by Bureau of Mines**

90.40 Enforcement of option of transfer; notices and orders.

AUTHORITY: The provisions of this Part 90 are issued under sections 203 and 508 of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-178).

Subpart A—General

§ **90.1** Scope.

Section 203(a) of the Federal Coal Mine Health and Safety Act of 1969 requires the operator of a coal mine to cooperate with the Secretary of Health, Education, and Welfare in making available to each miner working in a coal mine the opportunity to have chest roentgenograms. The films of such roentgenograms shall be read and classified in a manner prescribed by the Secretary of Health, Education, and Welfare, and the Secretary of the Interior shall submit the results of these roentgenograms to each miner and advise him of his

rights under the Act related thereto. Section 203(b)(1) of the Act provides that prior to December 30, 1972, any miner who, in the judgment of the Secretary of Health, Education, and Welfare based upon such reading or other medical examinations, shows evidence of the development of pneumoconiosis shall be afforded the option of transferring from his position to another position in any area of the mine, for such period or periods as may be necessary to prevent further development of such disease, where the concentration of respirable dust in the mine atmosphere is not more than 2.0 milligrams of dust per cubic meter of air. Effective December 30, 1972, section 203(b)(2) of the Act provides that such miner shall be afforded the option of transferring from his position to another position in any area of the mine, for such period or periods as may be necessary to prevent further development of pneumoconiosis, where the concentration of respirable dust in the mine atmosphere is not more than 1.0 milligrams of dust per cubic meter of air, or if such level is not attainable in such mine, to a position in such mine where the concentration of respirable dust is the lowest attainable below 2.0 milligrams per cubic meter of air. Section 203(b)(3) of the Act further provides that any miner so transferred shall receive compensation for such work at not less than the regular rate of pay received by him immediately prior to his transfer. The regulations in this Part 90 prescribe the manner by which the Director, Bureau of Mines shall notify miners of the results of chest roentgenograms and advise them of related rights; the method by which eligible miners shall exercise their option of transfer of position; the method to be followed by operators in transferring such eligible miners; and the manner in which the Director, Bureau of Mines shall enforce the option of transfer of position of eligible miners.

§ **90.2** Definitions.

As used in this Part 90:

(a) "Coal mine" means an area of land and all structures, facilities, machinery, tools, equipment, shafts, slopes, tunnels, excavations, and other property, real or personal, placed upon, under, or above the surface of such land

by any person, used in, or to be used in, or resulting from, the work of extracting in such area bituminous coal, lignite, or anthracite from its natural deposits in the earth by any means or method, and the work of preparing the coal so extracted, and includes custom coal preparation facilities;

(b) "Director" means the Director, Bureau of Mines, U.S. Department of the Interior.

(c) "Miner" means any individual working in a coal mine.

(d) "Operator" means any owner, lessee, or other person who operates, controls, or supervises a coal mine.

(e) "Option of transfer" means:

(1) Prior to December 30, 1972, the option afforded a miner, whose chest roentgenogram or other medical examination shows evidence of the development of pneumoconiosis, to transfer from his position to another position in any area of the mine, for such period or periods as may be necessary to prevent further development of pneumoconiosis, where the concentration of respirable dust in the mine atmosphere is not more than 2.0 mg./m.³ of air; however, if such miner is already working in a position where the concentration of respirable dust is not more than 2.0 mg./m.³ of air, he need not be transferred; and

(2) On and after December 30, 1972, the option afforded a miner, whose chest roentgenogram or other medical examination shows evidence of the development of pneumoconiosis, to transfer from his position to another position in any area of the mine, for such period or periods as may be necessary to prevent further development of such disease, where the concentration of respirable dust in the mine atmosphere is not more than 1.0 mg./m.³ of air, or if such level is not attainable in such mine, to a position in such mine where the concentration of respirable dust is the lowest attainable below 2.0 mg./m.³ of air; however, if such miner is already working in a position where the concentration of respirable dust is not more than 1.0 mg./m.³ of air, or if such level is not attainable in such mine, in a position where the concentra-

tion of respirable dust is the lowest attainable below 2.0 mg./m.³ of air, he need not be transferred.

(f) "Pneumoconiosis" means a chronic dust disease of the lung arising out of employment in a coal mine.

(g) "Respirable dust" means only dust particulates 5 microns or less in size.

(h) "Secretary" means the Secretary of Health, Education, and Welfare.

Subpart B—Notification to Miner
§ 90.10 Notification by Director; contents.

(a) Upon the receipt of information from the Secretary that a miner has been given a chest roentgenogram, and that such roentgenogram has been read and classified in the manner prescribed by the Secretary, the Director shall submit to such miner, by letter, the results of such roentgenogram and advise such miner of his rights related thereto. The Director shall include a copy of the information received from the Secretary.

(b) When a chest roentgenogram shows, in the judgment of the Secretary, evidence of the development of pneumoconiosis, the Director shall notify the affected miner that he has the option of transfer.

Subpart C—Miner's Election of Option of Transfer

§ 90.20 Election of option of transfer; notification to Bureau of Mines.

Any miner notified by the Director that he has the option of transfer, if he elects to exercise such option, shall, in writing, notify the Bureau of Mines of his election to exercise the option of transfer. A miner may fulfill this requirement by signing and dating a form, similar to Figure 1, which will be sent to him by the Director for this purpose. This notification shall be sent to the Chief, Health Division—Coal Mine Health and Safety, Bureau of Mines, Department of the Interior, Washington, D.C. 20240. The miner shall not be required to furnish the operator a copy of the medical information received from the Secretary and provided to the miner by the Director.

Subpart D—Operator's Transfer of Miner

§ 90.30 Notification of option of transfer.

Upon receipt by the Bureau of Mines, pursuant to § 90.20 of information from the miner that he elects to exercise the option of transfer, the Director shall send to the operator employing such miner a letter notifying the operator that the miner is afforded the option of transfer and that the miner has exercised the option of transfer. The Director shall send a copy of this letter of notification to the miner.

§ 90.31 Operator's transfer of miner; requirements.

(a) Except as provided in paragraph (b) of this section, an operator shall, upon receipt of a letter of notification from the Director in accordance with § 90.30, transfer the miner to such a position as is required by section 203(b) of the Federal Coal Mine Health and Safety Act of 1969, within the time prescribed in § 90.32.

(b) If, based upon the respirable dust sampling requirements of Part 70 of this chapter an operator ascertains that the miner who has exercised his option of transfer is already working in a position where the concentration of respirable dust in the mine atmosphere meets the requirements of section 203(b) of the Act, then the operator need not transfer such miner from such position.

§ 90.32 Transfer of miner; time requirement.

Except as provided in § 90.31 (b) the operator shall transfer the miner who has exercised the option of transfer as soon as practicable, but no later than 45 days from the date of the letter of notification by the Director pursuant to § 90.31, or by such other date after the period of 45 days that the miner may indicate, in writing, to both the operator and the Director as being acceptable to the miner for such transfer.

§ 90.33 Notification to District Manager.

(a) The operator shall, when the transfer has been accomplished or when the operator has ascertained that the miner who has exercised his option of transfer is already working in a

position where the concentration of respirable dust in the mine atmosphere meets the requirements of section 203 (b) of the Act, immediately notify the District Manager of the Coal Mine Health and Safety District in which the mine is located, in writing, that he has complied with § 90.31. This notice shall include the name and Social Security number of the miner who has exercised his option of transfer; the name and identification number of the mine; the section identification number; where applicable, the date of transfer, the position from which such miner was transferred, and the position to which such miner was transferred; and, where applicable, certification by the operator that such miner is already working in a position where the concentration of respirable dust in the mine atmosphere meets the requirements of section 203 (b) of the Act.

(b) Upon receipt of certification by the operator that a miner is already working in a position where the concentration of respirable dust in the mine atmosphere meets the requirements of section 203 (b) of the Act, the District Manager shall officially confirm such certification by reference to Bureau of Mines dust sampling data, and shall notify the miner, by letter, that the operator need not transfer him to another position. However if Bureau of Mines dust sampling data subsequently shows that the miner is working in a position where the concentration of respirable dust is in excess of the levels prescribed by section 203 (b) of the Act, then the District Manager shall notify the operator and the miner that such miner must be transferred in accordance with this part.

