



INTERNAL CORRESPONDENCE

RECEIVED

UW-0143 13

514-149-2

OCT 11 1979

SAFETY DEPT.

CHEMICALS AND PLASTICS · SO. CHARLESTON PLANT · P. O. BOX 8004, SO. CHARLESTON, WEST VIRGINIA 25302

To (Name) Mailing List A-8

Date October 5, 1979

cc: J. C. Nelson
R. G. Harmon
R. E. McEldowney
D. A. Baehl
B. Y. Lette
K. O. Hopkins
W. V. Filipek
~~C. W. Carman~~
R. G. Hull, Jr.
R. A. Ream

Originating Dept.

Answering letter date

Subject Asbestos Handling

Within the last few years, asbestos has been recognized as a serious health hazard. One of the effects of breathing asbestos fibers is "asbestosis" which develops over a long period of time. Asbestos fibers become deposited in the lungs and produce scarring of the tissues so the lungs cannot perform their proper function. People who breathe dust containing asbestos fibers can develop lung cancer, which could take as long as 20 to 30 years to appear.

To ensure that plant employees are being properly protected, the Maintenance Department reviewed their procedures for handling of asbestos with the advice and service of the Safety and Environmental Protection Departments. As a result of the complete review, the attached procedure now exists that, when followed, should keep us in compliance with OSHA and environmental standards.

The plant's greatest problem with asbestos is when old asbestos is removed from lines or equipment. The Maintenance Department is not the only function operating within the plant that gets involved with the removal of old asbestos. UCC Construction and operating/distribution functions will from time to time remove asbestos. It is important that employees not be over-exposed, and that we have adequate exposure measurements to prove compliance with OSHA standards.

It is suggested that you read the attached procedure and call Mr. W. C. Young of the Safety Department if you have any questions concerning the procedure.

William B. Troutman
Safety Director

WBT:bl

Attachment

UCC 017386

XVIII. HEALTH AND SAFETY CONSIDERATIONS FOR ALL CRAFTSPERSONS
IN HANDLING MATERIAL THAT CONTAINS ASBESTOS

(With the intent of Covering every craftsperson
who might come in contact with asbestos)

Understanding a few facts and observing some common sense practices listed below will eliminate the Health Hazards associated with the use of asbestos and will insure the health of all crafts-
persons.

A. Major Concern for Asbestos Health Hazards

In those instances when asbestos fibers are present that are longer than five micrometers, the greatest health hazard exists. If these fibers are inhaled into the respiratory system, they collect in the lung sacs. If the quantities of these fibers are great enough to accumulate through years of continued inhalation, they take up substantial space normally used for air. The way in which asbestos fibers are more harmful than other foreign particles that enter the lung sacs is that they are not dissolved and absorbed into body waste streams to be carried away and discharged from the body as other particles are. They remain in the lung sacs. Membranes then grow around each fiber, resulting in a fibrosis of the lung sacs. Fiber by fiber over the years results in what we term "asbestosis."

B. Normally Asbestos is Not a Major Health Hazard

Under most conditions, asbestos is not normally in fiber form small enough to be airborne in a person's breathing zone and small enough to pass through the nasal filtering system of hair and mucous that filter out all but the very finest fibers. However, it is these small fibers longer than five micrometers entering the lungs that are considered to be the culprits that cause asbestosis.

C. Health Risks Associated with the Use of Asbestos Have Been Greatly Reduced

Risk of harm to craftspersons from the use of asbestos is slight because asbestos-free insulating materials are used exclusively now. Woven asbestos tape and sock has been replaced with woven fiber glass tape and sock in stores. No asbestos tape or sock is to be available from plant stores. Furthermore, previous personal sampling of the breathing zone air of employees indicates that allowable limits are seldom reached even when asbestos fibers are present in any type material or activity provided normal precautions are observed.

XVIII. HEALTH AND SAFETY CONSIDERATIONS FOR ALL CRAFTS-
PERSONS IN HANDLING MATERIAL THAT CONTAINS ASBESTOS

D. Our Concern - The Potential Harm from Existing Insulation
Materials in the South Charleston Plant

The potential harm to employees at the South Charleston plant lies almost exclusively in the removal, cleanup and disposal of existing insulation materials which were applied prior to 1972.

The exposure we are concerned with is the stripping, cleanup, and disposal of old insulation. On piping, any insulation with tar paper weather barrier will most probably contain asbestos fibers. A number of steam-traced lines were insulated with "Unibestos" (trade name) and some of these lines will have either cloth and mastic or metal weather barrier. This material (Unibestos) contains asbestos, is easily recognized and must be handled, stripped off, cleaned up, and disposed of, using full precautions.

Now, we have another concern. A number of our steam lines are in the process of extensive repairs to the weather barrier and replacement of damaged sections of insulation. These will tie into present asbestos contained in pipe covering and will cover existing asbestos contained in insulation. In the future, all this insulation will have to be considered to contain asbestos and precautions taken to eliminate hazards.

Tank covers installed prior to 1972 will be treated as though they also contain asbestos and all precautions will be taken during stripping, cleanup, and disposal.

Old steam trap lines, steam tracers, etc. will have asbestos sock or tape. Should you encounter any of these situations, consider the insulation to contain asbestos and take the necessary precautions.

If you aren't sure of the kind of material you are getting ready to remove, ask your area insulator supervisor or observe all precautions.

E. Protection from Potential is Assured

By following a few precautionary measures as required by OSHA regulation 1910.1001 and using sound judgment, each employee can perform his/her work in a perfectly safe and healthful manner.

XVIII. HEALTH AND SAFETY CONSIDERATIONS FOR ALL CRAFTS-
PERSONS IN HANDLING MATERIAL THAT CONTAINS ASBESTOS

E. Protection from Potential is Assured (continued)

Present OSHA Allowable Limit

During an eight-hour period, the time-weighted average shall not exceed two fibers longer than five micrometers, per cubic centimeter of air.

OSHA Ceiling Concentration

No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of ten fibers, longer than five micrometers, per cubic centimeter of air. Methods of measuring airborne concentrations are spelled out in the OSHA Register, regulation 1910.001 (e).

October 4, 1979

Attachment

MANDATORY PRECAUTIONS AND PROCEDURES TO BE FOLLOWED
WHEN HANDLING AND WORKING WITH MATERIALS CONTAINING ASBESTOS

CHECK LIST

1. Respirators

Shall be worn while removing and cleaning up all insulation, whether asbestos is present or not. Disposable types are allowed if they meet requirements. If upper limits are reached, supplied air respiratory equipment must be used.

2. Work Area Precautions

The work area will be roped off with yellow barricade tape during the removal and cleanup of asbestos-laden insulation. Warning signs to state: ASBESTOS -- AVOID BREATHING DUST -- WEAR PROTECTIVE EQUIPMENT -- DO NOT REMAIN IN AREA UNLESS YOUR WORK REQUIRES IT -- BREATHING ASBESTOS DUST MAY BE HAZARDOUS TO YOUR HEALTH -- must be posted outside each barricaded area to warn an employee desiring to enter the area so he/she can take the necessary protective steps. The barricade tape and warning signs are to remain in place until the job is complete.

If the work is being performed where areas cannot be swept, or above open grating, the work area shall be covered with plastic sheeting or tarpaulins to contain the asbestos-laden insulation. Over grating, this will prevent insulation from filtering through into other work areas and will protect other employees from the asbestos hazards. On slagged areas this will prevent mixing insulation in the slag, made for easier cleanup and not leave insulation residues on the ground.

3. Wet Cleanup

Insofar as practicable, insulation containing asbestos should be wet down before removal, cleanup and disposal to prevent the presence of airborne fibers. If this is not practicable, place plastic sheeting under the job being stripped and mist spray, with water, the removed insulation. Where possible, strip the insulation into labeled plastic bags on the job site (fiber-pacs can be used to support bags until bag is wired closed).

When wet removal, cleanup is impractical due to temperature - below 32°F - location and/or nature of the job, sweeping compound will be applied to the work area during cleanup.

All insulation will be stripped and bagged in the area in which it is removed.

CHECK LIST (continued)4. Disposal

All removed insulation containing asbestos will be placed in dust-proof polyethylene bags, the bags wired closed and caution label attached to caution personnel about the asbestos contents. Bags with caution label on the bag front are being used. Each area insulation caution label on the bag front are being used. Each area insulation supervisor has a supply of these bags. The bagged insulation must be disposed of in landfill. This means we will place the bags in open top dumpsters and deliver to Filmont only, for covering up. Large quantities may be placed wet in a dumpster bed, covered to prevent dust loss, warning labels attached, and delivered to Filmont only and covered with soil.

5. Clothing Storage

Work clothing used by insulators will be stored in separate lockers away from their street clothing. Coveralls will be supplied for jobs where insulation containing asbestos is being removed, cleaned up, and disposed of. Coveralls will be changed each day when the concentration of asbestos fibers may be heavily concentrated. Coveralls should be removed or vacuumed before entering eating facilities or where food is handled.

