PLAINTIFF'S EXHIBIT

UC-4291

MEDICAL SURVEILLANCE OF ASBESTOS WORKERS AND THE REQUIREMENTS OF THE NEW OSHA STANDARD

Hilton C. Lewinsohn, MB. BCh., FCCP, MFOM, DIH.
Medical Director, Chemicals & Plastics Group
Union Carbide Corporation
39 Old Ridgebury Road, Danbury, CT 06817

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Introduction

The Occupational Safety and Health Administration published Final Rules in the Federal Register on Friday, June 20, 1986, entitled "Occupational Exposure to Asbestos, Tremolite, Anthophyllite and Actinolite," setting standards amending the existing regulations (29CFR 1910.1001). The new standard reduces employee exposure to asbestos to 0.2 fibers per cubic centimeter of air (f/cc) averaged over an 8-hour day. A departure from the previous standard is the establishment of an action level of 0.1 f/cc TWA-8. If this level is exceeded employers must begin compliance activities such as air monitoring, employee training and medical surveillance. Separate standards have been developed to apply to general industry (including maritime industries) and to the construction industry.

This paper will discuss medical surveillance as required by the two standards and attempt to determine the rationale for the various techniques which are incorporated in this regulation. The historical facts which need to be considered will be reviewed and used to develop the ~~critique~~ review of the medical surveillance requirements of the amended standards.

Historical Background

It is stated in the literature that the asbestiform minerals have long been used by man and that their use can be traced back to the ancient Greeks. The Greek geographer Pausanias discussed lamps of gold with incombustible wicks of "Carpathian flax" made in approximately 430 BC. The Romans used woven asbestos cremation cloths and the French Emperor, Charlemagne, is reputed to have impressed his enemies by passing an asbestos tablecloth through fire to cleanse it.

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"The fact that asbestos is a hazard to man's health was recognized quite early. In the first century, both Pliny the Elder, the Roman naturalist, and Strabo, the Greek geographer, wrote of a sickness of the lungs in slaves whose occupation was the weaving of asbestos into cloth."

The modern asbestos industry dates from the discovery in the 1870s of large deposits of chrysotile fibre in Canada and Russia. Chrysotile is the fibrous form of serpentine. This fibre is white in colour and is long and flexible, making it ideally suited for textile uses. Shorter varieties of chrysotile are used in cement products, brake-lining and friction materials manufacture and in composite products which have a multitude of uses. Shortly after the introduction of chrysotile into industrial use three other fibres derived from amphibole minerals were commercially exploited, namely crocidolite, amosite and anthophyllite. Perhaps the most important application of the asbestiform minerals was fireproofing of buildings and ships.

The first recorded health effects from exposure to asbestos dust in the English medical literature appeared in 1900. Asbestosis is a twentieth century disease. It was Dr. Montague Murray who drew attention to the death of an asbestos-exposed worker from pulmonary fibrosis in the absence of any evidence of tuberculosis and who subsequently recorded that a number of the deceased's colleagues had died from a similar condition. Cases continued to be reported in the medical literature, the first comprehensive report on the pulmonary fibrotic effects of asbestos being published in Great Britain by Merewether and Price in 1930. As a result of their recommendations the Asbestos Industry Regulations, 1931, were promulgated and the medical surveillance of asbestos workers was required to be carried out by the Silicosis Medical Boards, now known as the Pneumoconiosis Medical Panels. Asbestosis became a compensable illness in the United Kingdom in 1931. The first report of asbestosis cases in the United States of America was made by Pancoast et al in 1917. ~~Further~~ Additional cases were reported into the 1930s. North Carolina industries figure prominently in the U.S. ~~epidemiologic~~ literature on the subject with reports by Shull in 1936 and Dressen et al in 1938. These investigators reported cases of respiratory impairment and various degrees of "asbestosis" among the groups of workers investigated. Dressen's study was conducted on behalf of the U.S. Public Health Service and the permissible exposure limit of 5 million particles per cubic foot of air was based on their conclusions. This limit remained in effect until 1971 when the newly established Occupational Safety and Health Administration promulgated a 12 fibers/cc temporary Standard. A permissible exposure limit of 5 fibres per cubic centimetre of air averaged over an 8-hour period was permanently established in 1972. This standard reduced to 2 fibres per cubic centimetre of air 8-hour TWA in 1976. Medical surveillance was required by this standard for persons exposed to airborne concentrations of asbestos dust. An action level to trigger the medical surveillance requirements was not incorporated in the standard but was unofficially regarded by OSHA as 0.1 f/cc TWA8.

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About fifty years after the commercial exploitation of asbestos started, the first suspicions arose that lung cancer deaths in asbestos workers might be attributable to their occupation. Case reports in the USA and UK in 1935 sparked the interest in this subject. It was the same Dr. Merewether in the UK who found that lung cancer deaths occurred in 13% of certified cases of asbestosis diagnosed by the Silicosis Medical Boards, whereas none were associated with silicosis cases . In 1955 the landmark study of asbestos textile factory workers in Rochdale, Lancashire, England, was published by Doll and demonstrated a definite excess of lung cancer deaths in male workers exposed for more than ten years prior to the introduction of the Asbestos Industry Regulations, an excess in men employed for twenty years or more since that time and no excess in others with briefer lengths of employment. The findings of Merewether in 1945 were confirmed by Buchanan in the UK in 1964 when he found that approximately 60% of certified asbestosis cases died of lung cancer. It is unfortunate that smoking histories were not obtained for these cases and that no attempt was made to compare the cases with a control population.

Dr. Selikoff's studies of various exposed worker populations in the United States drew the world's attention to a number of previously neglected facts. Until the publication of his findings in asbestos insulation workers in New Jersey, the risk to other than factory workers had not been demonstrated and the disastrous effects of cigarette smoking combined with exposure to airborne asbestos fibres had not been realized to its full extent. Table 1 illustrates the overwhelming effect of smoking in combination with asbestos exposure in the etiology of lung cancer.

In 1960 Wagner et al published their findings which associated diffuse malignant mesothelioma of the pleura with exposure to asbestos. Although the first case of malignant mesothelioma in an asbestos worker is said to have been observed by Leicher in 1954, Wagner was the first to conclusively demonstrate an association between exposure to asbestos and this invariably fatal tumour. Wagner also introduced a new concept into the developing understanding of the asbestos-related diseases, namely that of indirect exposure. He found cases of mesothelioma in young persons whose exposure was to fibers which they inhaled when strapped to their mothers' backs while they hand-cobbed pieces of asbestos bearing rock. Cases also developed in the nearby mining town where people were exposed to fibers from the roads which were made from asbestos mine tailings or from the school playing area which was made from the same material. Wagner's work also led to the worldwide development of an interest in determining whether different fibre types produced differences in the observed effects of exposure to them. There is a considerable body of evidence that in the crocidolite mining areas which Wagner studied, in shipyards in the UK which used substantial quantities of crocidolite from World War I until the early 1960s, and in people who manufactured crocodolite containing gas masks during World War II in Britain, this tumour appears more commonly than in mining areas or manufacturing operations involving the use of chrysotile asbestos.

