STATEMENT OF

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BEFORE THE

HOUSE COMMITTEE ON EDUCATION AND LABOR

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TESTIMONY - James A. Merchant, M.D., Dr.P.H.

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Mr. Chairman, it is a pleasure to be invited to participate in this hearing dealing with respiratory disease among cotton textile workers. I welcome the interest of Congress in this matter which I believe requires the intervention of the Federal government.

As Director of the Division of Respiratory Disease Studies at the National Institute for Occupational Safety and Health (NIOSH), I am heavily involved in research and surveillance programs dealing with a broad range of occupational health effects. In this hearing, however, I will be drawing on my personal research and clinical experience in examining cotton textile workers and their industry, and previous work with the North Carolina State Board of Health and in advising the North Carolina Industrial Commission. It should be understood that in the following policy comments I do not represent NIOSH, the Department of Health, Education, and Welfare, or the Administration, but rather my own views. I am testifying on my own time as a private citizen.

Before discussing respiratory disease arising from cotton dust exposure, I would like to briefly describe a comprehensive study NIOSH has undertaken together with the Department of Labor at the request of Congress as mandated in Section 112 of the Black Lung Benefits Reform Act of 1977. This Section required that a study of all occupational respiratory and pulmonary diseases be completed by July of 1979. Our portion of this study consists of a detailed description of methods of epidemiological and environmental investigation of occupational respiratory disease, assessment of impairment and disability and a series of chapters on specific categories of occupationally induced respiratory disease:

A. Pneumoconioses.
   - Silicosis
   - Silicate pneumoconiosis - fibrous and nonfibrous
   - Asbestosis
   - Coal workers' pneumoconiosis and pneumoconiosis due to carbon exposure
   - Berylliosis
   - Pulmonary reactions to man-made fibers and miscellaneous pneumoconiosis including "mixed dust" pneumoconiosis.

B. Occupational asthma and rhinitis
C. Hypersensitivity pneumonitis
D. Chronic airways obstruction
   Industrial bronchitis
   Emphysema
   Non-specific airways obstruction
E. Byssinosis
F. Acute effects of inhaled toxic agents:
   Respiratory
   Systemic
F. Neoplasms:
   Nasopharyngeal
   Pulmonary
   Pleural
G. Infectious diseases
H. Heart disease - Cor pulmonale

Twenty experts in occupational respiratory disease research in addition to several of us in NIOSH and CDC are contributing chapters. For each disease the following information will be provided and interpreted:

A. Disease Definition
B. List of causative agents
C. List of occupations and industries involved
D. Estimate of population at risk
E. Pathology
F. Clinical description: Symptoms, signs, natural history, laboratory investigation, treatment and prognosis.

G. Diagnostic criteria

H. Epidemiology:

A detailed discussion of the epidemiology of the disease to include critical comments on the information available regarding the relationship between exposure and disease, other risk factors and progression to respiratory impairment.

I. Methods of prevention

J. Research needs

This report will be published in a book form but also distributed in an abstracted form. The remainder of this testimony will consist of a preview of the byssinosis chapter which I have authored, together with my reviews on the assessment of impaired and disabled workers.

(2)

Byssinosis is the generic name applied to an acute and chronic airways disease which occurs among those who process cotton, flax and hemp fibers. Respiratory disease attributed to these vegetable dust exposures was first described by Ramazzini early in the eighteenth century. Since then extensive research on this disease has been conducted abroad and more recently in the United States.

Today only the processing of cotton remains a major industry, although the processing of flax and hemp still occurs. Production and consumption of cotton products is commercially vital to developed and undeveloped countries alike. Thus, several million workers are exposed to cotton dust worldwide. In the United States, over 300,000 workers are significantly exposed to cotton dust and many more are potentially at risk.* Those exposed work primarily in the textile industry, but also in cotton ginning and warehousing, classing offices, cotton seed oil and delinting mills, bedding and batting manufacturing, and cotton waste utilization.

Today [illegible] estimated 80,000 have byssinosis at at least 35,000 [illegible] permanently disabled.