§ 90.34 Compensation of transferred miner.

Any miner transferred in accordance with the provisions of this Part 90 shall receive compensation for his work at not less than the regular rate of pay received by him immediately prior to his transfer.

Subpart E—Enforcement of Miner's Option of Transfer by Bureau of Mines

§ 90.40 Enforcement of option of transfer; notices and orders.

(a) If the notification prescribed in § 90.33 is not received from the operator within the time required by § 90.32, the District Manager

of the Coal Mine Health and Safety District where the mine is located shall make or cause to be made an inspection and investigation to determine whether or not the transfer of the miner has been accomplished and whether there is compliance with section 203 of the Act.

(b) If the inspection and investigation shows noncompliance with section 203 of the Act, the District Manager shall make or cause to be made appropriate findings, notices, and orders under section 104 of the Act. In no case shall a reasonable time for abatement of a violation of more than 30 days from the date of the notice of violation.

FIGURE 1

EXERCISE OF OPTION TO TRANSFER

Chief Health Division,
Coal Mine Health and Safety,
Bureau of Mines,
Department of the Interior,
Washington, D.C. 20240.

I have been notified by the Bureau of Mines that I am eligible, under the provisions of the Federal Coal Mine Health and Safety Act of 1969, to transfer to an area of the mine as is required by section 203(b) of the Act, if I am not already working in such an area.

I elect to exercise my option to transfer.

.....
(Signature of miner)
.....
(Date signed)

Name and Address of Miner.

LETTER FROM DISTRICT MANAGER TO MINER ELECTING HIS OPTION OF TRANSFER, BUT WHO IS ALREADY WORKING IN A POSITION WHERE THE RESPIRABLE DUST IN THE MINE ATMOSPHERE MEETS THE REQUIREMENTS OF SECTION 203(B) OF THE ACT.

Although you were previously notified by the Director, Bureau of Mines that, in accordance

with section 203(b) of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173), you were eligible for transfer to an area of the mine where the concentration of respirable dust is not more than 2.0 milligrams per cubic meter of air, if you were not already working in such an environment, review of our records has confirmed that you are already working in such an environment. Consequently, your employer need not transfer you from your present position at this time. However you may apply for Black Lung Benefits (title V of the Act) at the nearest Social Security Office; and if official records subsequently show that you are working in an area of the mine where the concentration of respirable dust is more than 2.0 milligrams per cubic meter of air, then you and your employer will be notified that you must be transferred as required by law.

*Coal Mine Health and Safety,
District Manager.*

LETTER TO MINE OPERATOR (COPY TO MINER) FROM DISTRICT MANAGER WHEN SUBSEQUENT DUST SAMPLING DATA SHOWS MINER IS WORKING IN A POSITION WHERE RESPIRABLE DUST IN MINE ATMOSPHERE EXCEEDS LEVELS PRESCRIBED BY SECTION 203(B).

Miner:.....
Soc. Sec. #:.....

DEAR OPERATOR: Records of the Bureau of Mines show that the above named miner is presently working in a position where the concentration of respirable dust is in excess of the levels prescribed by section 203(b) of the Federal Coal Mine Health and Safety Act of 1969 (Public Law 91-173). Therefore you must transfer this miner to a less dusty area of the mine as required by Part 90, Subchapter O, Chapter I, Code of Federal Regulations.

*Coal Mine Health and Safety,
District Manager.*

[FR Doc. 71-15574 Filed 10-26-71; 8:51 am]

X-RAY EXAMINATIONS, EXTENSION OF TIME

Federal Register, December 3, 1971, Notices

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of the Secretary

COAL MINE HEALTH

Extension of Time for Submission of X-rays Taken Under Approved Mine Operator Plans

Amendments to Part 37 of Title 42, Code of Federal Regulations, relating to specifications for chest X-ray examinations of underground coal miners, were published in the **FEDERAL REGISTER** on September 2, 1971 (36 F.R. 17577). In connection with the publication, it was stated, that to permit operators to fulfill their responsibilities in the initial round of medical examinations, the Department would continue to accept X-rays taken under approved plans until November 1, 1971.

Since during a work stoppage in the coal

mining industry, which began on October 1 and ended officially on November 15, 1971, it was not possible for many operators to afford miners an adequate opportunity to have a chest roentgenogram, the period during which the Department will continue to accept X-rays taken under approved plans is hereby extended for a period equal to that of the work stoppage.

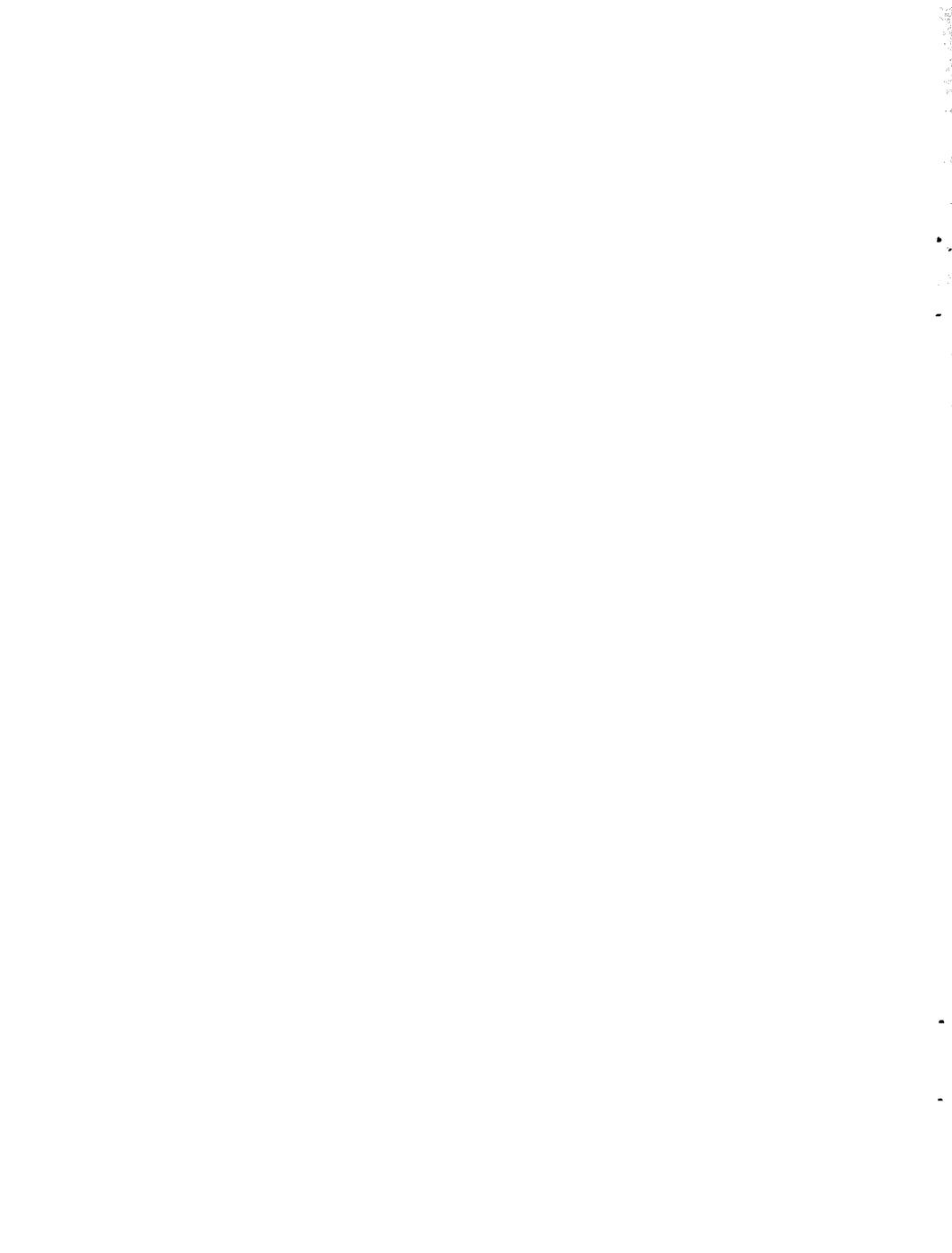
Accordingly, notice is hereby given that to permit operators to fulfill their responsibilities in the initial round of medical examinations, the Department will continue to accept X-rays taken under approved plans until December 30, 1971.