Malignant mesothelioma of the peritoneum was associated ~~some years~~ in the early 1960s with exposure to asbestos. A controversy still exists as to whether some cases of ovarian cancer in women with a history of asbestos exposure were in fact peritoneal mesotheliomata or true cases of ovarian cancer.

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Amosite asbestos (the fibrous variety of the cummingtonite-grunerite mineral series) may be largely responsible for the cases of malignant mesothelioma which have developed in shipyard workers and factory workers in the United States.

Other forms of cancer have been said to be associated with asbestos exposure. Selikoff has demonstrated a slight excess incidence of gastro-intestinal cancers in his study population. Elmes in Belfast also reported an excess of deaths from G-I cancers in insulation workers and so did Newhouse in London. The original cohorts of asbestos textile workers studied in Britain by Merewether and others, exposed mainly to chrysotile fibers, have not shown a similar excess. As Elmes' follow-up of his population progressed, the excess of deaths from G-I cancers declined over time, ~~possibly~~ indicating the effect of improving controls.

Because the 2f/cc standard was designed to protect workers from developing the "earliest signs" of asbestosis and did not take into account the development of lung cancer, mesothelioma and other asbestos-related conditions, it came under progressively increasing criticism from many quarters. In 1975 OSHA published a notice of proposed rule-making to revise the standard because the agency believed that "sufficient medical and scientific evidence has been accumulated to warrant the designation of asbestos as a human carcinogen." The proposal would have reduced the 8-hour time-weighted average to 0.5f/cc and imposed a ceiling limit of 5f/cc for 15 minutes. OSHA based its arguments very heavily on the theory that there was no safe threshold level demonstrable for a carcinogen and that the OSHAct therefore required that the PEL be set at a level as low as technologically and economically feasible. This philosophy was rejected by the Supreme Court in the benzene decision in 1980 and resulted in a further delay in the revision of the 1972 Asbestos Standard.

In 1983 OSHA issued an Emergency Temporary Standard for Asbestos but it was invalidated by the US Circuit Court of Appeals for the Fifth Circuit in 1984.

Before concluding these remarks about the historical background of the asbestos-related diseases, it is necessary to define and briefly discuss two findings which are frequently referred to in reports about asbestos exposed subjects. Lung tissue from asbestos workers contains unusual beaded, dumb-bell shaped or rod-like particles which were originally mistakenly called asbestosis bodies because they were thought to occur only in asbestosis cases. They can be found in sputum and in lung tissue of the general population, larger numbers being present in persons with known occupational exposure and decreasing in number as asbestos exposure possibilities decline. The name asbestosis bodies gave way to asbestos bodies when this was realized. These particles owe their golden colour to the fact that they contain iron and, for this reason, and because some authorities believe that the fibre core may be made up of materials other

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than asbestos, in some instances they prefer to call them "ferruginous bodies." There is considerable evidence that most ferruginous bodies are in fact asbestos bodies. Asbestos bodies are the "tombstones" of asbestos fibers and are also found in the absence of disease, thus providing an index to exposure but not having any other diagnostic significance.

The second finding commonly discussed in the literature and probably reported as the most frequent radiographic abnormality in asbestos-exposed workers in the United States today is involvement of the pleura, manifesting itself as localized pleural plaques or as diffuse thickening (pleural fibrosis). Cases of transient pleural effusions also occur in asbestos-exposed people. Pleural plaques have been associated with non-occupational exposure as well as occupational exposure to asbestos. When pleural plaques are seen on both sides of the chest the clinician's suspicion should be aroused to the possibility that they are asbestos-related. Plaques are another indicator of past exposure. They used to be regarded merely as an index to past exposure and not of significance in producing impairment of lung function, but it has become clear from studies conducted over many years on workers in British Naval Dockyards that persons with these radiographic findings may be more prone to subsequently developing asbestosis or may even be at increased risk of developing malignant mesothelioma.

MEDICAL SURVEILLANCE

In the UK, the Silicosis and Asbestosis (Medical Arrangements) Scheme, 1931, made initial and periodic medical examinations obligatory for workers employed in the process of breaking, crushing, disintegrating, opening or grinding of asbestos, and the mixing or sieving of asbestos or any admixture of asbestos, and in the making of asbestos textiles and insulating mattresses. It was believed that these examinations "may be of great value as a means of preventing or arresting the development of asbestosis."

Asbestosis was made a compensable disease under the Asbestos Industry (Asbestosis) Scheme, 1931.

In their 1930 Report Merewether and Price recommended "the control of the disease by periodical medical examinations of the workers by which those unfitted by health reasons are prevented from entering the industry, and cases of fibrosis and pulmonary tuberculosis are detected at the earliest possible moment. The ultimate and only reliable test of the effectiveness of the preventive measures adopted in the industry will be found in the statistics derived from the records of periodical medical examinations of workers....." These words of Merewether and Price remain true today but unfortunately their hopes for the establishment of a statistical data base were never realized and nowhere in the world is it possible to find information of a standardized nature on the incidence of asbestos-related disease in an entire national population.

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In the examination of asbestos-exposed workers, the following has been the traditional approach:

- o Medical history with emphasis on the respiratory system;
- o Chest x-ray (pre-placement) and periodically thereafter;
- o Physical examination with emphasis on the respiratory system.

The introduction of pulmonary function tests did not occur routinely until the late 1950s and proved most valuable in assessing fitness for work and also in determining disability for compensation purposes.

Assuming that lung function is normal at the time of pre-employment evaluation, the continued follow-up of a worker by means of pulmonary function testing should allow any deterioration to be measured and steps to be taken to remove the worker from any further exposure.

There is no adequately documented evidence to indicate that impairment of lung function can regress on removal from exposure to asbestos although some such claims have been made. Lung function impairment may take one of two forms in the early stages of asbestosis, either reduction in breathing ability, that is to say ventilatory capacity, or impairment of the process of gas exchange in the lungs. In either case the condition may progress to include the other at a later stage or it may become complicated by the changes in function which are associated with bronchitis or emphysema. The impaired ventilatory capacity may be due to diminished lung expansion (restrictive syndrome) related to the fibrotic scarring of the lungs, which is the basic pathological process occurring in asbestosis or it may be due to obstruction or narrowing of the airways (obstructive syndrome). The latter is not usually the presenting lung function abnormality associated with pulmonary fibrosis but may be present if it is complicated by bronchitis or emphysema.

Impairment of gas exchange when it occurs in asbestos workers may be the result of the thickening of the walls of the air sacs (alveolae) in the lungs and destruction of the pulmonary blood vessels associated with diffuse interstitial fibrotic changes. The ability of oxygen to diffuse into the venous blood and thus re-oxygenate it is impaired by the alveolar wall thickening, and may be further impaired in the presence of tissue destruction and abnormal distribution of pulmonary ventilation. The capacity to transfer gas across the alveolar-capillary membrane is known as the diffusing capacity or gas transfer factor. This can be measured by means of a test known as the carbon monoxide diffusing capacity obtained by the single-breath method. Measurement of the carbon monoxide diffusing capacity (T_L or D_L) requires sophisticated equipment and is not suitable for use in the routine medical surveillance of asbestos workers.