Vacuums may be used to remove dust from clothing. CAUTION -- at no time will compressed air be used for dusting off skin or clothing.

6. Laundering

All protective coveralls used by insulators will be placed in dust-proof polyethylene bags, wired closed, and a caution label attached to each bag to alert the laundry employees of the possible asbestos contamination of the contents.

CAUTION -- Used bags are to be disposed of and coveralls returned in clean containers.

7. Monitoring

All jobs of significant size are to be monitored. Safety Department will monitor these jobs with designated equipment for air samples at the employees' breathing air zone. Results will be recorded. One day notice should be given to the Safety Department so equipment can be prepared for the job. Monitoring results will be administered in accordance with Safety/Health Procedure No. 16.

8. EPA Notification

Stripping jobs of insulation containing asbestos must be reported to the plant EP Department (John Soice) for all large-scale jobs. A large-scale job is one where more than 260 linear feet of pipe is to be stripped or a job where more than 160 square feet is to be stripped. Notification must be 20 days in advance so proper notification can be filed with EPA.

9. Medical Records

Will be maintained by the Medical Staff.

Respirators approved for use:

- a) Normal Dust Exposure - 3M Respirator No. 8710
Wilson Respirator No. 1400

Both of the above are of the single use, disposable type.

- b) Heavy Dust Exposure - Type "C" supplied air, continuous flow or pressure-demand type, supplied with full breathing air from breathing air cylinders.

WARNING SIGNS

To State: Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work Require It
Breathing Asbestos Dust May be Hazardous to Your Health

Warning signs are located in each insulator building and must be used.

CAUTION LABELS

To State: CAUTION - Contains Asbestos Fibers
Avoid Breathing Dust
Breathing Asbestos Dust May Cause
Serious Bodily Harm

Caution tags for polyethylene bags containing discarded asbestos insulation materials and polyethylene bags containing coveralls used by insulators being sent to the laundry are stocked by each insulator supervisor in the three geographic areas. Bags with caution notices printed on the front are now being stocked and will be used.

INDUSTRIAL HYGIENE MEMORANDUM

To: SID Supervisors (938)
R&D Supervisors
Services Supervisors
Mr. H. L. Robinson

January 24, 1972

From: Fred Williams

Increasing concern about asbestos has resulted in the issuance of an emergency standard that reduces the concentration of airborne asbestos dust to which personnel may be exposed without approved respiratory protection. This standard became effective December 7, 1971, as reported in the Federal Register, Chapter XVII, Part 1910 - Occupational Safety and Health Standards.

Section 1910.93a Asbestos dust states:

(a) The 8-hour time-weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 5 fibers per milliliter greater than 5 microns in length, as determined by the membrane filter method at 400-450 X magnification (4 millimeter objective) phase contrast illumination. Concentrations above 5 fibers per milliliter but, not to exceed 10 fibers per milliliter, may be permitted up to a total of 15 minutes in an hour for up to 5 hours in an 8-hour day.

(b) Engineering methods, such as but not limited to, enclosure, vacuum sweeping, and local exhaust ventilation, shall be used to meet the exposure limits prescribed in paragraph (a) of this section. Where such engineering methods are not feasible, or do not otherwise reduce the concentrations below those prescribed in paragraph (a) of this section, respiratory protective devices shall be provided and used in accordance with paragraph (c) of the Federal Register.

(d) (2) All hand - or power-operated tools which produce asbestos dust such as, but not limited to, saws, scorers, abrasive wheels, and drills shall be provided with local exhaust ventilation and dust collectors in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems; ANSI Z9.2 - 1971.

(d) (3) Employees exposed to the spraying of asbestos or the demolition of pipes, structures, or equipment covered or insulated with asbestos shall be provided with respiratory protective devices in accordance with paragraph (c) (4) of the Federal Register.

(e) Asbestos cement, mortar, coatings, grout, and plaster shall be mixed in closed bags or other containers.

(f) Asbestos waste and scrap shall be collected and disposed of in sealed bags or other containers.

(g) All cleanup of asbestos dust and blowing shall be performed by vacuum cleaners. No dry sweeping shall be performed.

In order to protect individuals working with asbestos and to assure compliance with the Occupational Safety and Health Act, the following is recommended:

1. Notify the industrial hygienist when work with asbestos is to be performed that can create a dust, eg: sawing, grinding, blending, demolition, etc.

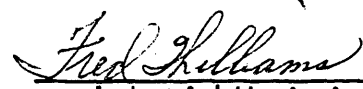
(a) Air samples may be collected to evaluate potential personnel exposures to asbestos.

(b) An evaluation will be made on the extent and type of personnel protection that will be needed.

(c) Waste disposal arrangements can be made.

(d) Record of personnel working with asbestos can be maintained.

2. When possible, substitute an insulation containing no asbestos.


Industrial Hygienist

F.Williams/ebc

Cuz
11/8/72

OSHA TECHNOLOGY MEMORANDUM

SUBJECT: MONITORING EXPOSURE TO ASBESTOS

To provide timely guidance, memoranda will be used to transmit technical information pertinent to NIOSH - OSHA health standards and to supplement the Group I Guidelines for compliance with the standards.

The following information pertains to monitoring of personnel exposure to asbestos fiber:

1. The Occupational Safety and Health Reporter (Bureau of National Affairs, Inc.) published on September 28, 1972 an OSHA Sampling Data Sheet No. 2 (Revised) for asbestos. This sheet was to be used by OSHA inspectors and made part of their Compliance Operations Manual. The sheet dealt with several subjects, including sampling time, ceiling limits, and calculation of 8-hour time-weighted average exposure. The sheet contains several errors and omissions. It will be reissued by OSHA within two weeks according to an OSHA spokesman.
2. We are receiving questions about how to distinguish between asbestos and other fibers, such as wood or glass, which are seen in some air samples. This can be done, but it is not a simple matter. It involves techniques such as using polarized lighting, sample staining, electron microscopy, or experienced "eye-ball" identification at high magnification. Neither we nor the NIOSH people can offer a simple method at this time. The NIOSH people recognize the need, and possibly some suggestions from them may be forthcoming. In the meantime let's procede in the following manner.
 - a) If the total fiber count you get is below the limit for asbestos, there is no need (for the present) to try to identify the fibers.
 - b) If the total count exceeds the asbestos limit, and if you suspect the presence of fibers other than asbestos and feel an effort to identify them is justified, advise us of the circumstances. We will work with you in making the identification and selective count. Each problem and the priority of the work will need to be considered individually.
3. Cressend Schonberg, Taft Plant Industrial Hygienist, recently attended NIOSH course No. 550, Industrial Hygiene Measurements, at Cincinnati. While there, he obtained a copy of their laboratory procedure for mounting slides, calibrating the magnification, and counting asbestos samples. He concluded that our Laboratory Method 38C-29X4-R1 is generally consistent with the NIOSH method. He has supplied us with a copy and we are currently examining both methods in detail. We find only very minor differences which do not impair the suitability of our method for our use. (See next item for possible revision of Method 38C-29X4-R1 at a later date.)

4. While in Cincinnati Cressend made some inquiries about the special asbestos counting courses to be given by NIOSH and reports the instruction will likely be quite elementary in nature. The first course, Oct. 31 - Nov. 2 is restricted entirely to government personnel and has been filled. We have Joe Neff, R/D Environmental Health Laboratory, registered for the second offering Nov. 20, 21, and 22nd. Immediately following those dates Joe will send you a brief description of the course to aid you in deciding whether you or your people should try to attend. Joe will also, if necessary, promptly revise our sampling and counting instructions as contained in the Group I Guideline and in Laboratory Method 38C-29X4-R1, to make them consistent in all detail with the current OSHA - NIOSH technology.



Environmental Health Laboratory

NHK:gk
10/31/72

Distribution:

J. S. Burdick, Niagara Falls
A. E. Bransford/L. G. McMullen, 510
C. W. Carman, Jr., 511 ←
M. G. Collins, 510
D. E. Deese, 515
C. U. Demehl, M. D., NYO-4
C. C. Duffield, 314
G. M. Frisch, 514
F. J. Garcia-Sharp, 293
R. E. Graebert, 312
H. R. Guest, 511
F. E. Hand, 519
R. W. Kiefer, 511
W. E. Knight, 513
R. G. Lilley, 514
R. O. Lohman, 314
W. F. Long, 380
S. V. Lucas, 380
H. W. Milward, 517
K. G. Morlock, 517
B. L. Murray, 514
W. D. Neal, 312
R. Oeben, 293
R. E. Peele, 514
J. C. Schonberg, 519
J. S. Schultz, 515
C. W. Shonnard, 380
J. H. Sledge, 510
E. D. Southard, 519
J. M. Swalm, 312
C. C. Tanona, 511
R. J. Taylor, 511
K. G. Townsend, 526
Fred Williams, 511
J. L. Wyatt, 526
J. O. Zimmerman, Elk Grove
J. P. Zuccarelli, 312

CEV
11/9/72

MEMORANDUM

ASBESTOS GUIDELINES CLARIFICATION

October 27, 1972

The recently circulated Group I guideline on the OSHA asbestos standard has resulted in requests for clarification of the statement regarding the mandatory use of Type C respirators during demolition or removal of asbestos insulation or covering.