Dated: November 30, 1971.

MARCUS M. KEY,

*Director, National Institute for
Occupational Safety and Health.*

[FR Doc. 71-17702 Filed 12-2-71; 8:51 am]



APPROVAL OF COAL MINE DUST PERSONAL SAMPLER UNITS

Federal Register, December 29, 1971, Notices 1

DEPARTMENT OF THE INTERIOR

Bureau of Mines

[30 CFR Part 74]

APPROVAL OF COAL MINE DUST PERSONAL SAMPLER UNITS

Notice of Proposed Rule Making

Section 202(a) of the Federal Coal Mine Health and Safety Act of 1969 (30 U.S.C. 842(a)) provides that the dust samples required from underground coal mine operators shall be taken only by a device approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare. On March 11, 1970, regulations for the approval of coal mine dust personal sampler units were issued by the Secretaries as Part 74 of Title 30, Code of Federal Regulations (35 F.R. 4326).

Notice is hereby given that it is proposed to amend Part 74 to permit the interchange of the assemblies which comprise a complete sampler unit. Interchangeability would permit greater flexibility in sampling instrumentation.

To reduce the effect of irregularity in flow rate due to pulsation so as to provide measurements of respirable dust consistent with those obtained with an MRE instrument, it is also proposed to amend § 74.3(a) (8) to require that the quantity of dust collected by a sampler unit shall be within ± 5 percent of that collected with a sampling head assembly operated with nonpulsating flow. This amendment would provide a period of 1 year from its effective date for manufacturers of approved units to comply with the new specification. Certificates of approval for sampler units which do not comply with this requirement would be revoked 1 year from the effective date of the amendment with the result that units which do not conform to this new specification, including those previously used by operators, would no longer be approved for taking respirable dust samples. The proposed amendments would not prohibit manufacturers from obtaining approval of sampler

units which meet the new specification prior to the expiration of the 1 year period for compliance.

Inquiries may be addressed and data, views, and arguments concerning the proposed amendments may be submitted in writing to the Director, Bureau of Mines, Washington, D.C. 20240. All material received within 45 days following publication of this notice in the FEDERAL REGISTER will be considered.

Dated: December 20, 1971.

ROGERS C. B. MORTON,
Secretary of the Interior.

Dated: November 30, 1971.

ELLIOT L. RICHARDSON,
*Secretary of Health,
Education, and Welfare.*

1. Sections 74.1 and 74.2 would be revised to read as follows:

§ 74.1 Purpose.

The regulations in this part set forth the requirements for approval of coal mine dust personal sampler units and assemblies thereof, which are designed to determine the concentrations of respirable dust in coal mine atmospheres; procedures for applying for such approval; test procedures; and labeling.

§ 74.2 Definitions.

As used in this part:

(a) "Sampler unit" means a coal mine dust personal sampler unit which consists of (1) a pump unit, (2) a sampling head assembly, and (3) if rechargeable batteries are used in the pump unit, a battery charger.

(b) "Assembly" means a pump unit, a sampling head assembly or a battery charger.

2. In § 74.3, the section heading would be changed to read "Specifications" and paragraph (a) (8) would be revised as follows:

§ 74.3 Specifications.

(a) * * *

(1) * * *

(8) *Pulsation* (i) The irregularity in flow

rate due to pulsation shall have a fundamental frequency of not less than 20 Hz.

(ii) Effective (insert date 1 year from effective date) the quantity of respirable dust collected with a sampler unit shall be within ± 5 percent of that collected with a sampling head assembly operated with nonpulsating flow.

(iii) Certificates of approval issued for sampler units which fail to comply with the specification set forth in § 74.3(a)(8)(ii) when such specification becomes effective, shall be revoked.

* * * * *

3. Section 74.4 through § 74.11 would be revised to read as follows:

§ 74.4 Tests of sampler units and assemblies.

(a) Except as provided in paragraph (b) of this section, the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, will conduct tests to determine whether a coal mine dust personal sampler unit or assembly thereof which is submitted for approval under these regulations meets the applicable requirements set forth in § 74.3.

(b) The Bureau of Mines, Department of the Interior, will conduct tests, pursuant to § 18.68 of this chapter, to determine whether the pump unit of a coal mine dust personal sampler unit submitted for approval under these regulations is intrinsically safe.

§ 74.5 Conduct of tests; demonstrations.

Prior to the issuance of a certificate of approval, only personnel of the Bureau of Mines and the National Institute for Occupational Safety and Health, representatives of the applicant, and such other persons as may be mutually agreed upon may observe the tests conducted. The Bureau of Mines and the National Institute for Occupational Safety and Health shall hold as confidential, and shall not disclose, principles of patentable features prior to certification, nor shall the Bureau or the Institute disclose any details of the applicant's drawings or specifications or other related material prior to such certification. After the issuance of a certificate of approval, the Bureau of Mines or the National Institute for Occupa-

tional Safety and Health may conduct such public demonstrations and tests of the approved coal mine dust personal sampler unit or assembly thereof as either deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the sole direction of the National Institute for Occupational Safety and Health and the Bureau of Mines and any other persons shall be present only as observers.

§ 74.6 Applications.

(a) *Complete sampler units.* Testing of a coal mine dust personal sampler unit will be undertaken by the National Institute for Occupational Safety and Health, and testing of the pump unit of such a sampler unit will be undertaken by the Bureau of Mines, only pursuant to a written application in duplicate, each copy accompanied by complete scale drawings, specifications and description of materials. An application to the Bureau of Mines must be accompanied by a check, bank draft, or money order in the amount of \$105, payable to the U.S. Bureau of Mines, to cover the fee specified in § 18.7 of this chapter. The applications, together with the drawings and specifications and any other related documents shall be sent to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, 1014 Broadway, Cincinnati, OH 45202, and to the Bureau of Mines, Department of the Interior, 4800 Forbes Avenue, Pittsburgh, PA 15213.

(1) Ten complete coal mine dust personal sampler units shall be sent to the National Institute for Occupational Safety and Health in connection with an application. One pump unit must be sent to the Bureau of Mines in connection with an application.

(2) Drawings and specifications shall be adequate in number and fully detailed to identify the design of the coal mine dust personal sampler unit or pump unit thereof and to disclose the dimensions and materials of all component parts.

(b) *Assemblies.* Testing of an assembly will be undertaken by the National Institute for Occupational Safety and Health, only pursuant to a written application in duplicate, each copy

accompanied by complete scale drawings, specifications and description of materials. The applications, together with the drawings and specifications and any other related documents shall be sent to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, 1014 Broadway, Cincinnati, OH 45202.

(1) Ten complete sampler units shall be sent to the National Institute for Occupational Safety and Health in connection with an application.

(2) Drawings and specifications shall be adequate in number and fully detailed to identify the design of the assembly and to disclose the dimensions and materials of all component parts.

(3) The application shall specify all other approved assemblies of the sampler unit with which the assembly under consideration is designed to operate.

(4) Where approval of a pump unit is sought, application shall also be made to the Bureau of Mines, in duplicate, accompanied by a check, bank draft, or money order in the amount of \$105 payable to the U.S. Bureau of Mines. One pump unit shall be sent to the Bureau of Mines, Department of the Interior, 4800 Forbes Avenue, Pittsburgh, PA 15213, together with drawings and specifications adequate in number and fully detailed to identify the design of the pump unit and to disclose the dimensions and materials of all component parts.