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OSHA's 1972 Asbestos Standard: Medical Surveillance

When the first OSHA Asbestos Standard was implemented in 1972 the requirements for medical surveillance were based on the traditional methods previously mentioned. The Standard required that every employer "shall provide, or make available, at least annually, comprehensive medical examinations to each employee engaged in an occupation exposed to airborne concentrations of asbestos fibers." The minimum requirement was for:

- a chest roentgenogram (Postero-anterior view 14" x 17")
- a history to elicit symptomatology of respiratory disease
- pulmonary function tests to include measurement of forced vital capacity (FVC) and forced expiratory volume at one second ($FEV_{1.0}$)

The 1972 Standard required the employer to provide or make available within 30 calendar days, before or after termination of employment, a comprehensive medical examination. No medical examination was required of any employee if adequate records showed that the employee had been examined in accordance with the requirements of the OSHA Asbestos Standard (29CFR ss1910.1001(j)(2)-(5) within the previous one year.

In general, medical surveillance of worker populations exposed to known health risks is undertaken for two main reasons, namely:

- to record a base-line state of health and follow the population prospectively by means of a designed epidemiological approach which is capable of linking medical and exposure records and evaluating dose-response relationships;

- to provide a tool for the detection of the earliest and least harmful effects of exposure at a stage when cessation of such exposure would be of benefit to the exposed person's continued health and well-being or when active intervention could restore the person to a "normal" state of health.

The second of these objectives cannot be met in full since the asbestos-related diseases are not readily amenable to therapy, and early effects may not always be easily recognizable, at a stage when removal from further occupational exposure could arrest or significantly delay the progress of asbestosis or prevent the occurrence of other, asbestos-related conditions. Then surveillance has been worthwhile. There is some cumulative evidence that early diagnosis and removal from exposure increases the ~~mean~~ number of years lived from time of diagnosis to death.

Para → Because of its increased and widespread use in the USA in many sectors of industry during the past 50 years and until recent times, it has been estimated that millions of people have been exposed in various ways to the different commercial forms of asbestos. Most of these people have experienced low levels of exposure in comparison to asbestos miners and

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millers, asbestos insulation workers, asbestos textile workers, workers in the asbestos cement industry, and employees of the friction materials manufacturers.

Pleural plaques without evidence of underlying pulmonary fibrosis on x-ray, lung function testing or clinical examination, are probably an important index to conditions in the workplace where such low concentrations of fibers were encountered. Some observers believe that plaques are related to duration of exposure rather than to level of exposure and that they are a sensitive marker in a population of long-term, low-level exposure conditions. Unfortunately the evidence necessary to prove this point conclusively from the study of well-documented medical surveillance records is lacking.

The radiological diagnosis of asbestos-related effects requires special training and skill on the part of the x-ray reader in order to differentiate them from similar appearances due to a number of other fibrotic lung diseases. The 1972 Standard did not make reference to any standardized reading technique or reader qualifications. This difficiency has obviously led to both under and over-diagnosis of asbestosis and other radiological abnormalities associated with asbestos exposure.

Although the 1972 Standard required that a history of respiratory symptoms be elicited, it did not specify the use of a standardized questionnaire. This difficiency has detracted from much of the available medical surveillance data obtained since it is not possible to carry out epidemiological studies on the morbidity of asbestos-exposed populations comparing radiologic appearances, pulmonary function changes and clinical findings in the determination of dose-response relationships.

1986 OSHA ASBESTOS STANDARDS: MEDICAL SURVEILLANCE

Once OSHA had made the determination that the 1972 Standard required amendment, consideration was given to the revision of the medical surveillance needs. It was determined that two Standards would be promulgated, one for General Industry and one for the Construction Industry. The General Industry Standard applies to manufacturers of asbestos products and workers employed in the primary or secondary manufacturing of such products have to be kept under medical surveillance if exposure is at or above the Action Level of 0.1 fibers per cubic centimeter TWA8. Exceptions to this definition by "process" include service industries such as automotive brake and clutch repair and replacement and the shipbuilding industry which fall under the General Industry Standard.

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The Construction Standard applies where workers are potentially exposed to asbestos as a result of removal, demolition, new installation, maintenance or new construction. The medical surveillance requirements of the two Standards differ in a number of respects and will be discussed later after the changes which have been made to this section of the new Standards have been considered and the rationale for them explained. The new medical surveillance requirements have introduced some modifications to the "traditional approach" but have nevertheless not satisfied all the criticisms of the old Standard.

(a) General Industry Standard and Medical Surveillance:

The employer must establish a medical surveillance program for all employees who are exposed to airborne concentrations of asbestos at or above the action level (0.1f/cc TWA_8).

All examinations must be performed under the supervision of a licensed physician and shall be provided without cost to the employee and at a reasonable time and place.

Examinations must include a complete physical examination with emphasis on the respiratory system, cardiovascular system and digestive tract. A comprehensive medical examination as defined by OSHA would encompass

- a medical history and work history
- a complete physical examination of all systems with emphasis on the respiratory, cardiovascular and gastro-intestinal systems
- completion of the respiratory disease standardized questionnaire Appendix D
- a chest x-ray (14" x 17")
- pulmonary function tests to include forced vital capacity(FVC), forced expiratory volume at 1 second(FEV1),
- and any additional tests deemed appropriate by the examining physician.

Examinations are required as follows:

- Preplacement;
- Termination of employment;
- Periodic examinations.

These examinations must be made available before an employee is assigned to an occupation exposed to asbestos, annually following the employee's first exposure to asbestos, or in the case of termination of employment, the examination "shall be given within 30 calendar days before or after the date of termination of employment." No medical examination shall be required if adequate records show that the employee has been examined in accordance with the requirements above within the past 1-year period.

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The employer must give the examining physician:

- a copy of the Standard and Appendices D and E
- a description of the employee's duties relating to asbestos exposure
- the employee's representative exposure level or anticipated exposure level
- a description of any personal protective and respiratory equipment used or to be used
- and information from previous medical examinations that is not otherwise available to the examining physician.

The employer must obtain a written signed opinion from the physician which contains:

- the results of the medical examination and the physician's opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk of material health impairment if exposed to asbestos
- any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators
- and a statement that the employee has been informed by the physician of the results of the examination and of any medical conditions resulting from exposure to asbestos that require further explanation or treatment.

The physician must be instructed not to reveal to the employer in the written opinion specific findings or diagnoses unrelated to occupational exposure to asbestos.

The employer must provide a copy of the physician's written opinion to the affected employee within 30 days after its receipt.