Although the etiological agents which cause byssinosis have not been chemically defined, it is known that they occur in the plant fragments (bract, leaf and stem) rather than in the cotton lint. Several theories on etiological agents and their mechanisms of action have been put forward. It is now apparent that there are likely several individual etiological agents and a complex series of cellular, pharmacological and physiological events occurring in both the acute and chronic form of the disease.

Early pathological observations described non-specific chronic bronchitis and emphysema which was more severe in those working at dusty jobs. Cor pulmonale or right-sided heart failure secondary to their lung disease was judged the cause of death in several of these cases. More extensive recent studies of lungs of those with byssinosis have found pathological evidence of chronic bronchitis to be the major lesion with evidence of emphysema in a significant proportion.

In life, the effects of cotton dust manifest in two inter-related forms. Early in the course of the disease, only acute dust effects are observed. These consist of a sensation of chest tightness which characteristically occurs on Monday following a weekend away from dust exposure. This tightness, sometimes described as "heaviness" or as a "chest cold", usually begins two or three hours after exposure. Often associated with this chest tightness is a Monday cough and sometimes exertional dyspnea (shortness of breath). Although a good deal of individual variability is recognized, strong group correlations have been found between Monday chest tightness and decreased lung function over the Monday work shift. Those who respond to dust exposure in this fashion are often called "reactors." Depending upon individual susceptability and other risk factors such as smoking, the acute effects of cotton dust exposure may first occur within months or after many years of dust exposure. Individuals with a history of asthma will often experience a severe asthma attack with first exposure to cotton dust. These individuals, therefore, often move out of jobs involving cotton dust exposure. With longer exposure to cotton dust, chest tightness and decreased lung function over the work shift may be observed on other work days. At

this point, lung function away from dust exposure is usually decreased and the disease has entered the chronic stage. Among those severely affected, chest tightness and shortness of breath occurs every work day with relief occuring only on weekends and holidays. Objective measurements of lung function in these individuals often shows a drop in lung function over the work shift of 20% or more. Some workers who will often attempt to continue to work despite marked impairment and disability may be observed to become cyanotic (turn blue). One such man we examined in one of our mill surveys was, I believe, the first worker compensated for byssinosis in this country (out of court settlement).

Epidemiological studies have taught us a great deal about the health effects of cotton dust exposures. Early mortality studies revealed marked excesses in death rates in higher age groups, particularly for bronchitis and pneumonia and particularly among those exposed at dustier jobs. More contemporary studies of cotton textile worker mortality has been difficult because of a lack of work history data on relatively small cohorts (study populations). Moderate but inconsistant increases in respiratory deaths among male preparation area workers and female spinners have been observed. Evidence of self-selection out of mill work by those with poorer health has been noted.

Review of Social Security disability data for textile workers has recently been completed by NIOSH. As previously reported, consistent increased rates of disability claims for respiratory disease, especially among those working in dustier areas, were observed. These results are consistent with those recently reported by Bouhuys. In an important and unique study of a textile mill community, Dr. Bouhuys found that of those retiring before age 65, 18% gave chest symptoms as the primary reason. Significantly higher proportions of textile workers compared to non-textile worker controls were found to be severely impaired ($FEV_1$ < 1.2 liters). Based on this data, Dr. Bouhuys has been able to estimate that there are <u>at least</u> 35,000 men and women, within or retired from the U. S. cotton textile industry, suffering from severe lung impairment associated with their work.

Epidemiological studies of textile workers currently employed have

allowed critical examination of disease prevalence and important risk factors, associations, and interactions. Respirable cotton dust has repeatedly been found to be strongly correlated with byssinosis prevalence and acute changes in lung function on Monday. Based on this data, the U. S. Department of Labor has promulgated a standard setting permissible exposure limits, which would largely eliminate byssinosis in this country. Assessment of duration of exposure to cotton dust has shown that a significant number of workers became symptomatic within the first five years of employment. Cigarette smoking has been consistently found to be a major risk factor which increases the frequency and severity of respiratory symptoms and decreases lung function. There is some evidence that smoking and dust exposure interact to produce greater than additive effects.

Based on this research experience, I believe it is now possible, and necessary, to develop comprehensive standards to compensate those who have developed partial or total disability or died as the result of their employment. The following are my personal views as to important elements of any legislated form of standards:

(1) Occupational exposure to dust (cotton or flax) must be defined and varified through employment records. Although many workers will develop acute and some severe acute reactions to cotton dust within the first five years of employment, it is unlikely that severe impairment would occur over that period. The British have required a time period of five years exposure to define eligibility for compensation.