(c) *Quality control.* Every application for approval of a sampler unit or assembly shall describe the manner in which each lot of component parts shall be tested to maintain the quality of each sampler unit or assembly. To ensure that the quality of the sampler unit or assembly will be maintained in production through adequate quality control procedures, the National Institute for Occupational Safety and Health and the Bureau of Mines reserve the right to have their qualified personnel inspect each applicant's control-test equipment procedures, and records and to interview the applicant's employees. Two copies of the results of any tests made by the applicant of the

sampler unit or assembly thereof shall accompany an application.

§ 74.7 Certificate of approval.

(a) Upon completion of the testing of a sampler unit or assembly thereof, the National Institute for Occupational Safety and Health or the Bureau of Mines, as appropriate, shall issue to the applicant either a certificate of approval or a written notice of disapproval, as the case may require. The National Institute for Occupational Safety and Health shall not issue a certificate of approval for a sampler unit or assembly unless the Bureau of Mines has issued a certificate of approval for the pump unit thereof. No informal notification of approval will be issued. If a certificate of approval is issued, no test data or detailed results of tests will accompany such approval. If a notice of disapproval is issued, it will be accompanied by details of the defects, resulting in disapproval, with a view to possible correction.

(b) A certificate of approval will be accompanied by a list of the drawings and specifications, covering the details of design and construction of the personal sampler unit or assembly thereof upon which the certificate of approval is based. The applicant shall keep exact duplicates of the drawings and specifications submitted to the National Institute for Occupational Safety and Health and to the Bureau of Mines relating to the sampler unit or assembly thereof which has received a certificate of approval. The approved drawings and specifications shall be adhered to exactly in the commercial production of the certified sampler unit or component. In addition, the applicant shall observe such procedures for, and keep such records of, the control of component parts as either the Institute or Bureau may in writing require as a condition of certification.

§ 74.8 Approval labels.

(a) Certificates of approval will be accompanied by photographs of designs for the approval labels to be affixed to each assembly.

(b) The labels showing approval by the National Institute for Occupational Safety and Health and by the Bureau of Mines shall contain such information as the Institute or Bureau may require and shall be reproduced

APPROVAL OF PERSONAL SAMPLER UNITS—Continued

legibly on the outside of each assembly as directed by the Institute or Bureau as appropriate.

(c) The applicant shall submit full-scale designs or reproductions of approval labels and a sketch or description of the position of the labels on each assembly.

(d) The certificate of approval and the approval label shall specifically set forth any restrictions or limitations on the use of the sampler unit or assembly and such other information as the Institute or the Bureau may require.

(e) Use of an approval label obligates the applicant to whom the certificate of approval was issued to maintain the quality of the sampler unit or assembly, as applicable, and to guarantee that such unit or assembly is manufactured or assembled according to the drawings and specifications upon which the certificates of approval were based. Use of the approval labels is authorized only on sampler units or assemblies thereof which conform strictly with the drawings and specifications upon which the certificates of approval were based.

§ 74.9 Material required for record.

(a) As part of the permanent record of the investigation, the National Institute for Occupational Safety and Health will retain a complete coal mine dust personal sampler unit, and the Bureau of Mines will retain a pump unit, that has been tested and certified. Material not required for record purposes will be returned to the applicant at his request and at his expense on written shipping instructions to the Institute or the Bureau.

(b) As soon as a sampler unit or assembly is commercially available, the applicant shall deliver a complete unit, free of charge to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, 1014 Broadway, Cincinnati, OH 45202.

§ 74.10 Changes after certification.

(a) Except as provided in paragraph (b) of this section, if the applicant desires to change any feature of a certified sampler unit or assembly, he shall first obtain the approval of the National Institute for Occupational Safety and Health pursuant to the following procedures:

(1) Application shall be made as for an original certificate of approval, requesting that the existing certification be extended to encompass the proposed change. The application shall be accompanied by drawings, specifications and related material, as in the case of an original application.

(2) The application and accompanying material will be examined by the National Institute for Occupational Safety and Health to determine whether testing of the modified sampler unit or assembly will be required. Testing will be necessary if there is a possibility that the modification may affect the performance of the sampler unit adversely. The National Institute for Occupational Safety and Health will inform the applicant whether such testing is required.

(3) If the proposed modification meets the pertinent requirements of these regulations, a formal extension of certification will be issued, accompanied by a list of new and revised drawings and specifications to be added to those already on file as the basis for the extension of certification.

(b) If a change is proposed in a pump unit, the approval of the Bureau of Mines with respect to intrinsic safety shall be obtained in accordance with the procedures set forth in this part.

§ 74.11 Withdrawal of certification.

Any certificate of approval issued under the regulations in this part may be revoked for cause by the Institute or the Bureau which issued the certificate.

[FR Doc. 71-18855 Filed 12-28-71; 8:49 am]

Appendix F.—COAL MINE HEALTH RESEARCH GRANTS

Grant number	Name, institution, project title	Project period	FY 1971 support ¹
EC 00221-05	Robert G. Burrell, West Virginia University, Morgantown, W. Va., "Immunological Study of the Pneumoconioses."	9/1/70-2/28/71	None ²
OH 00318-10	Roy E. Albert, New York Medical Center, New York, N. Y., "Pulmonary Deposition and Clearance of Dust."	5/1/69-4/30/72	\$90,576
OH 00333-02	Paul Gross, Industrial Health Foundation, Pittsburgh, Pa., "Biologic Activity of Lipid-Coated Quartz Dust."	11/1/70-10/31/71	16,214
OH 00334-03	Juraj Ferin, University of Rochester, Rochester, N. Y., "Influence of Airborne Factors on Lung Clearance."	9/1/69-8/31/72	67,401
OH 00336-01	Edward A. Boettner, University of Michigan, Ann Arbor, Mich., "Analysis of Quartz and Other Minerals in Dusts by DTA."	6/1/70-2/29/72	None ²
OH 00342-02	Morris Pollard, University of Notre Dame, Notre Dame, Ind., "Effects of Environmental Pollutants in Rodents."	6/1/71-5/31/74	21,776
EC 00509-01	Irving R. Tabershaw, University of California, Berkeley, Calif., "Symposium on Medicine and P.L. 91-173."	4/1/70-3/31/71	None ²
OH 00355-01	Harold G. Petering, University of Cincinnati, Cincinnati, Ohio, "Interaction of Coal Dust With Essential Metals."	6/1/71-5/31/75	55,232
OH 00356-01	Robert T. Christian, University of Cincinnati, Cincinnati, Ohio, "Cellular Response to Coal Mine Dust in Vitro."	6/1/71-5/31/72	33,896
OH 00357-01	Emil A. Pfitzer, University of Cincinnati, Cincinnati, Ohio, "Fate of Inhaled Coal Dust."	6/1/71-5/31/74	53,204

¹ No FY 1972 funds were used in calendar year 1971 to support coal mine health research grants.

² Supported by FY 1970 funds.

Appendix F.—COAL MINE HEALTH RESEARCH GRANTS—Continued

Grant number	Name, institution, project title	Project period	FY 1971 support ¹
OH 00358-01	Gary Warren Davis, Ohio State University, Columbus, Ohio, "Pathophysiology of Coal Pneumoconiosis in Equidae."	6/1/71-5/31/73	\$103,905
OH 00360-01	Robert Burrell, West Virginia University, Morgantown, W. Va., "Immune Injury in Occupational Respiratory Disease."	6/1/71-5/31/74	30,195
OH 00361-01	Irving J. Selikoff, The New York Academy of Sciences, New York, N.Y., "Conference on Coal Workers' Pneumoconiosis."	6/1/71-5/31/72	36,604

¹No F4 1972 funds were used in calendar year 1971 to support coal mine health research grants.