The Standard requires the employer to establish and maintain an accurate record for each employee subject to medical surveillance which shall include:

- name and social security number;
- physician's written opinions;
- any employee medical complaints related to exposure to asbestos;
- a copy of the information which was provided to the physician.

The employer must ensure that medical records are maintained for the duration of employment plus 30 years in accordance with 29CFR 1910.20.

(b) The Construction Industry Standard and Medical Surveillance.

The employer must establish a medical surveillance program for all employees engaged in work with potential for exposure to asbestos at or above the action level for 30 days or more per year, or who are required to wear negative pressure respirators.

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Examinations must include:

- a medical and work history with special emphasis directed to the pulmonary, cardiovascular and gastro-intestinal systems
- completion of the standardized questionnaires contained in Appendix D
- a physical examination directed to the pulmonary and gastro-intestinal systems
- a chest x-ray (14"x17") administered at the discretion of the physician
- pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at one second (FEV 1)
- any other examinations or tests deemed necessary by the examining physician.

Frequency of examinations will be:

- prior to assignment to an area where negative pressure respirators are to be worn
- on assignment to an area where exposure to asbestos may be at or above the action level for 30 or more days per year, a medical examination must be given within 10 days following the 30th day of exposure
- at least annually thereafter
- if the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide them as specified by the physician.

No medical examination shall be required if adequate records show that the employee has been examined in accordance with the requirements of the standard within the past 1-year period.

The employer must give the examining physician:

- a copy of the standard and Appendices D, E and I
- a description of the employee's duties relating to asbestos exposure
- the employee's representative exposure level or anticipated exposure level
- a description of any personal protective and respiratory equipment used or to be used
- and information from previous medical examinations that is not otherwise available to the examining physician.

The employer must obtain a written signed opinion from the physician which contains:

- the results of the medical examination and the physician's opinion as to whether the employee has any detected medical conditions that would place the employee at increased risk if exposed to asbestos
- any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators

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- and a statement that the employee has been informed by the physician of the results of the examination and of any conditions that may result from asbestos exposure. The physician must be instructed by the employer not to reveal to the employer, in the written opinion provided any specific findings or diagnoses unrelated to occupational exposure to asbestos.

The employer must provide a copy of the physician's written opinion to the affected employee within 30 days after its receipt.

The Standard requires the employer to establish and maintain an accurate record for each employee subject to medical surveillance which shall include:

- name and social security number;
- a copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests and physician's recommendations;
- physician's written opinion;
- any employee medical complaints related to exposure to asbestos;
- a copy of the information which was provided to the physician.

The employer must ensure that medical records are maintained for the duration of employment plus 30 years in accordance with 29CFR 1910.20.

New ~~Concepts Introduced~~ Features in the 1986 Standards

1. Action Level: 0.1f/cc TWA_8 for the General Industry Standard.

   The requirements for the Construction Standard with regard to the action level are triggered by a 30-day per year qualifying period or the requirement to wear negative pressure respirators.

   This represents a change from the 1972 Standard which did not specify any action level other than exposure to airborne concentrations of asbestos.

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2. Frequency of Chest X-rays: Table 2 of the General Industry Standard allocates the frequency of x-rays as illustrated:

Table 2: Frequency of Chest Roentgenograms

Years Since First Exposure	Age of Employee		
	15 to 35	35+ to 45	45+
0 to 10	Every Five (5) Years		
10+	Every 5 Years	Every 2 Years	Every Year

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This reduces the frequency of chest x-rays from the previous annual requirement. In the case of the Construction Standard the chest x-ray is "to be administered at the discretion of the physician." The change in the frequency of x-rays required reduces the need to x-ray younger workers who have been exposed for a short period of time.

3. Frequency of Medical Examinations: The 1986 Standards now require that a preplacement medical examination be given to assess each worker's state of health prior to beginning of exposure to asbestos fibers. The 1972 Standard permitted the medical to be conducted within the first thirty (30) days of hire. The provision for an annual medical examination has been retained in the 1986 Standards.

4. Medical Questionnaires: The 1972 Standard required that the examining physician elicit a history of respiratory symptoms, but did not stipulate the use of a standardized questionaire. The 1986 Standards mandate the use of the Initial and Periodic Medical Questionnaires in Appendix D, Parts 1 and 2. The questionnaire will record the employee's work history, respiratory symptoms and tobacco habits. OSHA requires the questionnaire to be administered verbatim and does not permit it to be altered or changed in any way.

5. Interpretation of Chest Roentgenograms: The 1972 Standard required an annual chest x-ray but did not require it to be interpreted or reported on in a standardized fashion. This undoubtedly led to a diminution in the value of this sensitive diagnostic tool because of poor quality control in terms of radiographic technique and proficiency of x-ray readers. The 1986 Standards require that Chest Roentgenograms be interpreted and classified in accordance with a professionally accepted classification system by either a NIOSH Certified B-Reader, a Board eligible/certified Radiologist or an experienced physician with known expertise in pneumoconioses. All interpreters, whenever interpreting chest x-rays, must have immediately available for reference the latest version of the ILO U/C International Classification of Radiographs for Pneumoconoses. The current version is the 1980 edition.

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6. Direction of the Medical Examination to Target Organ Systems: OSHA believes that the content of the revised Standard's physical examination requirements is consistent with the identification of adverse effects associated with exposure. The adverse health effects which are referred to are asbestosis, lung cancer, mesothelioma, and an "increase in esophageal, stomach, colo-rectal, kidney, laryngeal, pharyngeal and buccal cavity cancers." OSHA states "It is therefore important that the physical examination be directed to a determination of the condition of the pulmonary, cardiovascular and gastro-intestinal systems."

7. The revised Standards require that individuals other than licensed physicians who administer pulmonary function tests complete a training course in spirometry sponsored by an appropriate academic or professional institution. This provision will insure better quality control and reproducibility of tests administered in accordance with the requirements of the standards.

8. Mandatory and Non-mandatory Medical Surveillance:

   The medical and work history and physical examination are mandatory. These include the Questionnaires in Appendix D, Pulmonary Function Tests, and Chest X-rays. In the case of the Construction Standard the Chest X-ray may be administered at the discretion of the physician. Other tests such as sputum cytology and screening for the presence of occult blood in the stools of exposed workers were not considered to have either the sensitivity or specificity required for their mandatory incorporation in the medical surveillance requirements of the standards. The performance of such tests was left to the discretion of the examining physician.

9. Appendices: The incorporation of Appendices D, E and I are a significant new concept. Appendix D contains the mandatory questionnaires which will help to eliminate some of the difficulties in gathering comparable mortality and morbidity data when used in conjunction with pulmonary function test results and x-ray findings. Appendix E requires that chest x-rays be interpreted and classified in accordance with the ILO U/C Classification by readers proficient in its use utilizing a specially designed form for the purpose (Form CSD/NIOSH(M)2.8). Appendix I is intended to provide guidance to the examining physician in the recognition of the asbestos-related diseases. It also provides a synopsis of the main features of a medical surveillance program for asbestos workers.