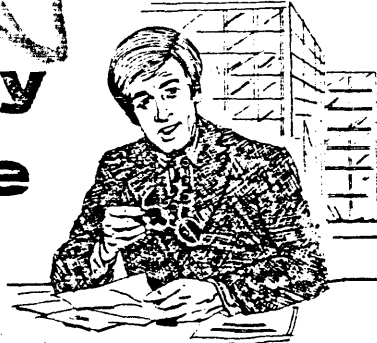
It is the opinion of the Group I Safety Office that this type work can be performed without respirator protection providing proper and careful monitoring proves that an exposure hazard does not exist. Two of our plants have determined that the level on small outdoor removal jobs has been below the 5-fiber TLV where care in removal, wetting down, and immediate cleanup were observed. It is emphasized that monitoring must be continued and records maintained to assure that a hazard does not develop. Different conditions such as a large demolition job or an inside job would have to be monitored and judged accordingly.

Group I Safety Department

RJT/ero
10/27/72

Distribution:
Industrial Hygienists
OSHA Representatives

policy guide



Asbestos Alarm

Between 8.5 million and 11 million U.S. citizens face a greatly increased risk of developing cancer because of work-related exposure to asbestos, the Department of Health, Education, and Welfare warns. HEW is sending letters to the nation's 400,000 doctors, alerting them to the kinds of occupations in which asbestos exposure has occurred, the diseases that may result, and the detection methods that are available. One of the largest groups exposed to asbestos is the 4.5 million workers employed in shipyards during World War II. Noting that asbestos-related diseases can take from 15 to 35 years or longer to develop, HEW Secretary Joseph Califano stresses that "workers exposed in the past, especially those from the war years, may just now be facing serious health effects."

Campaign Against Cancer

HEW's warning is part of the federal government's effort to focus public attention on the widespread health hazards caused by asbestos exposure. In addition to the letters to physicians, the National Cancer Institute has prepared an asbestos question-and-answer publication to inform the public of the risks incurred by exposure to the mineral. Also, Califano says, HEW is developing a "detailed public information" campaign, with the help of "unions, employers, and other interested parties," to alert the public to the dangers of asbestos.

About 1.5 million to 2.5 million workers currently are exposed to asbestos on the job. Exposure to asbestos, which has more than 3,000 known uses, primarily occurs in the construction industry, although the substance also is used in direct mining and manufacturing, insulation, roofing, and automotive brake and clutch work. Exposures as short as a month in duration can result in disease many years later because inhaled dust may remain in the body.

Diseases linked to asbestos include:

► **Lung cancer**—An estimated 20 to 25 percent of workers who were exposed to asbestos before workplace safety regulations limited its use stand a

good chance of dying from lung cancer. Nonsmokers exposed to asbestos are three to four times more likely to develop lung cancer than nonsmokers who have not been exposed, while exposed smokers are 30 times more likely to have lung cancer than exposed nonsmokers, and 90 times more likely than nonexposed nonsmokers.

► **Mesothelioma**—A rare form of chest and abdominal cancer, it has caused the death of about 7 to 10 percent of those exposed.

► **Gastrointestinal cancer**—Those exposed to asbestos are twice as likely to die of gastrointestinal cancers than those not exposed.

► **Asbestosis**—About 7 percent of exposed workers contract this irreversible lung disease, which makes breathing difficult and increases the risk of pneumonia and other ailments.

Compensation, Critics, and Contracts

Recently, a group of more than 400 workers were awarded an unprecedented \$20 million in damages as a settlement of their claim that they had not been given adequate warning of the cancer-causing effects of asbestos. The federal government agreed to pay \$5.25 million of that amount, with the employers picking up the rest. That case has prompted a barrage of similar suits by asbestos workers throughout the country and fueled a growing debate about the proper way to compensate employees.

The debate centers on whether Congress should pass a "white lung" bill to pay benefits to victims of asbestos disease or whether the workers should remain free to seek damages in court. Although the Asbestos Workers union supports the white lung bill, other segments of organized labor are holding out for comprehensive legislation dealing with all kinds of occupational illnesses.

Meanwhile, Dr. Sidney Wolfe, director of Ralph Nader's Health Research Group, says that the government should contact exposed workers directly. He also says that the government should provide "information on legal remedies that can or should be sought by hundreds of thousands likely to develop asbestos-related disease."

According to HEW, people who think they may have been exposed to asbestos should consult their personal physicians. Health information also is available from the National Cancer Institute (Office of Cancer Communications, Bethesda, Md. 20014) or from local cancer information services. HEW says that former employees of the Department of Defense can contact DOD directly or can route their inquiries about compensation to the Department of Labor. Private-sector employees can contact their unions for information or get in touch with state workers' compensation officials.

Dry-Wall Joint Work New Asbestos Danger

WASHINGTON — (AP) — The Labor Department warned the construction industry Tuesday of a new-found source of danger to workers from exposure to asbestos fibers.

Asst. Labor Secretary John H. Stender, chief of the department's Occupational Safety and Health Administration, said the agency has found that many spackling and taping compounds used to cover seams in dry-wall joints contain asbestos.

Employees sanding joints smooth before painting may

be exposed to dangerous levels of asbestos fibers, Stender said. He urged the construction industry to alert all employers and employees of the potential hazard and the need to comply with government health rules.

The agency's health standard governing asbestos limits exposure to five fibers per cubic centimeter of air. Stender said asbestos exposure from the dry-wall joint taping compounds range from three to 13.7 fibers per cubic centimeter.

Union Carbide Corporation
Chemicals and Plastics
Institute, West Virginia

Special Report
Medical Department
1 August 1973

ASBESTOSIS

SUMMARY

The Medical Department, early in 1973, completed the first survey including a comprehensive medical examination and obtained chest X-ray films on 70 Institute Plant workers who possibly have had or are still having exposure to asbestos-containing materials such as insulation, as required by law. The local radiologists who make and read X-ray films regularly for the Institute Plant diagnosed 20 cases (29%) of pneumoconiosis (asbestosis). The films on these 20 positive cases were interpreted by an impartial out-of-town radiologist who confirmed 11 cases (16%) as positive for pneumoconiosis. The law further requires this survey to be completed annually and the Medical Department will comply. It behooves the plant administrators to attempt to eliminate the hazard from asbestos.

INTRODUCTION

The William-Steiger Occupational Safety and Health Act (OSHA) of 1970 emphasized the need for standards to protect the health of workers exposed to a potential hazard; e.g., asbestos. Exposure to asbestos may result in pneumoconiosis, a disease of the lungs that produces symptoms, abnormal physical findings and X-ray changes of the lungs. The condition is progressive and may result in partial or total permanent disability. Asbestos exposure is believed also to induce neoplasms; i.e., mesothelioma of the pleura or lung -- a tumor with an unfavorable prognosis.

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document, "Occupational Exposure to Asbestos," which simply is the criteria for a recommended standard. OSHA, in 1972, accepted the recommendations of NIOSH and adopted the recommended standards into the law. The medical requirements now are contained in Section 1910.93a(J).

Since asbestos is a component of insulating materials which are widely used in industry, it is believed that some Corporation on-site Plant 512 employees had or may still be having exposure to asbestos or asbestos-containing materials. If so, the law requires that these individuals be included in a medical surveillance program conducted at company expense.

MEDICAL SURVEILLANCE

Medical management, as described *in toto* in the law, includes many facets but most important at present is (1) an attempt to ascertain the names of all employees who have had or may still be having exposure to asbestos and, after compiling the list, (2) to complete a comprehensive medical examination on each of those individuals.

For the former, the Medical Department sent an inquiry to various plant department heads, production managers and superintendents. Replies included the names of 42 insulators, 2 laborers and 8 sheetmetal workers in the Maintenance Department and the names of 18 operators in the Steam Plant Department. Insulators,

of course, handle asbestos-containing insulation, sheetmetal workers use asbestos in fabricating and joining ductwork, Steam Plant operators handle two filter materials containing diatomaceous earth* in the condensate filters and laborers in at least one plant maintenance area clean up debris after maintenance insulators complete jobs in the area.

The comprehensive medical examination, to be completed annually as outlined in OSHA Section 1910.93a(J) (3), includes as a minimum the following:

- (1) A history to elicit symptoms of respiratory disease,
- (2) A Pulmonary Function Test, including Forced Vital Capacity (FVC) and Forced Expiratory Volume at one second (FEV_{1.0}), and
- (3) A chest Roentgenogram (posterior-anterior, 14 x 17 inches).