Appendix G.—COAL MINE HEALTH RESEARCH CONTRACTS

Number, title, project officer	Contractor, project director	Funds to date	Contract period
PH-86-67-245, Agreement with United Mine Workers of America, Dr. W. Keith Morgan.	United Mine Workers of America, Washington, D.C., Dr. Lorin Kerr.	\$ 31,000.00	6/20/67-12/31/72
Description: Provide transportation between ALFORD and the residences of the individuals who were selected for participation in the clinical research and testing procedures. Also provide per diem living expenses for the period such individual is traveling and participating in such testing procedures.			
PH-86-67-250, Reimburse the West Virginia University Medical Center Hospital for certain ancillary services, Dr. W. Keith Morgan.	West Virginia University Medical Center, Morgantown, W. Va. Dr. Edmond Flink.	25,528.00	3/13/68-6/25/72
Description: Furnish all labor, facilities, equipment, materials supplies and service necessary to perform several services such as blood tests and urinalysis for a maximum of 200 bituminous coal miner patients.			
CPE-70-127, Coal mine dust respiratory protective devices, Alan Gudeman.	Eastern Assoc. Coal Corp., Everett, Mass., H. E. Harris.	153,315.00	6/29/70-6/29/72
Description: Perform surveys to determine present coal mine respirator use and trends based on a statistically adequate survey of coal mines which will yield accurate estimates and make recommendations based on these surveys.			
CPE-70-128, Coal mine dust mass distribution, Jeremiah R. Lynch.	New York University Medical Center, New York, N. Y., Morton Lippmann.	29,708.00	6/15/70-6/14/72

Description: Develop and test in laboratory experiments, an instrument for accurate measurement of the mass distribution of coal mine dust. Two complete instruments together with drawings and specifications will be furnished by the contractor.

Appendix G.—COAL MINE HEALTH RESEARCH CONTRACTS—Continued

Number, title, project officer	Contractor, project director	Funds to date	Contract period
CPE R-70-0035, Standardization conference for pneumoconiosis in miners, Dr. William S. Lainhart.	American College of Radiology, Chevy Chase, Md., Otha Linton.	\$574,121.00	7/1/70-6/30/72
Description: Develop and conduct a combined standardization and training conference to be voluntarily attended by physicians who are primarily interested or involved in the taking and interpretation of chest roentgenograms for pneumoconiosis in coal miners. Other training conferences are also required.			
CPE R-70-0036, Evaluation of a coal mine dust personal sampler performance, Jeremiah R. Lynch.	University of Minnesota, Minneapolis, Minn., Dr. K. J. Caplan.	101,619.00	6/25/70-9/24/72
Description: Furnish data on the effect of mass loading, particle charge, cyclone orientation and air flow pulsation on the performance of coal mine dust personal samplers.			
CPE R-70-0041, Lung samples and histories from human subjects whose diseases were not related to inhalation of industrial vapors or dusts, John V. Crable.	University of Cincinnati College of Medicine, Cincinnati, Ohio, Dr. Ralph E. Yodaiken.	21,272.00	9/1/70-11/30/71
Description: Furnish all personnel, facilities and materials necessary to supply lungs from human subjects whose diseases were not related to the inhalation of industrial vapors or dusts.			
CPE R-70-0050, Data system development for coal medical examination program, Earle Shoub.	West Virginia University Center, Morgantown, W. Va., Wayne E. Muth.	614,453.00	6/22/70-6/21/72
Description: Provide computer program documentation and Computer Center personnel and training for implementation of P.L. 91-173 examination program at ALFORD.			

CPE R-70-0055, Reading and interpreting chest X-rays for detection of pneumoconiosis—B & C readings, Earle Shoub.	Dr. Benjamin Felson, Cincinnati, Ohio.	173,400.00	6/26/70-6/30/72
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Description: Furnish all labor, equipment and materials necessary to provide professional and administrative services necessary to process, read and classify 14- by 17-inch roentgenograms for the detection of pneumoconiosis.

CPE R-70-0056, Reading and interpreting chest roentgeno- grams for the detection of pneumoconiosis —B & C readings, Earle Shoub.	Dr. Leonard J. Bristol, Saranac Lake, N. Y.	120,000.00	6/24/70-6/30/72
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Description: Furnish all labor, equipment and materials necessary to provide professional and administrative services necessary to process, read and classify 14- by 17-inch roentgenograms for the detection of pneumoconiosis.

CPE R-70-0057, Reading and interpreting chest roentgeno- grams for the detection of pneumoconiosis —B & C readings, Earle Shoub.	Professional Staff Asoc. of the LAC/USC Medical Center, Los Angeles, Calif., Dr. George Jacobson.	85,000.00	6/30/70-6/30/72
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Description: Furnish all labor, equipment and materials necessary to provide professional and administrative services necessary to process, read and classify 14- by 17-inch roentgenograms for the detection of pneumoconiosis.

CPE R-70-552, Giving, reading, classifying and submitting chest X-rays—Pennsylvania, Earle Shoub.	Pennsylvania Dept. of Health, Harrisburg, Pa.	108,000.00	6/30/70-6/30/72
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Description: Provide chest roentgenograms of those miners which are determined to be within the purview of the law and required.

CPE R-70-553, Giving, reading, classifying and submitting chest X-rays—Illinois, Earle Shoub.	Northwest Industrial Medical Clinic, Inc., Seattle, Wash., Dr. J. Sealey.	45,100.00	6/30/70-6/30/72
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Description: Provide chest roentgenograms of those miners which are determined to be within the purview of the law and required.

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81 **Appendix G.—COAL MINE HEALTH RESEARCH CONTRACTS—Continued**

Number, title, project officer	Contractor, project director	Funds to date	Contract period
CPE R-70-554, Giving, reading, classifying and submitting chest X-rays—Colorado, Earle Shoub.	Northwest Industrial Medical Clinic, Inc., Seattle, Wash., Dr. J. Sealey.	\$17,000.00	5/30/70-6/30/72
Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.			
CPE R-70-555, Giving, reading, classifying and submitting chest X-rays—Utah, Earle Shoub.	Northwest Industrial Medical Clinic, Inc., Seattle, Wash., Dr. J. Sealey.	21,650.00	6/30/70-6/30/72
Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.			
CPE R-70-560, Giving, reading, classifying and submitting chest X-rays—West Virginia, Earle Shoub.	Medical Planning & Mgmt. Corp., Sewickley, Pa.	334,650.00	6/30/70-6/30/72
Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.			
CPE R-70-561, Giving, reading, classifying and submitting chest X-rays—Kentucky, Earle Shoub.	Medical Planning & Mgmt. Corp., Sewickley, Pa., Dr. Ben Lambiotte.	241,530.00	6/30/70-6/30/72
Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.			
CPE R-70-562, Giving, reading, classifying and submitting chest X-rays—Alabama, Earle Shoub.	Northwest Industrial Medical Clinic, Inc., Seattle, Wash.	45,218.00	6/30/70-6/30/72
Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.			

ACEH-71-004, Giving, reading, classifying chest X-rays for coal miners, Earle Shoub.	Northwest Industrial Medical Clinic, Inc., Seattle, Wash., Dr. J. I. Sealey.	\$ 15,500.00	6/1/71-6/30/72
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Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.

EHS R-71-0001, Immunological aspects of experimental pneumoconiosis, William D. Wagner.	West Virginia University, Morgantown, W. Va., Dr. Robert Burrell.	47,489.00	1/5/71-1/4/74
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Description: Provide information from experimental animals as to the time of onset of lung-reactive antibodies during exposure to coal dust. This data will then be correlated with the onset of pathology as evidenced from pulmonary function and autopsy data.

EHS C-71-104, Literature search and bibliographic study on coal tar pitch volatiles, John Crable.	Franklin Institute, Philadelphia, Pa.	29,666.00	1/2/70-1/3/72
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Description: Provide a complete annotated bibliography of existing and future publications pertinent to the development of criteria for a standard for safe occupational exposure to coal tar pitch volatiles.

EHS R-71-521, Giving, reading, classifying X-rays—Ohio, Tennessee, Virginia, Earle Shoub.	Medical Planning & Mgt. Corp., Sewickley, Pa., Dr. Ben Lambiotte.	60,218.00	2/8/71-6/30/72
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Description: Provide chest roentgenograms under the medical examination program of the Coal Mine Health and Safety Act.