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Unresolved Issues

The frequency of medical examinations remains the same, i.e. every year after the initial examination. There are some authorities who consider this to be unnecessary and burdensome. The time-frame for the development of asbestos-related diseases is such that exposure to asbestos fibers at the new PEL is unlikely to result in any detectable clinical, physiological or radiological effects for at least 10 years. The lapsed interval from first exposure to diagnosis of or death from lung cancer is in the order of 15 to 20 years, and for mesothelioma it can be from 20 to 50 years. The value of medical examinations increases with increasing length of exposure and seems reasonable to suggest that the periodicity should be flexible enough to take this into account. OSHA considers that the annual medical examination is an important tool in protecting the worker exposed to asbestos by

(1) establishing and maintaining rapport between the medical staff and asbestos exposed workers;

(2) detecting changes in a workers physical condition;

(3) detecting biological effects of inhalation of asbestos as early as possible;

(4) providing a way to re-evaluate the work-place conditions; and

(5) evaluating the workers ability to continue doing the same job.

For these reasons OSHA has retained the annual medical examination provision in the standard.

In the preamble to the Standards OSHA indicates that other organ systems besides the lungs and pleura may be the targets for asbetos-related diseases. They emphasize in particular the gastro-intestinal tract and deliberate the value of screening tests for colo-rectal cancer. The epidemiologic evidence for an association between asbestos exposure and GI cancers is weak and the sensitivity and specificity of the available screening tests (occult blood, etc.) is insufficient to enable OSHA to legislate their performance. OSHA also considered the desirability of including sputum cytological examination in the medical surveillance requirements but found that the value of this test alone as a routine screening method was questionable. OSHA believes it inappropriate to include mandatory sputum cytology and occult blood screening in the medical surveillance protocol. In the case of both tests there is insufficient data to answer the central question as to whether they can reduce the mortality from lung cancer or colo-rectal cancer by enabling earlier diagnosis at a curable stage of the diseases. This issue remains open for the time being and the use of these screening techniques is left to the discretion of the examining physician.

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A01635

Conclusion

The 1986 OSHA Standards for asbestos have definitely improved the medical surveillance section and should result in better data than has hitherto been forthcoming from industry in general and construction work in particular. The most significant changes have been in the area of quality control of history taking by the use of a standardized questionnaire, the interpretation of radiographs by the use of the ILO U/C International Classification of Radiographs for the Pneumoconioses, 1980, and the requirements for the training of persons other than physicians who administer pulmonary function tests.

The Standards will also insure that records are correctly maintained, that employers are given proper feedback after medical examinations have been conducted, that employees are notified of the physicians' findings, and that employers provide the examining physicians with the necessary information to enable them to carry out their duties.

There is still a lack of good data on the dose-response relationship between asbestos and the various conditions said to be caused by it. The medical surveillance requirements of the new Standards go part of the way towards improving the data that can ultimately be studied. In 20 years' time some of the unresolved issues may be resolved and some of the uncertainty surrounding the asbestos dose-response may be more readily understood.

The hope is that advances in medical science will eventually lead to means of therapeutic intervention in cases of asbestos associated malignant disease, or even in the reversal of the pulmonary fibrotic process. The latter, in my opinion, is no longer the major threat to asbestos workers, while the malignant conditions are likely to remain the most common cause of death in asbestos workers well into the 21st Century. The medical surveillance of asbestos exposed populations is essential if the natural history of the associated diseases is to be fully understood. ~~in the future~~ Because of changing uses of asbestos, changing workplace conditions and exposure levels, changes in workers life-styles and habits and changes in surveillance techniques it is essential to conduct surveillance in a systematic and standardized manner, taking into account the lapsed periods between first exposure, diagnosis and ~~death~~ death. The OSHA Standard gives guidance, but it is up to employers, employees, physicians, epidemiologists and many others to work together towards gathering good data in order to devise the best means to protect employee health.

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SLIDE #1

MEDICAL SURVEILLANCE OF ASBESTOS WORKERS
AND THE REQUIREMENTS OF THE REVISED
OSHA ASBESTOS STANDARDS, 1986.
(29 CRF PARTS 1910 AND 1926)

PERMISSIBLE EXPOSURE LEVEL:
0.2 FIBERS PER CUBIC CENTIMETER (f/cc)
AVERAGED OVER AN 8-HOUR DAY (TWA_8)

ACTION LEVEL: 0.1 f/cc (TWA_8)
IF THIS LEVEL IS EXCEEDED IT REQUIRES:
* AIR MONITORING
* EMPLOYEE TRAINING
* MEDICAL SURVEILLANCE

A01575

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SLIDE #2

SEPARATE STANDARDS HAVE BEEN PROMULGATED:
* ASBESTOS STANDARD FOR GENERAL INDUSTRY
(29 CFR 1926.1001)
* ASBESTOS STANDARD FOR CONSTRUCTION
(29 CFR 1926.58)

THE GENERAL INDUSTRY STANDARD APPLIES TO INDUSTRIES THAT USE ASBESTOS TO MAKE ASBESTOS PRODUCTS, NAMELY, PRIMARY OR SECONDARY MANUFACTURING.

(EXCEPTIONS: Service Industry Such As Automotive Brake and Clutch Repair and Replacement; Shipbuilding)

THE CONSTRUCTION STANDARD APPLIES WHEN ASBESTOS EXPOSURE OCCURS AS A RESULT OF REMOVAL, DEMOLITION, NEW INSTALLATION, MAINTENANCE OR, NEW CONSTRUCTION.

A01576

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SLIDE 35

ASBESTOS KNOWN TO AND USED BY THE GREEKS
IN AT LEAST 430 B.C.
ALSO USED BY THE ROMANS TO WEAVE
CREMATION CLOTHS
CHARLEMAGNE REPUTED TO HAVE IMPRESSED HIS
ENEMIES BY CLEANSING ASBESTOS TABLECLOTH WITH FIRE!

"THE FACT THAT ASBESTOS IS A HAZARD TO MAN'S HEALTH
WAS RECOGNIZED QUITE EARLY. IN THE FIRST CENTURY,
BOTH PLINY THE ELDER, THE ROMAN NATURALIST, AND
STRABO, THE GREEK GEOGRAPHER, WROTE OF A
SICKNESS OF THE LUNGS IN SLAVES WHOSE OCCUPATION
WAS THE WEAVING OF ASBESTOS INTO CLOTH."
(Asbestos: An Information Resource.
Richard J. Levine, MD, Editor,
DHEW Publication No.79-1681, May 1978.)

A01577

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SLIDE #7

1870'S: DISCOVERY OF LARGE DEPOSITS OF
CHRYSOTILE FIBER IN CANADA AND RUSSIA.
THIS FIBER IS WHITE IN COLOR, LONG & FLEXIBLE.
USED IN TEXTILES.
SHORTER VARIETIES USED IN ASBESTOS
CEMENT PRODUCTS.