In addition to the above, NIOSH also recommended the inclusion of additional procedures as follows:

- (1) A history to describe smoking habits, details of past exposure to asbestos and their dusts and the presence or absence of pulmonary, cardiovascular and gastrointestinal symptoms, and
- (2) A physical examination with special attention to pulmonary rales, clubbing of fingers and other signs related to cardiopulmonary systems.

The Medical Department developed a form (MD-4), which included entries for all the above components, plus body temperature, pulse rate at rest, blood pressure, height, weight, hemoglobin and hematocrit to compile a record of the examination.

CHEST X-RAYS

Since July, 1950, all Institute Plant employees have had their chests X-rayed, at company expense but not on company time, regularly. Formerly, this was accomplished as part of a periodic physical examination, offered on a voluntary basis to all employees by the plant Medical Department, and since December, 1969, as a component of Multiphasic Health Screening, offered to all employees, again on a voluntary basis, every two years.

The medical "firm" presently called Doctors Elkin, Kugel and Deardorff, Inc., has been taking chest X-rays on Plant 512 employees and providing professional interpretation of the films since the inception of the program. The Plant Medical Director requested in 1950 that the chest X-ray interpretations be fully explanatory and as complete as possible. The first film obtained on each employee (usually as a component of the preplacement examination) resulted in an interpretation that satisfied this request. However, follow-up films on many employees (and some have had as many as 12 or 14 in the 25-year period) have resulted in interpretations such as, "The previously noted minor abnormalities . . . are again evident but comparison with an old chest X-ray of 14 months earlier shows no change. The heart, lungs and thoracic cage show no other pathology."

*Two trademarked products called CELITE. The red-labeled product contains diatomaceous earth plus chrysotile asbestos fiber and the blue-labeled product contains diatomaceous earth.

The Medical Department was not satisfied completely with the latter interpretations, particularly since the present survey was to evaluate the employee from a specific standpoint -- mainly asbestosis. Therefore, the Medical Department stamped the X-ray orders as follows: "COMPLETE NEW INTERPRETATION REQUESTED" and "ASBESTOSIS SURVEY."

The roentgenologists in the medical "firm" providing this service agreed and also advised that each film interpreted would be classified according to the UICC/Cincinnati Classification of Radiographic Appearances of Pneumoconioses.

PNEUMOCONIOSES

In 1867, F. A. Zenker, the Professor of Pathology at the University of Dresden coined the term "*pneumono koniosis*" to describe changes in the lungs due to all types of inhaled dusts. He proposed the term, now shortened by common usage to pneumoconiosis, after publishing the medical history and pathological findings of the brick-red-colored lungs of a 31-year-old female factory worker who died of respiratory disease. This patient had worked with iron oxide which had been inhaled into the lungs so Zenker also coined the term "*siderosis*" from the Greek word for iron. It may be interesting to the reader to know that one Plant 512 sheetmetal worker's X-ray was interpreted as pneumoconiosis, presumptively due to asbestos, but a careful work history indicated that the diagnosis should be siderosis rather than asbestosis. Based on Zenker's original proposal, any lung disease due to dust is classified as a pneumoconiosis.

There are many trades or occupations potentially associated with pneumoconioses and consequently there are many materials or compounds that are capable of causing a pneumoconiosis. The specific type of pneumoconiosis is usually named for the compound causing the disease, has a synonym named for the occupation or is named for the person first describing the disease, such as:

Berylliosis	-	beryllium
Bagassosis	-	bagasse (dried sugar cane fiber)
Chalcosis	-	copper
Silicosis	-	silicon dioxide
Talcosis	-	talc
Coal Worker's Pneumoconiosis	}	coal dust
Black Lung		
Miner's Asthma		
Collier's Lung		
Anthrocosis	}	dust from moldy silage or dust from threshing grain
Farmer's Lung		
Thresher's Lung	}	iron
Siderosis		
Grinder's Disease	}	bauxite fume
Shaver's Disease		
Asbestosis	-	asbestos

ASBESTOSIS

Even under very severe dust conditions, it may take five to ten years of exposure for asbestosis to develop. The onset is usually insidious with only shortness of breath and vague chest pains. Bronchitis and increased sputum are not a feature of the early stages of the disease. Lung function tests may show only a lowering of the total vital capacity.

The radiographic diagnosis may be more reliable and exacting in the early stages rather than by the symptomatology or the physical findings, particularly the latter, because these develop later. Pleural thickening which is not a feature of other kinds of pneumoconioses but can and does occur from many other diseases, happens early and may be the only radiographic change noted in early asbestosis. As the disease progresses, the next earliest change is usually seen at the lung bases. The normal vascular pattern is replaced or obscured by small, irregular, fine, medium or coarse opacities. In time, these become more profuse and extend to the upper lung field zones. Eventually, presented radiographically, may be the hazy appearance of the entire lungs -- the so-called "Ground Glass" appearance. This, of course, is a late sign. Another late radiographic sign that rarely occurs under 20 years of exposure is calcification of the pleura -- a striking feature-- and this may occur in the absence of any other clinical features. Eventually the outline of the left cardiac border may become ill-defined and produce, in severe cases, the classical "Shaggy" heart appearance.

Early in the disease, despite a few symptoms -- shortness of breath and vague chest pains -- there is an absence of abnormal clinical findings except for the early X-ray changes. Except for the X-ray evidence and the elicitation of the exposure history, the diagnosis is difficult to make. Even after the diagnosis of pneumoconiosis is established, the etiology of the disease is even more difficult to make. Complicating factors are exposures in previous occupations, exposures in "moonlighting" ventures, hobbies, cigarette smoking and many others. As the disease progresses, there can be noted definite abnormal findings. There may be wheezing and fine basal rales. The fingers, and occasionally the toes, may be clubbed and with a careful occupational history to pinpoint continued exposure, a definitive diagnosis can be advanced. In addition, the radiographic appearance will worsen and helps confirm the diagnosis.

THE COMPREHENSIVE MEDICAL EXAMINATION

During January, 1973, the Medical Department mailed requisitions to 70 Plant 512 employees so they could obtain, at company expense, on their own time, a chest X-ray. When the interpretations were received by the Medical Department, the employee was given an appointment to complete the remaining components of the examination. The employee was asked to complete the front of Form MD-4; i.e., the brief work history, the medical history and the smoking history. The nurse obtained the employee's blood pressure, body temperature, respiratory rate, pulmonary function and other pertinent procedures. The medical technologist performed a hemoglobin and hematocrit on the employee's blood specimen. After obtaining and recording the above information, including the X-ray report, the employee was examined by the physician.

On completion, the employee was told the results -- either he had no problem or he had pneumoconiosis. If the latter, the employee was requested to complete Form MD-5 -- a detailed history of his occupational experiences -- in an attempt to obtain additional information that would pinpoint the etiology of his pneumoconiosis.

EXAMINATION RESULTS

Of the 70 Institute Plant employees examined, the first was completed on 29 Jan 73 and the last was completed on 15 May 73. The physician was absolutely amazed, or perhaps a better word, astounded, to find that five of the first six men scheduled to be examined (five insulators and one sheet-metal worker) had had their X-rays classified as positive for pneumoconiosis. Some of these workers had symptoms -- shortness of breath, coughing and rales -- and some of them had abnormal physical findings; e.g., diminished chest expansion, wheezing and increased respiratory rate. However, all five of the men with positive X-rays do now or did smoke cigarettes excessively during most of their lifetime and this history, plus the information obtained on prior chest X-rays, had resulted in previous diagnoses of chronic obstructive lung disease; e.g., pulmonary emphysema, chronic bronchitis, etc. It was a further source of amazement to the examining physician that when the roentgenologist was requested to interpret the X-ray from the viewpoint of diagnosing pneumoconiosis, he could now readily diagnose this specific condition.

Undoubtedly, if this survey had been started ten years ago, some of the cases diagnosed presently as pneumoconiosis might have become evident at that time. However, in recent years, X-ray equipment has been improved considerably and with a new so-called "Grid" the X-ray films produced now show greater detail than previously, allowing diagnoses to be more definitive. The examining physician, who has practiced occupational medicine for 25 years, has been aware of the existence of pneumoconiosis and asbestosis for many years. In addition, he was well aware that some plant employees worked in the plant at trades where they could easily have opportunities for exposure to asbestos. For some unknown reason, the author never considered that plant employees could be having exposures to asbestos that might be harmful. It is with some regret that this admission must be made and the author's position is untenable.

Concurrently, the same roentgenologists have been interpreting X-ray chest films on these same employees periodically for many years. Of course, the radiologists did not know that these employees were working with materials that are capable of causing pneumoconiosis but they have never indicated in past interpretations that pneumoconiosis was a possibility. These physicians readily admit that they have missed diagnoses and their explanations of why this happened seems logical and acceptable. One of their explanations is that comparing the newest film with the one immediately preceding is somewhat like being closely associated with a person dieting. The change is so gradual that it is not noticed until finally, after much weight is lost or the film is so different, i.e., attention is directed to the drastic end result, then it is quite obvious and apparent that there is a considerable difference.*

What has happened previously cannot be altered but of the 70 Institute Plant employees participating in this survey, 20 employees (28.6%) were diagnosed as now having pneumoconiosis. A table following shows the pertinent statistics:

*Physicians and hospitals who take X-rays legally may destroy any films after five years but the written reports (medical records) must be retained. Therefore, chest X-ray films made 20 years ago are not available for comparison with recent films.