BOSH-099-71-1, Development of an index for carcinogenic hazard to man of coal tar pitch volatiles, John V. Crable.	University of Cincinnati, Cincinnati, Ohio.	25,000.00	6/1/71-5/31/72
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Description: Design and acquire detailed information on the photophysical properties of carcinogenic polynuclear hydrocarbons and their heterocyclic analogues. Will provide for the development and evaluation of an electronic emission spectral index which can be related to the carcinogenic hazard of the respirable portion of coal tar pitch volatiles.

Number, title, project officer	Contractor, project director	Funds to date	Contract period
BOSH-099-71-003, Granite workers health study, Howard Ayer.	Harvard School of Public Health, Cambridge, Mass., John Peters.	\$77,436.00	3/4/71-3/3/72
Description: Perform supplemental physiologic and radiologic measurements of granite workers, estimate group dust exposures by environmental measurements and plant history, relate medical findings to dust exposure and from this data estimate a safe level of exposure to granite dust.			
BOSH-099-71-004, Pilot plant study of factors affecting polynuclear aromatic hydrocarbon emission from coke ovens, Jeremiah Lynch.	Eastern Assoc. Coal, Everett, Mass.	30,023.00	6/3/71-3/2/72
Description: Reveal the effect of oil additives, coal blend, coking time and phase of coking on the generation and emission of polynuclear aromatic hydrocarbons.			
HSM-99-71-005, Design of protective knee pads for mine workers, Francis J. LaPallo.	Century Research Corporation, Arlington, Va., Robert Sleight.	23,986.00	6/7/71-1/6/72
Description: Determine the design requirements for protective knee devices to be used in mine situations where the workmen must work and crawl on their knees.			
HSM-99-71-007, Evaluation of sampling procedures and analytical methods for coal tar pitch, John V. Crable.	Union Carbide Corporation, Cleveland, Ohio, Dr. P. D. Coulter.	190,000.00	6/30/71-6/29/72
Description: Provide a means for evaluating abilities and efficiencies of sampling procedures and analytical methods in determining the potential hazards associated with coking and roofing operations.			

<p>HSM-99-71-013, Computer services University of West Virginia, Robert Reger.</p>	<p>West Virginia University, Morgantown, W. Va., Wayne Muth.</p>	<p>\$ 5,500.00</p>	<p>6/15/71-2/14/72</p>
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Description: Provide computer service to NIOSH at the Computer Center of West Virginia University, Morgantown, W. Va.

<p>HSM-99-71-014, Foam systems for suppressing respirable coal mine dust, Francis J. LaPallo.</p>	<p>MSA Research, Evans City, Pa., Ralph Hiitz.</p>	<p>105,033.00</p>	<p>6/30/71-6/29/72</p>
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Description: Investigate the feasibility of using high expansion surfacant foam to contain or suppress the respirable dust generated by the mining machine at the coal face.

<p>HSM-99-71-015, Histologic evaluation of animal tissue, Dr. D. H. Groth.</p>	<p>Pathology Services Assoc., Belmont, Calif., D. P. Sasmore.</p>	<p>6,936.00</p>	<p>6/30/71-3/29/72</p>
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Description: Animal tissue will be examined microscopically by board-certified veterinarians or human pathologists and the results will be reported in a semi-quantitative manner, thus allowing a comparison between control and exposed animals and between animals exposed to different doses of the same compound.

<p>HSM-99-71-016, Rehabilitation of coal miners with respiratory disability, Dr. Marilyn K. Hutchison.</p>	<p>Monongahela Valley Assoc. of Health Centers, Inc., Fairmont, W. Va., Dr. J. Temple.</p>	<p>85,214.32</p>	<p>6/30/71-12/29/72</p>
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Description: Appraise the effectiveness of medical and physical rehabilitation for coal miners with respiratory disability through the establishment of treatment plans for three study groups of patients with symptoms of disabling respiratory diseases.

<p>HSM-99-71-018, Factors affecting removal of dust from lungs, William Wagner.</p>	<p>University of Cincinnati College of Medicine, Cincinnati, Ohio, Dr. Eula-Mattheis.</p>	<p>\$7,968.00</p>	<p>6/29/71-6/28/72</p>
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Description: Determine the number and functional integrity of alveolar macrophages in rats exposed to certain dusts of coal. Also,

Appendix G.—COAL MINE HEALTH RESEARCH CONTRACTS—Continued

Number, title, project officer	Contractor, project director	Funds to date	Contract period
correlate alterations in number and function with physical and chemical characteristics of the selected samples of dust and biological availability of certain constituents of the dust. Finally, evaluate the influence of age on the disposition of a load of dust by the rat.			
HSM-99-71-022, Follow-up study of three coal mining communities in W. Va., Earle Shoub.	University of Michigan, Ann Arbor, Mich., Dr. I. T. T. Higgins.	\$620,281.00	6/30/71-6/29/74
Description: Follow-up the people who were studied approximately 6 years ago in Mullens and Richwood, W. Va., by the USPHS and in Marion County, W. Va., by Dr. I. T. T. Higgins. Mortality as well as prevalence, incidence, progression, and remission of chronic respiratory diseases will be studied.			
HSM-99-71-025, Lung samples from deceased coal miners, John V. Crable.	Pennsylvania State University, Pathology Department, Hershey, Pa., Richard Naeye.	44,000.00	6/30/71-6/29/73
Description: Determine the correlations among a coal miner's exposure to dust, the cause of his death, his lung pathology, and the concentrations of the various constituents found in his lung.			
HSM-99-71-027, Neutron activation and analysis, John R. Carlberg and Dr. David H. Groth.	Washington State University, Pullman, Wash., R. H. Filby.	14,000.00	6/30/71-3/31/72
Description: Analyze human lung tissue for 21 elements which, for technical reason, have been indeterminable by conventional methods. Also analyze human lung tissue for seven of the elements routinely determined. These results will serve as a check for the accuracy of present procedures and will indicate the possibilities of loss or contamination arising in samples preparation procedures.			
HSM-99-71-034, Follow-up of coal miners with positive X-rays, Ruth Reifschneider, R.N.	American College of Radiology, Chevy Chase, Md., Dr. Paul Jones.	47,587.00	6/30/71-6/29/72

Description: Intended as a means whereby the PHS can determine whether the miner is, in fact, following through on the recommendation made to him to seek medical advice for a non-pneumoconiotic chest problem revealed in the chest X-ray.

HSM-99-71-035, Coal handlers study, N. LeRoy Lapp and Jeremiah Lynch.	Commonwealth of Pennsylvania, Harrisburg, Pa., E. J. Baier.	\$168,758.00	6/30/71-6/29/73
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Description: Develop information on the exposure of coal handlers to coal dust and to quartz and medically evaluate these workers for signs of pneumoconiosis.

HSM-99-71-038, Development of improved head protective device for coal miners, Steven F. Alder.	Synsis, Inc., Los Angeles, Calif., Samuel Tobey.	50,000.00	6/30/71-8/29/72
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Description: Delineate the appropriate principles of head protection in the coal mining environment which will offer substantially better protection for impacts to the front, rear, and sides of the head; determine the design characteristics for a protective safety cap; and provide a prototype device believed to be acceptable to a miner which can alleviate injury and discomfort.

HSM-99-71-042, Development of a prototype air-supplied respirator system for underground coal mining equipment operation, Alan Gudeman.	Synsis, Inc., Los Angeles, Calif.	83,500.00	6/30/71-2/28/73
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Description: Develop a prototype air-supplied respirator system for use by underground coal mining equipment operators, such as mining machine operators, coal cutter operators and shuttle car operators.

HSM-99-71-049, Development of coal mine dust sampler, John Vining.	Bendix Corp., Baltimore, Md., Spiros Vennos.	79,263.00	6/30/71-6/29/72
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Description: Design, fabricate, test and demonstrate a prototype personal gravimetric size-selective coal mine dust and quartz sampling unit of advanced concept, design, construction and performance for use by the mobile underground coal miner.