AMPHIBOLE ASBESTOS FIBER VARIETIES INTRODUCED
INTO COMMERCIAL USE IN EARLY 1900'S. MAIN TYPES:
CROCIDOLITE / AMOSITE / ANTHOPHYLLITE

DR. MONTAGUE MURRAY....LONDON...1904
MEREWETHER AND PRICE...ENGLAND..1930

A01578

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SLIDE #9

ASBESTOS INDUSTRY REGULATIONS, 1931

ASBESTOSIS COMPENSABLE IN UK - 1931

A01579

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SLIDE #10

DR. MONTAGUE MURRAY.....LONDON....1904
MEREWETHER AND PRICE....ENGLAND...1930
PANCOAST ET AL.....U.S.A.....1917
SHULL.....U.S.A.....1936
DRESSEN ET AL.....U.S.A.....1938

A01580

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SLIDE #7/11

1938 U.S. PUBLIC HEALTH SERVICE BASED
RECOMMENDED EXPOSURE LIMIT ON THE
RESULTS OF DRESSEN STUDY:

5 MILLION PARTICLES PER CUBIC FEET OF AIR

A01581

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SLIDE #12.

OSHA 1971.....ETS.....12f/cc

1972.....PEL.....5f/cc TWA_8

1976.....PEL.....2f/cc TWA_8

SUGGESTED ACTION LEVEL 0.1f/cc TWA_8
TO TRIGGER MEDICAL SURVEILLANCE

A01582

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SLIDE #13.

LUNG CANCER:
* CASE REPORTS IN 1935
* MEREWETHER 1946. 13% ASBESTOSIS CASES DIED OF LUNG CANCER.
* DOLL, 1955, SHOWED THAT RELATIVE RISK OF LUNG CANCER AFTER 10 YEARS' EXPOSURE WAS RAISED.
* BUCHANAN, 1964, SHOWED CERTIFIED CASES OF ASBESTOSIS DIED OF LUNG CANCER.

A01583

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SLIDE #10

1960 - WAGNER ET AL. PUBLISHED PAPER ASSOCIATING DIFFUSE MALIGNANT MESOTHELIOMA OF THE PLEURA WITH EXPOSURE TO CROCIDOLITE ASBESTOS IN THE NORTHWEST CAPE PROVINCE OF SOUTH AFRICA

A01584

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SLIDE #21

CONCEPT OF INDIRECT EXPOSURE.
NEIGHBORHOOD
DOMESTIC CONTACT
CASUAL EXPOSURE IN THE WORKPLACE

WAGNER FIRST TO PROPOSE & STUDY
THE THEORY THAT DIFFERENT FIBER
VARIETIES PRODUCED DIFFERENT EFFECTS.

CONSIDERED CROCICOLITE MORE DANGEROUS
THAN AMOSITE WITH CHRYSOTILE BEING
LEAST LIKELY TO CAUSE MESOTHELIOMA

A01585

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SLIDE #22

OTHER FORMS OF CANCER SAID TO BE
ASSOCIATED WITH EXPOSURE TO ASBESTOS:

* STOMACH & COLO-RECTAL CANCER
* LARYNGEAL CANCER
* KIDNEY
* PHARYNGEAL
* BUCCAL
* OVARIAN

A01586

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SLIDE #23

1975 OSHA NOTICE OF PROPOSED RULEMAKING:

"...SUFFICIENT MEDICAL AND SCIENTIFIC EVIDENCE HAS BEEN ACCUMULATED TO WARRANT THE DESIGNATION OF ASBESTOS AS A HUMAN CARCINOGEN."

PROPOSAL: 0.5 f/cc TWA_8

CEILING LIMIT OF 5 f/cc FOR 15 MINUTES

SPUTUM CYTOLOGY IN ASBESTOS WORKERS OVER AGE 40 OR WITH 10 YEARS OR MORE EXPOSURE WAS ALSO A REQUIREMENT IN THE MEDICAL SURVEILLANCE SECTION.

A01587

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SLIDE #4

1983...OSHA ISSUES ETS

INVALIDATED IN 1984

A01588

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SLIDE # 26

ASBESTOS BODIES (FERRUGINOUS BODIES)

PLEURAL INVOLVEMENT:

EFFUSION
PLAQUES
DIFFUSE THICKENING

A01589

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SLIDE #28

MEDICAL SURVEILLANCE

IN THEIR 1930 REPORT, MEREWETHER AND PRICE RECOMMENDED:

"...THE CONTROL OF THE DISEASE (ASBESTOSIS) BY PERIODICAL MEDICAL EXAMINATIONS OF THE WORKERS BY WHICH THOSE FITTED BY HEALTH REASONS ARE PREVENTED FROM ENTERING THE INDUSTRY, AND CASES OF FIBROSIS AND PULMONARY TUBERCULOSIS ARE DETECTED AT THE EARLIEST POSSIBLE MOMENT.
THE ULTIMATE AND ONLY RELIABLE TEST OF THE EFFECTIVENESS OF THE PREVENTATIVE MEASURES ADOPTED IN THE INDUSTRY WILL BE FOUND IN THE STATISTICS DERIVED FROM THE RECORDS OF PERIODICAL MEDICAL EXAMINATIONS OF WORKERS...."

A01590

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SLIDE #29

TRADITIONAL APPROACH TO SURVEILLANCE

- o MEDICAL HISTORY WITH EMPHASIS ON RESPIRATORY SYSTEM
- o PRE-PLACEMENT CHEST X-RAY AND PERIODICALLY THEREAFTER
- o PHYSICAL EXAMINATION WITH EMPHASIS ON THE RESPIRATORY SYSTEM

A01591

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SLIDE #18

PULMONARY FUNCTION TESTS INTRODUCED
INTO SURVEILLANCE PROGRAMS IN LATE 1950'S

ADVANTAGE: A MEANS TO MEASURE IMPAIRMENT
AND ASSESS DISABILITY

A01592

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SLIDE #30.

IMPAIRMENT MAY BE INDICATED BY:

- o REDUCTION IN BREATHING ABILITY I.E. VENTILATORY CAPACITY DUE TO RESTRICTION
- o IMPAIRMENT OF PULMONARY BLOOD-GAS EXCHANGE MECHANISMS
- o BOTH

A01593

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SLIDE ~~#22~~ 33

COMPLICATIONS WHICH AGGRAVATE IMPAIRMENT;

- o AIRWAYS OBSTRUCTION e.g. BRONCHITIS
- o DIFFUSE PLEURAL THICKENING - INCREASES RESTRICTIVE ELEMENT IMPAIRING VENTILATORY CAPACITY

A01594

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SLIDE ~~#~~ 45

IMPAIRMENT OF GAS EXCHANGE:

- o ALVEOLAR (AIR SACS) WALL THICKENING
- o DESTRUCTION OF CAPILLARY BLOOD VESSELS ASSOCIATED WITH DIFFUSE INTERSTITIAL FIBROSIS