Table 1.—X-ray and Examination Findings of 70 Workers Presumably Exposed to Asbestos		
	Positive X-rays	Negative X-rays
Total number insulators	13	29
Total number sheetmetal workers	2	6
Total number laborers	1	1
Total number Power House operators	4	14
Total number employees	20	50
Total number with symptoms	12	15
Total number with reduced FVC*	11	12
Total number with abnormal PE findings	6	4

*Forced Vital Capacity

Individuals reading this report would have no difficulty understanding the codes used to classify the radiographic appearances of pneumoconiosis (asbestosis) if they are familiar with the UICC/Cincinnati Classification. However, for the benefit of those not familiar with the system, the X-ray interpretations of the 20 positive films can be categorized into the following:

- 6 - Category 0, or highly suspicious of asbestosis (3 employees with only pleural thickening and 3 with Code 0/1).
- 10 - Category 1, or minimal asbestosis (5 employees with Code 1/0, 1 with Code 1/1 and 3 with Code 1/2).
- 4 - Category 2, mild to moderate asbestosis (2 employees with Code 2/1 and 2 with Code 2/2).

There were no films of Institute Plant employees interpreted as Category 3 (severe or advanced asbestosis) during this survey.

Of the 20 employees having positive X-rays, there were 12 (60%) who complained of shortness of breath and coughing, while in the group of 50 employees with negative X-rays, 15 (30%) had symptoms. In the former group, 11 (55%) had reduced Forced Vital Capacity while in the latter, only 12 (24%) were reduced from their predicted normal. The employees with abnormal physical findings (reduced chest expansion, rales or ronchi) numbered 6 (30%) of the 20 with positive X-rays, while in the negative group, only 4 (8%) had abnormal findings. It would appear that percentagewise, at least, the employees with X-rays positive for pneumoconiosis manifested a significant increase in symptoms, reduced vital capacity and abnormal findings over the negative group.

SIGNIFICANCE

It is obvious to the physician that without the assistance of the chest X-ray, it would be most difficult to make a conclusive diagnosis of asbestosis, particularly in a worker who has only very minimal, mild or moderate disease. The radiologist's contribution is perhaps the greatest factor in establishing a diagnosis of pneumoconiosis. Yet, his radiological diagnosis and his classification of the degree of illness represents his opinion only and is subject to question. Unfortunately, his interpretation is not selective enough to diagnose the precise etiology of the pneumoconiosis.

To substantiate this comment, it may be worthwhile to elaborate on the case of an insulator who has worked with asbestos-containing material for only four years and a complication is that he worked for two years with a coal cutting and loading machine. His occupational history revealed further that he was in the armed service four years as an electrician and spent six years in a master mechanic's school. Prior to his most recent and present job as an insulator, he was employed ten years as a chemical operator.

The radiologist reading this employee's chest X-ray films classified them as UICC 2/1 q CO OD (dense pericardial calcifications) Grade 3. He reported that the pericardium was calcified both about the anterior and posterior circumferences of the heart and was 2 to 5 mm in thickness. The fine nodular fibrosis in the lungs was compatible with pneumoconiosis. The UICC classification is interpreted as Category 2 (mild to moderate pneumoconiosis), q (rounded opacities up to about 1.5 mm in diameter), CO (abnormality of cardiac size or shape) and OD (other significant disease) in reference to the pericardial calcification. The radiologist told me personally that this worker, if exposed to asbestos, presumably had asbestosis, but he was unable to correlate the findings of pericardial calcification with this diagnosis and didn't understand the connection, if any existed.

There appears to be little, if any, question that this insulator does have pneumoconiosis but whether it is a result of two years' exposure in the coal mines and a coal worker's pneumoconiosis, or 14 years working at the Institute Plant and an asbestosis, or possibly a pneumoconiosis resulting from a combination of these two work experiences is anyone's guess. Also, since we are using and paying for the services of these radiologists, their classification of this worker's chest X-ray films, Code 2/1, and definition, Category 2 (moderate pneumoconiosis), should be accepted without question. The author, however, was disturbed by the description of the pericardial calcification and further disturbed by the radiologist's statement that he couldn't explain its etiology or connection with the pneumoconiosis. Therefore, arrangements were made to send these two films (posterior-anterior view and right lateral view) to the USPHS in Cincinnati for an interpretation by their consulting radiologists.

These physicians are representatives of one of the three groups that collaborated to establish the UICC/Cincinnati classification system and they are considered to be the world authorities on the subject of pneumoconiosis. Their interpretation of these films were: (1) Pneumoconiosis 0/1 t all six zones, (2) slight generalized cardiac enlargement and (3) extensive pericardial calcification. Their general consensus of opinion was that the pericardial changes were due to cardiovascular disease rather than due to dust exposure. The author is not convinced that this insulator has asbestosis, although he certainly has a pneumoconiosis.

One of the physicians of the local radiology "firm" was given the report from the USPHS group and each of the other four radiologists of the "firm" then reviewed the films independently without knowledge of the USPHS group's opinion. They all agreed separately with the original reading and collectively disagreed with our world authorities. These films now should be interpreted by a third group or a "C" reader.

Our local radiologists have taken an intense interest in the Institute Plant's small series of pneumoconiosis X-rays and offered to meet with the corporation's local physicians and review with us all of the films they have reported as positive.

RADIOLOGY CONFERENCE

On 30 May 73, Doctor T. Spencer (Plant 511), Doctor Q. Hull (Plant 514) and the author met with three of the five radiologists to review and discuss the X-rays on the twenty Institute Plant employees believed to have asbestosis. As each film was reviewed by the radiologists, the author presented a brief work history on the employee. This session proved to be informative.

Without having the written interpretations and UICC classifications available, the three radiologists attempted to collectively interpret and classify each of the 20 films. Unfortunately, 17 of the 20 positive films had been interpreted initially by the two radiologists who could not attend. The three radiologists present could not seem to agree on individual interpretations or classifications and, in addition, could not re-interpret some of the films in the same manner or same classification that was recorded initially. The radiologists present were in agreement that probably most of the films had been overread.

The author suggested that all the positive films be sent to an impartial radiologist for his interpretation and classification. The Charleston radiologists would thus be the "A" readers and another physician would be the "B" reader. The latter would provide his opinion without knowledge of our radiologist's report. This suggestion was received favorably and Doctors Elkin, Kugel and Francke suggested Doctor Benjamin Felson, Professor of Radiology, University of Cincinnati Medical College. The author was pleased with this suggestion since Doctor Felson is perhaps the world's leading authority on pneumoconiosis. Accordingly, the films were sent to Doctor Felson, who will interpret and classify them for a fee.

FINAL RESULTS

The X-ray films were sent to the "B" reader for interpretation and his findings, in part, and his diagnoses of the 20 positive cases are listed in Table 2. For comparison, the information provided by the "A" readers is tabulated also.

Of course, not all the information included in the radiologists' interpretations is included in the table because this would tend to confuse the non-medical recipients of this report. Entries in the interpretation, although important in establishing or arousing suspicion of the diagnosis of pneumoconiosis, especially asbestosis, such as pleural thickening, pleural calcification and lung zones involved, purposely are omitted from the table.

Of the 70 employees participating in the survey, the "A" readers believed that 20 had a pneumoconiosis, an asbestosis or, even though the actual diagnosis was not included in the report, all 20 interpretations were classified and categorized, which implied that some of the features of a pneumoconiosis were thought to be visible on the film. The author assumed that all 20 cases were suspect until proven otherwise.

The "B" reader diagnosed six cases as "normal chest" and two others as "probably normal chest," although the latter were categorized by the "B" reader as "pneumoconiosis" so there is still some element of suspicion. One case (No. 10) the "B" reader interpreted as an "abnormal chest" but his finding indicated healed disease whose etiology was not dust.

The "A" reader interpreted four cases (Nos. 3, 5, 9 and 15) as "pneumoconiosis, cause unknown," and would not definitely state asbestosis since the pleural findings -- thickening and calcification -- were not present and the "B" reader came to the same conclusion; i.e., diagnosing "pneumoconiosis" in the first three cases but concluding that the fourth case (No. 15) had a "normal chest X-ray."