Appendix G.—COAL MINE HEALTH RESEARCH CONTRACTS—Continued

Number, title, project officer	Contractor, project director	Funds to date	Contract period
HSM-99-71-058, Breathing metabolic simulator, Alan K. Gudeman	IBM Inc., Gaithersburg, Md., Dr. Bartlett.	\$ 34,900.00	6/30/71-4/29/72
Description: Design, fabricate, and deliver a device that will simulate all relevant breathing and metabolic functions of man.			
68-03-0018, Chest X-rays—Pneumoconiosis, Dr. William S. Lainhart	Dr. E. Pendergrass, Wynnewood, Pa.	17,300.00	3/15/71-3/14/72
Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs. (5500 single X-rays and 300 pairs of X-rays).			
68-03-0019, Chest X-rays—Pneumoconiosis, Dr. William S. Lainhart.	Dr. Benjamin Felson, Cincinnati, Ohio.	9,050.00	3/15/71-3/14/72
Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (2500 single X-rays and 300 pairs of X-rays).			
68-03-0020, Chest X-rays—Pneumoconiosis, Dr. William S. Lainhart.	Dr. John Harris, Carlisle, Pa.	4,237.00	3/15/71-3/14/72
Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (750 single X-rays and 300 pairs of X-rays).			
68-03-0021, Chest X-rays—Pneumoconiosis, Dr. William S. Lainhart.	Dr. Stephen Martella, Wilkes-Barre, Pa.	4,237.00	3/15/71-3/14/72

Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (750 single X-rays and 300 pairs of X-rays).

68-03-0022,
Chest X-rays—Pneumoconiosis, Dr. John Dennis, \$ 15,237.00 3/15/71-3/14/72
Dr. William S. Lainhart. Baltimore, Md.

Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (4750 single X-rays and 300 pairs of X-rays).

68-03-0023,
Chest X-rays—Pneumoconiosis, Dr. Leonard Bristol, 9,050.00 3/15/71-3/14/72
Dr. William S. Lainhart. Saranac Lake, N.Y.

Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (2500 single X-rays and 300 pairs of X-rays).

68-03-0024,
Chest X-rays—Pneumoconiosis, Professional Staff Assoc., 17,900.00 3/15/71-3/14/72
Dr. William S. Lainhart. Los Angeles, Calif.

Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (5500 single X-rays and 300 pairs of X-rays).

68-03-0025,
Chest X-rays—Pneumoconiosis, Professional Staff Assoc., 4,837.00 3/15/71-3/14/72
Dr. William S. Lainhart. Los Angeles, Calif.

Description: Provide for the examination of roentgenograms in evaluating chest X-rays of persons who have inhaled and retained airborne particulate matter in their lungs (750 single X-rays and 300 pairs of X-rays).

**Appendix H.—FORMS USED UNDER THE MEDICAL X-RAY
EXAMINATION PROGRAM**

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
 Public Health Service
 Environmental Health Service
 Environmental Control Administration
 Bureau of Occupational Safety and Health

Form Approved
 Budget Bureau No. 05-RO129

Federal Coal Mine Health and Safety Act of 1969
 Medical X-Ray Examination Program
 MINER IDENTIFICATION DOCUMENT

NOTE: Please type or print and send
 this completed form to:

X-Ray Receiving Center
 Environmental Health Service
 ALFORD -- Box 425B
 Morgantown, West Virginia 26595

INFORMATION ON THE MINER	
Social Security Number	Name (Last, First, MI)
Address (Includes city, county, state, ZIP)	
Date of Birth	Age
Title of Present Job	
Total number of years miner has worked in coal mines? _____	
How many years has miner worked in <u>Underground</u> mines? _____	
PRESENT EMPLOYER	
Name of Mining Company	Address of Mining Company
Name of Mine	
Address of Mine (Include City, County, State)	
X-RAY EXAMINATION	
Name of X-Ray Facility	Certification No.
Make & Model & Serial Number of X-Ray Unit Used	Date of X-Ray
<p>RELEASE: I hereby voluntarily agree to participate in the periodic X-Ray Examination Program authorized by the Federal Coal Mine Health and Safety Act of 1969. This examination will include periodic chest X-ray examinations and the above occupational history. I authorize and request that any findings by the Public Health Service be referred to my personal physician:</p>	
Dr.	Address
<p>In addition, I understand that I shall be advised of the findings of this examination, and will be advised of my rights under the Act that relate to these findings.</p>	
Miner's Signature	Date

ASSURANCE OF CONFIDENTIALITY: The U.S. Public Health Service hereby gives assurance that your identity and your relationship to any information obtained by reason of your participation in the Periodic X-Ray Examination Program, will be kept Confidential in accordance with Public Health Service Regulations (42 CFR Part 1).

ECA-108 (Cin)
 (7-70)

Thomas C. Key, M.D.
 Director, Bureau of Occupational Safety and Health

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Form Approved
Budget Bureau No. 05-20136

**Public Health Service
Environmental Health Service
Environmental Control Administration
Bureau of Occupational Safety and Health**

**Federal Coal Mine Health and Safety Act of 1969
Medical X-Ray Examination Program
COAL MINE OPERATOR'S PLAN**

A WORD OF EXPLANATION: Federal specifications resulting from the Coal Mine Health and Safety Act of 1969 (42 CFR Part 37) include a provision whereby Mine Operators shall submit a plan which describes the arrangements they have made to provide chest X-Ray examinations for all miners who desire to participate in this program. This document is provided to help mine operators furnish information that is necessary for the conduct of this program. A supply of Certification Documents is enclosed for X-Ray Facilities, and physicians who will interpret the films. Please forward the appropriate document to each of the facilities and physicians you select. They should complete their form and mail it directly to the address shown on the form. Mine Operators should complete this document and return it to:

Bureau of Occupational Safety and Health ENS
Department of Health, Education, and Welfare
1014 Broadway, Cincinnati, Ohio 45202

Name of Mine Operator		
Address of Mine Operator		Phone No.
List mines to be covered by this plan. (Use other side if necessary) *		
Name of Mine	Mine Address (include County)	
* Please show the number of miners employed at each mine as of Date of Plan		
Describe your plan, including the time schedule under which your miners will receive the Chest X-Ray Examination, the name(s) of facility(ies) and physicians(s) who will be participating at your request, in this program.		

I am participating in this program in the manner specified by Part 37 of the Code of Federal Regulations (42 CFR Part 37) and understand that all information used in connection with this program will be held STRICTLY CONFIDENTIAL and divulged only as specified by the above Regulation.

ECA-113 (C1a)
(7-70)

Signature of Mine Operator or Legal Representative Date

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Environmental Health Service

Environmental Control Administration

Bureau of Occupational Safety and Health

Federal Coal Mine Health and Safety Act of 1969

Medical X-Ray Examination Program

X-RAY FACILITY CERTIFICATION DOCUMENT

Form Approved
Budget Bureau No. 05-R0130

NOTE: Please type or print and send this completed form to:

X-Ray Receiving Center
Environmental Health Service
ALFORD - Box 4250
Morgantown, West Virginia 26505

Facility Name

Facility Address (Street, City, County, State)			Area Code + Phone Number		
TYPE OF FACILITY		1- 24 <input type="checkbox"/> 25- 49 <input type="checkbox"/> 50-99 <input type="checkbox"/> 100-199 <input type="checkbox"/> 200-299 <input type="checkbox"/> 300-up <input type="checkbox"/>		Average number of chest X-rays taken per week.	
Hospital (check number of beds) _____					
Clinic <input type="checkbox"/>					
Private Office <input type="checkbox"/>					
Other (Specify) _____					
X-RAY UNITS TO BE USED IN THIS PROGRAM (If more than 4, use back of this form)					
Unit	Make/Model	Serial No.	Technical Factors ¹	Date of last Calibration	Date of Last Inspection and Actions on Deficiencies (§)37.4)(a)(4)
1.					
2.					
3.					
4.					
X-RAY TECHNOLOGISTS WHO WILL BE PARTICIPATING IN THIS PROGRAM					
Name			Qualifications		
1.					
2.					
3.					
4.					