CAPACITY TO TRANSFER GAS ACROSS THE ALVEOLAR-CAPILLARY MEMBRANE IS KNOWN AS THE DIFFUSING CAPACITY (D_L) OR THE GAS TRANSFER FACTOR (T_L). IT CAN BE MEASURED --DIFFUSING CAPACITY OF CARBON MONOXIDE, SINGLE BREATH (D_LCO)

A01595

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SLIDE ~~#32~~ 436

1972 OSHA STANDARD
MEDICAL SURVEILLANCE REQUIREMENTS

COMPREHENSIVE MEDICAL EXAMINATION ANNUALLY, AND WITHIN 30 DAYS, BEFORE OR AFTER TERMINATION. MINIMUM REQUIREMENT:

- o CHEST X-RAY (POSTERO-ANTERIOR VIEW 14"x17")
- o HISTORY - SYMPTOMS OF RESPIRATORY DISEASE
- o PULMONARY FUNCTION TESTS
  - FORCED VITAL CAPACITY (FVC)
  - FORCED EXPIRATORY VOLUME AT ONE SECOND (FEV_1)

NO MEDICAL EXAMINATION REQUIRED IF ADEQUATE RECORDS SHOWED ALL ABOVE FULFILLED WITHIN THE PREVIOUS 1 YEAR.

A01596

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SLIDE #4

PURPOSE OF MEDICAL SURVEILLANCE

(I) (a) RECORD BASE-LINE HEALTH STATUS
(b) FOLLOW EMPLOYEES PROSPECTIVELY TO:

- DETECT EARLIEST ADVERSE EFFECTS
- STUDY EXPOSED POPULATION BY EPIDEMIOLOGIC METHODS AND DERIVE HEALTH STANDARDS TO PROTECT WORKERS

(II) DEVELOP MEASURES TO ARREST PROGRESSION OF DISEASE e.g. EARLY REMOVAL FROM EXPOSURE

(a) TREAT COMPLICATING FACTORS EARLY e.g. CHEST INFECTIONS

(b) COUNSEL EXPOSED PERSONS TO MODIFY LIFE-STYLE e.g. STOP SMOKING

A01597

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SLIDE #48

PLEURAL PLAQUES

INDEX TO LONG-TERM, LOW-LEVEL EXPOSURE

RELATED TO DURATION OF EXPOSURE
RATHER THAN TO CONCENTRATION

A01598

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SLIDE #49

DEFICIENCY IN 1972 OSHA STANDARD

I. o NO STANDARDIZED RADIOGRAPHIC TECHNIQUE REQUIRED
o NO X-RAY READER QUALIFICATIONS STIPULATED

RESULT - NO QUALITY CONTROL
- UNDER AND OVER-READING OF X-RAY APPEARANCES
- BIAS IN EPIDEMIOLOGIC STUDIES
- UNNECESSARY WORRY TO SOME PEOPLE

II. USE OF STANDARDIZED RESPIRATORY SYMPTOMS QUESTIONNAIRE NOT SPECIFIED

III. NO REQUIREMENTS FOR INSURING PROFICIENCY OF PERSONS PERFORMING PULMONARY FUNCTION TESTS

A01599

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SLIDE #~~20~~ 51

GENERAL INDUSTRY STANDARD

ACTION LEVEL: 0.1f/cc TWA_8

- o ALL EXAMINATIONS UNDER SUPERVISION OF LICENSED PHYSICIAN
- o COMPLETE PHYSICAL EXAMINATION:
  - * MEDICAL AND WORK HISTORY
  - * PHYSICAL-EMPHASIS ON RS, CVS & GIT
  - * STANDARDIZED RESPIRATORY DISEASE QUESTIONNAIRE (APPENDIX D)
  - * PULMONARY FUNCTION TESTS (FVC, FEV_1)
  - * ANY ADDITIONAL TESTS DEEMED APPROPRIATE BY EXAMINING PHYSICIAN

A01600

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SLIDE ~~#26A~~ 52

GENERAL INDUSTRY STANDARD (Cont'd)

FREQUENCY OF EXAMINATIONS

- o PRE-PLACEMENT
- o TERMINATION OF EMPLOYMENT
- o PERIODIC EXAMINATIONS ANNUALLY

NO MEDICAL EXAMINATION REQUIRED IF ADEQUATE RECORDS SHOW THAT THE EMPLOYEE HAS BEEN EXAMINED WITHIN THE PAST 1-YEAR PERIOD

A01601

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53

SLIDE ~~#27 AND 53~~ (MAKE 2 SLIDES)

EMPLOYER MUST GIVE PHYSICIAN

- COPY OF STANDARD & APPENDICES D AND E
- EMPLOYEE'S JOB DESCRIPTION
- REPRESENTATIVE OR ANTICIPATED EXPOSURE LEVEL
- DESCRIPTION OF PERSONAL AND RESPIRATORY PROTECTIVE EQUIPMENT TO BE USED
- INFORMATION FROM PREVIOUS MEDICAL EXAMINATIONS NOT OTHERWISE AVAILABLE TO THE PHYSICIAN

A01602

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A01603

UCC 011121

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56.

SLIDE ~~#29 AND 35~~ (MAKE 2 SLIDES)

THE PHYSICIAN MUST BE INSTRUCTED NOT TO REVEAL TO THE EMPLOYER IN THE WRITTEN OPINION SPECIFIC FINDINGS OR DIAGNOSES UNRELATED TO OCCUPATIONAL EXPOSURE TO ASBESTOS.

THE EMPLOYER MUST PROVIDE A COPY OF THE PHYSICIAN'S WRITTEN OPINION TO THE AFFECTED EMPLOYEE WITHIN 30 DAYS AFTER ITS RECEIPT.

A01604

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SLIDE ~~50~~ 57

ACCURATE RECORD OF FOLLOWING MUST BE ESTABLISHED AND MAINTAINED FOR EACH EMPLOYEE:

- NAME
- SOCIAL SECURITY NUMBER
- PHYSICIAN'S WRITTEN OPINIONS
- ANY EMPLOYEE MEDICAL COMPLAINTS RELATED TO ASBESTOS
- COPY OF THE INFORMATION WHICH WAS PROVIDED TO THE PHYSICIAN

RECORDS MUST BE MAINTAINED FOR DURATION OF EMPLOYMENT PLUS 30 YEARS IN ACCORDANCE WITH 29CFR 1910.20.

A01605

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SLIDE [redacted] 5[redacted]9

CONSTRUCTION STANDARD

ACTION LEVEL: 0.1f TWA_8 FOR 30 OR MORE DAYS PER YEAR

OR WHO ARE REQUIRED BY THIS SECTION TO WEAR NEGATIVE PRESSURE RESPIRATORS

A01606

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SLIDE ~~#37A~~ 60

CONSTRUCTION STANDARD (Cont'd)

- o ALL EXAMINATIONS UNDER SUPERVISION OF LICENSED PHYSICIAN
- o COMPLETE PHYSICAL EXAMINATION:
  - * MEDICAL AND WORK HISTORY
  - * PHYSICAL - EMPHASIS ON RS, CVS, GIT
  - * STANDARDIZED RESPIRATORY DISEASE QUESTIONNAIRE (APPENDIX D)
  - * CHEST X-RAY (PA 14"X17" AT DISCRETION OF PHYSICIAN
  - * PULMONARY FUNCTION TESTS (FVC, FEV_1)
  - * ANY ADDITIONAL TESTS DEEMED APPROPRIATE BY EXAMINING PHYSICIAN

A01607

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SLIDE ~~#2~~ 64 .