2. Based on epidemiological and clinical data, a reasonable presumption can be made that those with the requisite occupational exposure and with objective evidence of chronic airways obstruction have developed this airways disease, at least in part, from their exposure to cotton dust. Using this procedure, specific diagnoses which are not standardized and about which well qualified physicians frequently disagree - emphysema, chronic bronchitis, asthma, and byssinosis - would be obviated. These diseases overlap etiologically and pathologically making individual diagnoses difficult and unreliable - hence the term chronic obstructive pulmonary disease which is recognized more readily and known to be of multifactorial etiology - smoking, occupational

exposure, air pollution, infection, genetic constitution and other risk factors. Specifically excluded from consideration should be chest diseases known not to be associated with occupational exposure to cotton dust - restrictive lung disease such as pulmonary fibrosis, cancer, tuberculosis, etc. Should evidence later emerge linking occupation to one of these diseases, then they should be included.

3. It must be strongly emphasized that objective assessment of impairment must be the cornerstone of the evaluation. NIOSH has recently made recommendations for the assessment of total disability to the Department of Labor to revise and improve the Black Lung standards. These include recommendations for spirometry, arterial blood gas determinations at rest and exercise, equipment and test methods, and pathological evaluation of biopsy and autopsy material. These standards I believe are based upon good epidemiological and clinical data and take into account other important factors such as sex, age, ethnic origin, etc. Similar recommendations could be adopted and used to evaluate those exposed to cotton dust.

4. Many individuals will develop partial disability yet be able to continue to work. Using objective tests for impairment and occupational management guidelines appearing in the Department of Labor Cotton Dust Standard, schedules for partial disability should be developed and workers encouraged to continue to work in jobs where dust levels are low through allocation of transfer rights and wage retention.

5. Although impairment can be measured and reasonably judged through clinical and laboratory evaluation, evaluation of disability involves social and economic factors for which further provisions would be necessary. The basis for this evaluation, however, must be objective assessment of impairment and application of fair and equitable standards through employment of qualified professionals using standardized equipment and procedures.

6. My personal view is that funding for such a compensation program should come from two sources, principally the industry where the occupational

exposure occurred and secondly from a substantial tax on cigarettes. The public should be spared from directly sharing these costs.

7. The industry contribution should not be fixed but linked with both an assessment of the cases of disease produced and environmental dust control of each company. Thus, Congress could build into legislation an economic incentive to industry to reduce dust levels. This would also bring about an element of competition within the industry making it more difficult to pass these costs on to the consumer.

8. Finally, it is important to recognize that byssinosis is but one of a number of occupational lung diseases which may result in disability and death. A comprehensive rather than a categorical legislative approach is needed.

In conclusion, I would like to offer several papers which I have authored or co-authored for the record and again urge you to provide legislation which would provide just and equitable compensation for this occupational disease. Like most other occupational lung diseases, the burden of byssinosis is now borne almost wholly by the affected worker.

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15. Supplementary Notes

16. Abstract (Limit: 200 words) This testimony summarized information available on respiratory disease arising from exposure to cotton dust which will appear in a comprehensive study NIOSH has undertaken together with the Department of Labor at the request of Congress. The NIOSH portion of the study involved a detailed description of methods of epidemiological and environmental investigation of occupational respiratory disease, assessment of impairment and disability and a series of chapters on specific categories of occupationally induced respiratory disease. In this testimony specific information was imparted regarding byssinosis. Topics included: byssinosis; the number of exposed workers; etiological agents; Monday morning chest tightness; chronic effects; epidemiology; disability; and cigarette smoking as a risk factor. Elements important to standards for compensation for disability from cotton dust exposure were suggested, including a definition of cotton dust exposure, the use of the term chronic airways obstruction, objective assessment of impairment, development of schedules for partial disability, evaluation of social and economic factors related to disability, providing funding from the industry where exposure occurred and a tax on cigarettes, linking the industry contribution to cases of disease produced and environmental dust control, and the development of a comprehensive rather than a categorical legislative approach.

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