Of the eight cases the "B" reader diagnosed as "normal," or "probably normal," while the "A" reader implied or diagnosed "pneumoconiosis" or "asbestosis," the most interesting comparison was Case No. 7 and Case No. 14. The interpretation of the X-rays of Case No. 7 by the "A" readers was "asbestosis" and Case No. 14 as "possible asbestosis or inflammatory disease residua," with the radiologist favoring the latter diagnosis. Yet the "B" reader believed both of these to be completely "normal." It is interesting that Case No. 2 and Case No. 12 were interpreted and classified as to category and opacity type almost exactly alike by the two readers. Unfortunately, the "A" readers did not advance a definitive diagnosis in 13 cases and had they done so, the comparison between their interpretations and those provided by the "B" reader would be more useful. Other than the "normal chest" diagnoses, the greatest differentiation was between the interpretations of the type opacity by the two readers. The "A" readers tended to read rounded type opacities (p, q or r), while the "B" reader interpreted irregular opacities (s, t or u). This is a minor difference but it certainly emphasizes that interpretation of X-rays is qualitative and there can and will be differences of opinion.

As indicated earlier in this report, it may take many years of exposure to asbestos-containing material for asbestosis to develop and become evident; i.e., satisfy the X-ray diagnostic criteria. Table 2 shows that the insulators with many years of company service and exposure had the highest incidence of positive films (Cases 1, 2, 3, 4 and 9). The Steam Plant operator (Case No. 18) with the most years of company and presumably the same number of years exposure to diatomaceous earth and asbestos was a suspect case of asbestosis. The information on Table 2 also indicates that the sheetmetal craft in the Institute Plant is not a hazardous trade from the asbestosis standpoint. Although Case No. 3 was diagnosed as pneumoconiosis by both the "A" and "B" readers, his work history would indicate that the problem is not asbestosis. This 64-year-old employee has worked at the sheetmetal trade in the Institute Plant for the last seven years with no known exposure to asbestos. However, he had respiratory symptoms, reduced vital capacity and diagnoses of chronic bronchitis and emphysema prior to his assignment in the sheetmetal craft. In addition, he worked for many years as a blacksmith, a tool dresser, a welder and a grinder. His descriptions of the coal dust, vapors, metal fumes and dust to which he has been exposed would lead one to believe his pneumoconiosis probably is of etiology other than asbestos.

Table 2.—UICC/Cincinnati Radiographic Classifications - Comparisons

Case #	Emp. Init.	Years Exposed	Craft	Reader "A"		Reader "B"	
				Code* Type	Diagnosis	Code* Type	Diagnosis
1	RMB	32	In	1/2 q	?	2/1 s	Asbestosis
2	REB	30	In	2/2 s	Asbestosis	2/2 t	Asbestosis
3	ABC	8	SM	1/2 q	Pneumoconiosis	1/0 ?	Pneumoconiosis
4	HFC	25	In	1/0 p	?	2/3 s	Asbestosis
5	RC	4	In	2/1 q	Pneumoconiosis	0/1 t	Pneumoconiosis
6	DEE	2	SP	1/0 q	?	0/1 s	Probably normal chest
7	JLH	30	SM	? ?	Asbestosis	0/0 ?	Normal chest
8	HCH	7	In	0/1 q	?	-- -	Normal chest
9	AK	17	In	2/1 s	Pneumoconiosis	1/0 s	Pneumoconiosis
10	FLM	8	In	1/0 ?	?	-- -	Healed TBC or histoplasmosis
11	HHM	2	L	0/0 ?	?	0/0 ?	Asbestosis
12	CM	6	SP	2/2 t	?	2/2 u	Asbestosis
13	BEP	31	In	1/1 p	?	? t	Asbestosis
14	CQR	6	In	0/- ?	Possible asbestosis or inflammatory dis.	-- -	Normal chest
15	LCS	11	In	1/0 q	Pneumoconiosis	-- -	Normal chest
16	EWT	16	SP	1/2 q	?	-- -	Normal chest
17	WBT	25	In	0/1 q	?	1/1 s	Asbestosis
18	LIU	30	SP	0/1 t	?	0/0 ?	Suspect Asbestosis
19	CEU	4	In	1/0 q	?	0/1 t	Probably normal chest
20	HFV	8	In	1/1 q	?	-- -	Normal Chest

In - Insulator SM - Sheetmetal Worker SP - Steam Plant Operator L - Laborer

? - No answer reported for the entry in the table.

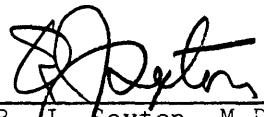
*Radiographic appearances of pneumoconioses (including asbestosis) are classified into four categories: 0, 1, 2 and 3 and subclassified into codes. Thus Category 0 includes 0/-, 0/0 and 0/1. The number left of the slant mark is the Category and the number to the right, the degree or extent. Category 1 includes 1/0, 1/1 and 1/2, Category 2 includes 2/1, 2/2 and 2/3 and Category 3 is graded into 3/2, 3/3 and 3/4. Types represent the size of the opacity; i.e., rounded opacities are graded as p, q or r and irregular opacities are graded s, t or u.

Accordingly, from Table 2, the "A" reader implied or diagnosed 20 cases of pneumoconiosis (asbestosis) while the "B" reader diagnosed only 11 cases as positive. Therefore, of the total of 70 cases surveyed, the Institute Plant employees were either 29% or 16% positive for pneumoconiosis.

CONCLUSIONS

1. The Institute Plant has a health hazard (asbestos) representing a problem to Maintenance Department insulators and laborers and a similar hazard (diatomaceous earth) to Steam Plant operators.
2. The pneumoconiosis (asbestosis) diagnoses confirmed included only suspicious, mild and moderate cases; e.g., Categories 0, 1 and 2. There were no cases diagnosed as advanced pneumoconiosis (asbestosis), i.e., Category 3, and no extreme findings such as "Ground Glass" appearances or "Shaggy" hearts were reported.
3. Physical examination disclosed only reduced vital capacity and no cases exhibited severe findings such as clubbing of fingers and toes.
4. X-ray orders in the future will be stamped "COMPLETE NEW INTERPRETATION" and "PNEUMOCONIOSIS SURVEY" rather than "ASBESTOSIS SURVEY" since the author is convinced that the latter tends to mislead the radiologist.
5. The radiologists will be requested to report their findings on a standard pneumoconiosis survey form rather than the usual descriptive report so that all of the appropriate information, either affirmative or negative, will be reported, including the diagnosis.
6. The Medical Department will work with and cooperate fully with the Industrial Hygiene Department and plant supervision to eliminate this hazard.
7. OSHA has been praised and damned equally but it is the author's opinion that the requirement to survey medically all asbestos workers is most beneficial and is advantageous to workers and company alike. It will be continued on an annual basis as the law requires.

Submitted by:


R. J. Sexton, M.D.
Plant Medical Director

RJS:gh

To: John Barua
 Dale Mc Makin

Guy,

Look at the attached letter. Before we accept any asbestos removal work we better make sure the plant agrees to be responsible for making all arrangement for proper disposal. We should not accept this responsibility - but they try to put this on us if we don't have firm agreements - this is them -

Randy

 @ 100 - asbestos file - BB

RECEIVED
 AUG 21 1986
 SAFETY DEPT.



INTERNAL
CORRESPONDENCE

RECEIVED
AUG 06 1986

9(f)

UNION CARBIDE CORPORATION P.O. BOX 2831, CHARLESTON, W. VA. 25330
AGRICULTURAL PRODUCTS COMPANY, INC. INSTITUTE PLANT

To (Name) J. L. Worstell
Division
Location
Area

Date July 31, 1986

Originating Dept.

Area

Copy to F. L. Boggs
L. H. Dupuy
R. J. Romagnoli

Subject Asbestos Disposal
At Goff Mountain

RECEIVED
AUG 12 1986
J. L. COLLINS

RECEIVED

AUG 14 1986
SAFETY DEPT.

Jack,

As you know there has recently been a significant increase in insulation work at both the South Charleston and Institute Plants. As far as I know the current activity level is planned to continue for the next year or two. Most of the insulation being stripped contains asbestos, wherein lies my problem. Our ability to landfill safely the quantity of asbestos we are currently receiving, using our current landfill technique is of concern. Also of concern is the capacity issue. I know of several jobs currently planned at Institute that may be more than we can handle. As a result of these concerns I am doing the following;

- 1) I have asked for and received pricing information from alternative disposal sites. A copy of this information is attached, and
- 2) I have requested that our IH group perform asbestos monitoring at Goff.

Other than the two items above, no action is being taken at this time. However, there is a good chance that at least some of the asbestos containing insulation will have to be taken to another disposal site in the near future, particularly large jobs.

Jack, I will keep you informed as necessary and will give you as much lead time as possible if we should decide to cease taking asbestos at Goff.

Very truly yours,

Mark E. Tapp

MET/dw
7040A

TO: M. E. Tapp
FROM: E. L. Patton
DATE: July 23, 1986

Mark,

B. Toler has preliminary cost for asbestos insulation disposal.

All insulation must be double bagged.