I agree to participate in this program in the manner specified by Part 37 of the Code of Federal Regulations (42 CFR Part 37), and understand that all information used in connection with this program will be held **STRICTLY CONFIDENTIAL** and divulged only as specified by the above Regulation.

Name of Facility Director

Signature

Date

ECA-114 (C)
(7-70)

¹As written in Specifications - (§)37.20(d)(1,2,3) and (e)(2,3)

FOR OFFICIAL USE ONLY

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Environmental Health Service

Environmental Control Administration

Bureau of Occupational Safety and Health

Form Approved
Budget Bureau No. 05-R0128

**Federal Coal Mine Health and Safety Act of 1969
Medical X-Ray Examination Program
INTERPRETING PHYSICIAN CERTIFICATION DOCUMENT**

NOTE: Please type or print and send
this completed form to:

X-Ray Receiving Center
Environmental Health Service
ALFORD - Box 4258
Morgantown, West Virginia 26505

Social Security Number	Medical License No.	State
Name (Last, First, MI)		Area Code + Phone No.
Office Address (Street, City, County, State, ZIP)		
Years of practice in coal mining areas?	Average number of Chest Films interpreted per week?	
Specialty Training, Boards, etc.		
Select one:	<input type="checkbox"/> I choose to submit six UICC-classified films for review. <input type="checkbox"/> I have taken instruction in the UICC Classification System. <input type="checkbox"/> I intend to take instruction in the UICC Classification System.	
<p>I agree to participate in this program in the manner specified by Part 37 of the Code of Federal Regulations (42 CFR Part 37), and understand that all information used in connection with this program will be held STRICTLY CONFIDENTIAL and divulged only as specified by the above Regulation.</p>		
<hr style="width: 80%; margin: 0 auto;"/> Physician Signature		<hr style="width: 80%; margin: 0 auto;"/> Date

FOR OFFICIAL PROGRAM USE ONLY

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

FORM APPROVED
BUREAU BURET NO. 15-80119

PUBLIC HEALTH SERVICE
ENVIRONMENTAL HEALTH SERVICE
BUREAU OF OCCUPATIONAL SAFETY AND HEALTH
Federal Coal Mine Health and Safety Act of 1969
Medical X-Ray Examination Program
ROENTGENOGRAPHIC INTERPRETATION

NOTE: Please record your interpretation of a single film by placing an "X" in the appropriate boxes on this form and return it promptly to:

X-RAY RECEIVING CENTER
ENVIRONMENTAL HEALTH SERVICE
ALPOND-Bldg. 4358
Martinsburg, West Virginia 26505

Do all writing with No. 2 pencil

WRITE YOUR NUMERALS LIKE THIS

1 2 3 4 5 6 7 8 9 0

MINER'S SOCIAL SECURITY NUMBER

2. DATE OF X-RAY

MO MONTH DA Y YE AR

+ - + U/R

3. FILM QUALITY

YES NO
 1/2 2/3 IF YES, GO TO ITEM 15
 X IF NO, COMPLETE ITEMS 5-14 AS APPLICABLE AND ITEM 15.

4. IS FILM COMPLETELY NEGATIVE?

5. SMALL OPACITIES—ROUNDED

a. TYPE	b. PROFUSION	c. ZONES																				
P Q T	<table border="1"> <tr><td>1/2</td><td>2/6</td><td>3/4</td></tr> <tr><td>1/6</td><td>1/1</td><td>1/2</td></tr> <tr><td>2/1</td><td>2/2</td><td>2/3</td></tr> <tr><td>2/2</td><td>3/3</td><td>3/4</td></tr> </table>	1/2	2/6	3/4	1/6	1/1	1/2	2/1	2/2	2/3	2/2	3/3	3/4	<table border="1"> <tr><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td></tr> <tr><td>X</td><td>X</td></tr> </table>	X	X	X	X	X	X	X	X
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6. SMALL OPACITIES—IRREGULAR

a. TYPE	b. PROFUSION	c. ZONES																				
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2/1	2/2	2/3																				
2/2	3/3	3/4																				
X	X																					
X	X																					
X	X																					
X	X																					
		R L																				

7. LARGE OPACITIES

a. SIZE O A B C

b. TYPE WD ID

8. PLEURAL THICKENING

a. Costophrenic Angle

b. Diffuse

c. Plaques

d. Grade of b/c

R	L
1	2
R	L
0	1 2 3

9. ILL DEFINED DIAPHRAGM

O R L

10. ILL DEFINED CARDIAC OUTLINE

0 1 2 3

11. PLEURAL CALCIFICATION

a. DISTRIBUTION

b. SMALL

c. OTHER SITES

d. GRADE OF a/b/c

R	L
0	1 2 3

12. OTHER SYMBOLS

a. OBLIGATORY

b. OPTIONAL

OTHER (SPECIFY OTHER)

ca	co	cp	es	tbp	od						
ax	bu	cn	cv	di	em	hi	ho	k	px	rl	tb

13. COMMENTS

SEE DOCTOR

YES

SPECIFY REASON. HAS PRIVATE PHYSICIAN BEEN NOTIFIED?

14. OTHER COMMENTS

I UNDERSTAND THAT ALL THE ABOVE INFORMATION WILL BE HELD STRICTLY CONFIDENTIAL AND DISCLOSED ONLY AS APPLICABLE TO PART 31 OF THE CODE OF FEDERAL REGULATIONS (42 CFR).

15. FILM READER'S INITIALS

PHYSICIAN'S SOCIAL SECURITY NUMBER

DATE OF READING

MO MONTH DA Y YE AR

MO MONTH DA Y YE AR

MO MONTH DA Y YE AR

Appendix I.—SELECTED PUBLICATIONS

- Carlberg, John R.; John V. Crable; Leonard P. Limtiaco; Harold B. Norris; John L. Holtz; Patricia Mauer; and F. R. Wolowicz: Total Dust, Coal, Free Silica, and Trace Metal Concentrations in Bituminous Coal Miners' Lung. *American Industrial Hygiene Association Journal*, 32:7, July 1971.
- Cuppett, C. C.; H. Resnick; and W. J. Canady: Physical Evidence for the Existence of at Least Two Salt-Dependent Forms of Alpha-Chymotrypsin at Slightly Acid pH. *Journal of Biological Chemistry*, 246: 1135, 1971.
- Hahon, N.; J. A. Booth; and H. L. Eckert: Anti-IgG Hemagglutination-Inhibition Test for Influenza. *Infection and Immunology*, 4:508, 1971.
- Kenan, Robert G.; John V. Crable; A. W. Smallwood; and John R. Carlberg: Chemical Composition of the Coal Miner's Lung. *American Industrial Hygiene Association Journal*, 32:6, June 1971.
- Key, Marcus M.; L. E. Kerr; and M. Bundy: *Pulmonary Reactions to Coal Dust, A Review of U.S. Experience*, Academic Press, New York, 1971, 215 pp.
- Lapp, N. L.; A. Seaton; K. C. Kaplan; M. R. Hunsaker; and W. K. C. Morgan: Pulmonary Hemodynamics in Symptomatic Coal Miners. *American Review of Respiratory Diseases*, 104:418, 1971.
- Publications from the Appalachian Laboratory for Occupational Respiratory Diseases, 1968-1971*. NIOSH, 1971, 23 pp. (Available from the Public Information Office, Appalachian Center for Occupational Safety and Health, P.O. Box 4256, Morgantown, W. Va. 26505.)
- Resnick, H.; N. L. Lapp; and W. K. C. Morgan: Serum Trypsin Inhibitor Concentrations in Coal Miners with Respiratory Symptoms. *Journal of the American Medical Association*. 215:1101, 1971.
- Resnick, H. and W. K. C. Morgan: Hydroxyproline Excretion in Complicated Pneumoconiosis. *American Review of Respiratory Diseases*, 103:849, 1971.
- Seaton, A.; N. L. Lapp; and C. H. Chang: Lung Perfusion Scanning in Coal Workers' Pneumoconiosis. *American Review of Respiratory Diseases*, 103:338, 1971.