FREQUENCY OF EXAMINATIONS

- PRIOR TO ASSIGNMENT OF EMPLOYEE TO AN AREA WHERE NEGATIVE PRESSURE RESPIRATORS ARE WORN
- ON ASSIGNMENT TO AN AREA WHERE EXPOSURE MAY BE AT OR ABOVE ACTION LEVEL FOR 30 OR DAYS PER YEAR, MEDICAL EXAMINATION MUST BE GIVEN WITHIN 10 WORKING DAYS FOLLOWING 30TH DAY OF EXPOSURE
- ANNUALLY THEREAFTER
- AT OTHER FREQUENCY SPECIFIED BY EXAMINING PHYSICIAN.

A01608

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SLIDE [redacted] 62.

FREQUENCY OF EXAMINATIONS, Cont'd

NO MEDICAL EXAMINATION IS REQUIRED OF ANY EMPLOYEE IF ADEQUATE RECORDS SHOW THAT THE EMPLOYEE HAS BEEN EXAMINED WITHIN THE PAST 1-YEAR PERIOD.

A01609

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SLIDE ~~#~~ 63.

ACCURATE RECORD OF FOLLOWING MUST BE ESTABLISHED AND MAINTAINED FOR EACH EMPLOYEE:

- NAME
- SOCIAL SECURITY NUMBER
- COPY OF EMPLOYEE'S MEDICAL EXAMINATION RESULTS, INCLUDING THE MEDICAL HISTORY, QUESTIONNAIRE RESPONSES, RESULTS OF ANY TESTS AND PHYSICIAN'S RECOMMENDATIONS
- PHYSICIAN'S WRITTEN OPINIONS
- ANY EMPLOYEE MEDICAL COMPLAINTS RELATED TO ASBESTOS
- COPY OF THE INFORMATION WHICH WAS PROVIDED TO THE PHYSICIAN

RECORDS MUST BE MAINTAINED FOR DURATION OF EMPLOYMENT PLUS 30 YEARS IN ACCORDANCE WITH 29CFR 1910.20.

A01610

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SLIDE ~~#57~~ 64

NEW FEATURES IN 1986 STANDARDS

- o TWO SEPARATE STANDARDS
- o ACTION LEVEL: 0.1f/cc TWA_8
- o ACTION LEVEL AND BRIEF EXPOSURE PERIOD (30 DAYS OR MORE) IN 1 YEAR
- o REQUIREMENTS LINKED TO USE OF NEGATIVE PRESSURE RESPIRATOR IN CONSTRUCTION STANDARD

A01611

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SLIDE ~~#38~~ 65

NEW FEATURES IN 1986 STANDARDS

- o REDUCED FREQUENCY FOR CHEST X-RAYS
- o X-RAYS ONLY AS REQUIRED BY PHYSICIAN-CONSTRUCTION STANDARD
- o PRE-PLACEMENT MEDICAL EXAMINATIONS
- o "PRE-PLACEMENT" MEDICAL EXAMINATIONS FOR RESPIRATOR WORK OR 10 DAYS AFTER 30TH DAY, IF EXPOSURE MAY BE AT OR ABOVE ACTION LEVEL IN CONSTRUCTION WORK

A01612

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SLIDE #66

NEW FEATURES IN 1986 STANDARDS

- MANDATORY USE OF STANDARDIZED INITIAL AND PERIODIC RESPIRATORY DISEASE QUESTIONNAIRES
- X-RAY READER MUST HAVE DEMONSTRATED PROFICIENCY IN USE OF ILO U/C CLASSIFICATION AND MUST USE STANDARD FILMS
- TARGET ORGAN SYSTEMS CONCENTRATED ON IN MEDICAL EXAMINATIONS
- TRAINING REQUIREMENT FOR PULMONARY FUNCTION TECHNICIANS
- PUBLICATION OF APPENDICES D, E & I

A01613

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SLIDE ~~#9~~ 67

UNRESOLVED ISSUES

- MOST SUITABLE EXAMINATION FREQUENCY
- EMPHASIS ON NON-PULMONARY ORGAN SYSTEMS
- VALUE OF OTHER SCREENING TESTS

A01614

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SLIDE ~~#2~~ SLIDE 68

POSSIBLE RESULTS

- BETTER DATA COLLECTION
- QUALITY CONTROL OF
  - MEDICAL HISTORY
  - X-RAY INTERPRETATION
  - PULMONARY FUNCTION TESTING
- IMPROVED RECORDKEEPING
- IMPROVED RECORDS CONTENT
- IMPROVED COMMUNICATION



- BETTER PREVENTION OF ASBESTOS-RELATED ILLNESSES

A01615

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SLIDE #25A (Same as Slide #5)

ASBESTOS INDUSTRY REGULATIONS, 1931

ASBESTOSIS COMPENSABLE IN UK - 1931

A01616

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SLIDE #2A

THE GENERAL INDUSTRY STANDARD APPLIES TO INDUSTRIES THAT USE ASBESTOS TO MAKE ASBESTOS PRODUCTS, NAMELY, PRIMARY OR SECONDARY MANUFACTURING.

(EXCEPTIONS: Service Industry Such As Automotive Brake and Clutch Repair and Replacement; Shipbuilding)

THE CONSTRUCTION STANDARD APPLIES WHEN ASBESTOS EXPOSURE OCCURS AS A RESULT OF REMOVAL, DEMOLITION, NEW INSTALLATION, MAINTENANCE OR, NEW CONSTRUCTION.

A01617

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TABLE 1

Age standardized lung death rates* for cigarette smoking and/or occupational exposure to asbestos dust compared with no smoking and no occupational exposure to asbestos dust.

Group	Exposure to Asbestos?	History Cigarette Smoking?	Death Rate	Mortality Difference	Mortality Ratio
Control	No	No	11.3	0.0	1.00
Asbestos Workers	Yes	No	58.4	+47.1	5.17
Control	No	Yes	122.6	+111.3	10.85
Asbestos Workers	Yes	Yes	601.6	+590.3	53.24

* Rate per 100,000 man-years standardized for age on the distribution of the man-years of all the asbestos workers. Number of lung cancer deaths based on death certificate information.

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A01618

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TABLE 2: FREQUENCY OF CHEST ROENTGENOGRAMS

Years Since First Exposure	Age of Employee		
	15 to 35	35+ to 45	45+
0 to 10.....	Every Five	(5) Years	
10+.....	Every 5 Years	Every 2 Years	Every Year

AU1619

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