<u>Contractor</u>	<u>Costs</u>
CECOS; Niagara Falls	\$50/yd ³ + \$1700 transportation @ 30yds ³
CECOS; Ohio	\$115/yd ³ + \$850 " " "
CWM; Ft. Wayne	\$95/yd ³ + \$1140 " + \$110 tax one time chg of \$200

NOTE:

The Niagara Falls location is not a "secure" landfill, but has a 10ft. compacted clay liner plus a G.W. collection system.

7040A2
dw

9(g)

RECEIVED

MEMO

JAN 15 1986

SAFETY DEPT.

TO: B. R. McMakin
R. W. Scoular

cc: L. L. Bissett
R. E. Gardner
P. L. Graham
W. G. Lilly, Jr.
C. P. Maxwell
M. L. Mills
L. R. Noble
M. A. Patel
R. J. Romagnoli

DATE: January 15, 1986

Gentlemen:

The attachment to Tom Collins' letter to you dated January 8, 1986, regarding asbestos removal was not included in the envelope. The letter has been reprinted and is enclosed here with the attachment. Please excuse any inconvenience.



Cathy Wells

/cw
Attachment
0933w



INTERNAL
CORRESPONDENCE

9(g)

UNION CARBIDE CORPORATION TECHNICAL CENTER

P.O. BOX 6221, SOUTH CHARLESTON, WV 25301

B. R. McMakin
2009/512

R. W. Scoular
701/511

January 8, 1986

Technical Center
Site Services

L. L. Bissett, 2000/511
R. E. Gardner, 2000/511
P. L. Graham, 725/511
W. G. Lilly, Jr., 2000/511
C. P. Maxwell, 725/511
M. L. Mills, 2149/512
L. R. Noble, 725/511
M. A. Patel, 701/511
R. J. Romagnoli, 701/511

Asbestos Removal

Attached is an item from the January 3, 1986, issue of Inside EPA relating to the enforcement of asbestos removal regulations.

Since EPA is apparently putting a high priority on monitoring asbestos removal, we need to be especially careful to be familiar with, and to observe, the regulations covering the removal of asbestos.

Please contact our staff if you have any questions.

Tom

T. L. Collins

CW

TLC/cw
Attachment
0933w

UCC 017416

ENVIRONMENTALISTS PRESS SUIT SEEKING EPA REGULATION OF DIOXIN UNDER TSCA

Contending that "there are no issues of material fact," attorneys for the Environmental Defense Fund and National Wildlife Federation have asked for summary judgment in a case challenging EPA's denial of an October 1984 petition by the two groups calling for multi-media controls of dioxin under the Toxic Substances Control Act. In what may be the first test of a TSCA section 21 provision allowing *de novo* court review of EPA decisions on citizen petitions, environmentalists charge that EPA has failed the "non-discretionary" duty to promptly commence the TSCA section 4 testing and section 8 information gathering EPA granted under the petition.

In response to EPA's rejection, environmentalists have asked the U.S. District Court for the District of Columbia to order that EPA, in addition to beginning the TSCA section 4 and 8 actions, "immediately initiate" rulemakings under TSCA section 6. The TSCA section 6 rulemaking would lead to controls on disposal of waste contaminated with dioxins and furans, limits on product contamination and labeling requirements for contaminated products.

Attorneys for EDF and NWF in an October 1984 TSCA section 21 petition sought a wide variety of measures aimed at multi-media pollution control of dioxins and furans. EPA, however, rejected sweeping sections of the petition, agreeing only to "administrative proceedings" to collect information on dioxin and furan contamination (Inside EPA, Jan. 25, 1985, p1). Environmentalists sued in March 1985 — and industry groups, contending that EPA "granted everything that was legally grantable," promised to intervene in the suit. One major industry organization, the Chemical Manufacturers Assn., has asked the court for an additional month to reply to the original environmentalist brief, citing "significant issues raised," sources say.

EPA WINS FIRST CRIMINAL PENALTIES FOR HAZARDOUS AIR POLLUTANT REGS VIOLATIONS

In a precedent-setting victory for EPA, a U.S. District Court on Dec. 19 for the first time slapped criminal penalties on violators of Clean Air Act hazardous air pollutant standards. EPA's Region I successfully persuaded the court to prosecute two men involved in the illegal removal of asbestos from a Connecticut store, charging them with knowing endangerment of human health.

The U.S. District Court in Bridgeport, CT sentenced Maurice Fabiani, owner of the Old Pin Shop in Oakville, CT, to one year in prison, with all but 30 days suspended. Fabiani was found guilty of failure to inform EPA of his intent to demolish his building, which contained carcinogenic asbestos. Under the air act, asbestos removal must be reported to the government and undertaken using specific procedures. Peter J. Vileisis, Jr., owner of the Waterbury Wrecking Co. contracted to raze the building, received a suspended sentence of one year. Both men were fined \$25,000, placed on probation for five years, and ordered to perform 1,000 hours of community service. Vileisis was also instructed to attend an asbestos removal training seminar.

EPA officials were pleased with the ruling, which they believe sends a strong signal to the public that EPA intends to fully enforce, particularly for asbestos, the hazardous air pollutant standards — even to the extent of resorting to criminal prosecution.

EPA GEARS UP WOODBURNING STOVE NSPS NEGOTIATED RULEMAKING PROJECT

EPA in mid-January will lay the groundwork for a negotiated rulemaking project aimed at drafting Clean Air Act section 111 new source performance standards for woodburning stoves — "Residential Wood Combustion Units" in the argot of the project. With a *Federal Register* notice proposing the creation of a negotiated rulemaking panel due about mid-month, sources hope for organizational meetings by late February.

According to sources, woodburning stoves represent one of the largest stationary sources of polycyclic organic materials (POM). By late 1983, an estimated 10.6-million residential wood stoves were in use — a figure increasing by about a million units a year. Actual emissions, sources say, vary "greatly" according to design and condition of the fuel — but are "substantial" for particulates (2.7-million tons; including POM, 20,000 tons) carbon monoxide (7.4-million tons) and hydrocarbons (62,000-tons). Improvements in control technology, however, can lead to emissions reductions of 50% to more than 90%.

Key issues of debate are expected to include the definition of the "affected facility," the best methods for measuring emissions and efficiencies, the meaning of "best demonstrated technology," the "units" used to express the standard — as well as the numeric emissions limits themselves. The schedule for imposing limits will be key, as will certification programs, labeling requirements and rules governing replacement of catalyst materials. As with other negotiated rulemakings, the panel will be limited to 25;



AGRICULTURAL PRODUCTS COMPANY, INC.
P. O. BOX 2831, CHARLESTON, W. VA. 25330
Institute Plant

9(h)
RECEIVED

JAN 11 1985

SAFETY DEPT.

January 9, 1985

Regional Administrator
U.S. Environmental Protection Agency
Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Sir:

The attached notification relative to the demolition and/or renovation of facilities containing friable asbestos insulation is provided per requirements of 40 CFR 61.146.

Please contact the writer if there are questions regarding information contained in the notification.

Very truly yours,

F. L. Boggs

/cb
Attachment
4161A

LRN }
PLE }
MLM }

FYI

Notification was submitted for calendar year '85 but not the specific job that was performed on Friday, January 4th. It is Institute's responsibility to notify. Randy has written a letter regarding construction responsibility.

CM

cc: JK Petros

CM

1-17-85

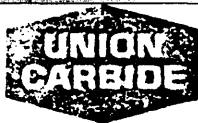
UCC 017418

NOTICE OF INTENT TO DEMOLISH OR RENOVATE STRUCTURES,
EQUIPMENT OR PIPING INVOLVING FRIABLE ASBESTOS INSULATION

1. Name of Owner: Union Carbide Corporation, Agricultural Products Co., Inc.
2. Address of Owner: Institute Plant, P. O. Box 2831
Charleston, West Virginia 25330
3. Description of Facility: Various buildings, equipment and piping used in manufacture and distribution of chemicals and plastics. The work to be done involves routine maintenance which may result in the removal of asbestos insulation. The amount is unknown, but may exceed 160 square feet and/or 260 linear feet.
4. Address of Site: (Same as Item 2 above)
5. Scheduled Start and Completion Dates: Calendar Year 1985
6. Nature of planned demolition or renovation and methods employed:

Demolition of obsolete facilities and renovation of existing facilities.
7. Procedures employed: Insulation wetted before removal, lowered to ground, disposed in a site which is fenced or protected by natural barrier or covered daily.
8. Name and address of disposal site: Goff Mountain Landfill
(Address same as Item 2 above)
9. Agency ordering demolition: Not applicable.

4161A



INTERNAL
CORRESPONDENCE

② Collins

JUL 10 1984

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD, DANBURY, CT 06817

SAFETY DEPT.

9(i)

To (Name) DISTRIBUTION LIST ATTACHED

Date June 28, 1984

Division

Originating Dept. HS&EA

Location

Area P2

Area

Copy to

Subject

ASBESTOS COMMENTS

FILE: ASBESTOS

*R.B.
Please file
with asbestos
file.
c m*

Enclosed is a copy of the cover letter from ORC's recent submission to OSHA concerning the Notice of Proposed Rulemaking (NPR) for asbestos.

Basically, ORC is recommending a dual exposure limit:

Permissible Ambient Concentration (PAC) of 0.5 fibers/cc - engineering would be required to control ambient concentrations to this level.

Permissible Exposure Limit (PEL) of 0.2 fibers/cc - employee exposure greater than 0.2 fiber/cc but less than 0.5 fiber/cc would require the use of a negative pressure respirator with a high efficiency filter, capable of providing a minimum fit factor of 5 and capable of being qualitatively or quantitatively fit tested.

Where the PAC exceeds 0.5 fibers/cc and where engineering, administrative or work practice controls are not feasible, ORC recommends the use of positive pressure supplied air or self-contained breathing apparatus.

If you would like a copy of the full text of ORC's comments and recommendations (about 40 pages), let me know.

Richard G. Hanlon
Richard G. Hanlon

6-7-12-84

*I prepared a letter to R.G. Hanlon requesting the full text of
ORC's comments & recommendations*

FCH:jmc
Attachment

CPM

RECEIVED

JUL - 5 1984

J. L. COLLINS

900



Organization Resources
Counselors, Inc.

May 25, 1984

Docket Officer
Docket No. H-033C
Room S-6212
U.S. Department of Labor
Third Street and Constitution Ave., N.W.
Washington, D.C. 20210

In Re: Notice of Proposed
Rulemaking (49 FR 14116)
Occupational Exposure to
Asbestos.

Dear Sir or Madam:

On Tuesday, April 10, 1984, OSHA published in the Federal Register a Notice of Proposed Rulemaking (NPR) on Occupational Exposure to Asbestos. The NPR requested data and comments on OSHA's proposed revisions to its Asbestos Standard 1910.1001.

Organization Resources Counselors, Inc., (ORC) sponsors an Occupational Safety and Health Group which is composed of about 60 companies from a wide range of industries and with employment size ranging from medium to large. All of these companies have a strong commitment to employee safety and health. The members of the Group work with ORC on OSHA rulemaking activities and other aspects of employee safety and health. Although this statement was prepared in consultation with member companies, the views it presents are solely the responsibility of ORC. Independent comments may be submitted by ORC member companies.

ORC commends OSHA's action in undertaking the revision of 1910.1001. Such a revision is long overdue, because many provisions of the present standard do not reflect the increased understanding of the disease process associated with asbestos or the range of actions that can be undertaken to control potential exposure to it. ORC, recognizing the need to impose stricter controls on employee exposure to asbestos, developed and submitted to OSHA on June 6, 1983 a Recommended Revision of 1910.1001.

RECEIVED

JUN 13 1984

N. W. GAINES

It is widely recognized that exposure to asbestos fibers can be a significant source of risk to American workers. There is no known threshold for "safe" exposure to asbestos, and there are many studies that amply document the nature of the risk associated with exposure to asbestos fibers.

Recognizing the necessity to closely control employee exposure to asbestos, we must also recognize that much of the disease that we are seeing today is the result of exposures that took place 30-40 years ago. Much has changed in the industrial environment since 1944, and our understanding of the disease process has improved dramatically.

As our understanding of the risk presented by exposure to asbestos fibers has grown, the use of asbestos containing products and the concomitant exposure to it have dropped sharply. The use of improved respiratory protective equipment, coupled with prudent administrative and work-practice controls, has reduced the actual exposure of the great majority of American workers to levels approaching the limits of reliable detection.

As OSHA makes much needed revisions to its Asbestos Standard, it must recognize that the new standard will be applied to conditions of exposure existing in 1984 not 1944. OSHA's revised Asbestos Standard will be applied to reduce exposures that in a majority of cases are already below 0.5 fibers per cubic centimeter of air. Thus, calculations of benefit and risk must be based on studies which reflect today's exposures not yesterday's!

In its revised Recommendations For Revision of 1910.1001 (May 25, 1984) ORC is recommending two permissible concentrations of asbestos fibers:

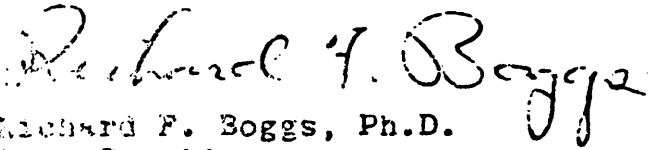
- (1) Permissible Airborne Concentration: (PAC) Intended to regulate ambient concentrations of airborne asbestos on the worksite to 0.5 f/cc, or less.
- (2) Permissible Exposure Limit: (PEL) Intended to regulate actual employee exposures to asbestos fibers, (fibers inhaled into the lungs), to 0.2 f/cc.

In the accompanying material, ORC has submitted a modified version of its Recommended Revision of 1910.1001 along with comments and additional data concerning key elements of any asbestos standard.

Docket Officer
May 25, 1984
Page 3

It is our hope that these comments and the accompanying data will prove to be useful, and we would be happy to answer any questions you may have concerning our submission.

Sincerely,

Handwritten signature of Richard F. Boggs in cursive script.

Richard F. Boggs, Ph.D.
Vice President

RFB:jkj

TABLE OF CONTENTS

INTRODUCTION

OSHA's NPR A Disappointment.....	1
The Need For Latitude.....	1
A Factual Misunderstanding.....	1
Regulatory Outlook For Asbestos.....	2
Major Sources of Occupational Exposure.....	3
What Needs To Be Done.....	3
A Practical Compromise.....	3
Permissible Concentrations.....	4
ORC's Intent.....	4
A Problem of Definitions.....	4

PERMISSIBLE AIRBORNE CONCENTRATIONS

AND PERMISSIBLE EXPOSURE LIMITS.....

Permissible Airborne Concentration.....	5
Permissible Exposure Limit.....	5
A Practical Distinction.....	6

PRACTICAL METHODS TO CONTROL ASBESTOS

EXPOSURES.....

Results Possible With A Good Program.....	8
Dealing With Contractors.....	8
Shipbuilding and Repairing.....	9
Integrated Safety and Health Programs.....	10
Engineering Controls May Be Difficult.....	10
Short Term Jobs Most Common.....	11
The Difficulty of Control.....	11

MONITORING ASBESTOS REMOVAL.....

Constant Monitoring Not Required.....	11
---------------------------------------	----

DISCUSSION OF THE RISK AT 0.5 Fibers/cc.....

Factors Affecting Risk Estimates.....	13
Nature of Early Studies.....	13
Studies Done in Asbestos Industry.....	13
Few Studies At Low Exposures.....	13
Many Exposures Not Measured.....	13
Cumulative Dose.....	13
Excessively High Numbers Used.....	14
Sampling And Analytical Problems.....	14
No Allowance For Fiber Type and Industry.....	15
Lack Of Smoking History.....	16

TABLE OF CONTENTS

- 2 -

<u>A USEFUL RISK ANALYSIS TECHNIQUE FOR ASBESTOS EXPOSURE.....</u>	16
<u>RESPIRATORY PROTECTION.....</u>	17
ORC Recommendations For Respirator Use.....	17
Discussion of Permissible Airborne Concentration.....	18
Discussion of Permissible Exposure Limit.....	18
ORC Recommended Respirator Requirements.....	18
Methods of Compliance.....	19
Respirator Programs.....	21
<u>ORC RECOMMENDATIONS FOR A STANDARD CONTROLLING</u>	
<u>THE USE OF RESPIRATORS WITHIN AN ORGANIZATION.....</u>	21
Scope.....	21
Objective.....	21
Permissible Practice and Responsibility.....	21
Employer Responsibility.....	22
Employee Responsibility.....	22
Standard Operating Procedures.....	23
Program Administration.....	23
Respirator Selection & Issue.....	23
Respirator Fit-testing.....	25
Training.....	26
Respirator Maintenance & Inspection.....	27
Work Area Surveillance.....	28
Health Evaluation.....	28
Air Quality.....	29
Respirator Use in IDLH Atmospheres.....	30
<u>ORC MEDICAL SURVEILLANCE RECOMMENDATIONS.....</u>	31
Discussion Of ORC Medical Surveillance	
Recommendations.....	33
<u>APPENDIX OF ORC COMMENTS.....</u>	36
<u>APPENDICES.....</u>	38

TABLE OF CONTENTS

- 3 -

APPENDICES

"Estimating The Risk From Exposure To Asbestos" Howard E. Ayer.	A
"Asbestos Removal", Carl D. Richardson.	B
"Techniques For Asbestos Analysis: Understanding The Problem," Graham W. Gibbs.	C
"Asbestos Removal In The Petrochemical Industry" T.E. Kupferer.	D
"Working With Asbestos Containing Materials, And The Use of Respirators To Protect Against Asbestos Fibers," Norman A. Beddows.	E
"Asbestos Removal Techniques In The Paper Industry" E. A. Pinzer.	F
"Respirator Health Evaluation Questionnaire," ORC	G
"Comments on OSHA NPR for Asbestos", Joseph F. Stelluto.	H