UV-0136 #217

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BUSINESS CONFIDENTIAL

MATERIALS ENGINEERING CENTRAL FILE

UNION CARBIDE CORPORATION
ENGINEERING AND HYDROCARBONS DIVISION
CENTRAL ENGINEERING
SOUTH CHARLESTON, WEST VIRGINIA

MEMORANDUM

April 7, 1987

TO: J. R. Allen, 3001
R. G. Eager, Jr., 312
E. A. Knockaert, Weston Canal
J. B. Rader, 514

CC: G. B. Elder, 511
MOC

FROM: H. T. Pritt

SUBJECT: ASBESTOS-CONTAINING GASKETS

Attached is the final draft of the Recommended C&P Program to Phase-out Use of Asbestos-Containing Materials In The Work Place. Since this program makes the statement "no asbestos-containing materials will be purchased after January 1, 1989", I felt you would want to be aware of the possible implications affecting your use of asbestos sealing materials.

Although the program does not forbid the use of asbestos sealing materials, EPA rules for handling asbestos are such that the usage of asbestos will rapidly decline which will help them (EPA) implement their purposed ban of asbestos in ten years. Effective July 1, 1986, EPA lowered the acceptable exposure to asbestos from 2.0 to 0.20 fibers per cubic centimeter on an 8 hour time-weighted average. The 0.2 fibers/CC has been exceeded in some air samples when handling asbestos gaskets.

The present recommendation for replacement of asbestos compressed gasketing is Grafoil and spiral wound gaskets with Teflon or Grafoil filler. Reinforced Teflon may also be used. The organic fiber (ARAMID) compressed gaskets are not recommended for use in the plants because they do not pass the API 607 fire test. Preliminary data from a current test program being conducted by the Materials Technology Institute show that after 24 hours at 750°F the organic fiber gasket is disintegrated and at 550°F retains zero breaking load strength compared to 50 PSI breaking load for compressed asbestos.

The chemical resistance of Teflon is outstanding, as is well known. Grafoil also had excellent chemical resistance, particularly in organic chemicals. We will be doing some specific chemical compatibility testing with Grafoil.

0101J

UCC 015695

PLAINTIFF'S EXHIBIT
UC-2411

Grafoil is a relatively expensive material and I have attached a cost study comparing Grafoil and asbestos gasketing with the additional cost of handling asbestos according to EPA requirements being considered. The technical service people at the Carbon Products Division are available to discuss Grafoil for specific application needs.

There is also enclosed the UCC Specification SH-256 from the Health, Safety and Environmental Technology Group that details the handling of asbestos-containing insulation material. While the specification addresses insulation the handling requirements apply to asbestos in general.

If there are further questions, please contact me.

Harold

H. T. Pritt

HTP:es

ATTACHMENT

18583 INDEX: B, 23, 42, 50, 112
113, 180, 343

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9/29/86

D R A F T

RECOMMENDED C&P PROGRAM

CHEMICAL AND PLASTICS BUSINESS GROUP (C&P)

GOAL: PHASEOUT USE OF ASBESTOS-CONTAINING MATERIALS[1] IN THE WORK PLACE

PURPOSE/BACKGROUND

The Corporate Charter (1.1) contains the following commitment to employees:

> "To provide working conditions, programs of training and education, and persistent review and appropriate modification of facilities and practices to protect the health and safety of employees."

It also contains a social commitment to conduct business "in accordance with all the applicable national and local laws and regulations."

As a result of available evidence that airborne asbestos in the occupational environment had proven to be carcinogenic in man, all C&P Insulation Standards were revised in 1976 to specify only asbestos-free insulating materials; and new or replacement installations of these materials have subsequently been selected accordingly. Additionally, a Safety/Health Standard designated SH-256 was prepared covering the safe removal and handling (includes disposal) of asbestos-containing insulating material during renovation and demolition. The requirements of this Standard equal or exceed those of current applicable government standards.

OSHA's rule-making efforts relative to asbestos usage in the work place are mired in controversy. Hearings on the latest EPA proposal which includes the phaseout of all asbestos over a ten-year period are now in progress. The proposal states: "EPA is considering banning the manufacture, importation, and processing of asbestos construction products and asbestos clothing soon after the rule's promulgation with the category of asbestos friction products banned about five years later, and other asbestos products banned at a later time." Gaskets and packing that contain asbestos are in the category of "other asbestos products" that would apparently be banned after ten years. No peer company that we are aware of has a target date for removal of existing asbestos-containing insulation, gaskets, or packing; however, one major chemical company has recently discontinued the purchase of asbestos-containing gaskets and packing.

A cost analysis of pipe-size gaskets shows that GRAFOIL®, probably the most expensive of the acceptable gasket substitute materials, is, in fact, cost effective when the cost of mandatory work practices associated with the use of asbestos (e.g., wetting for removal or airborne fiber

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[1] "Asbestos-containing materials" include but are not limited to insulation, gaskets, packing, welding blankets, and construction products.

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exposure monitoring during removal, placing in labeled plastic bags after removal, landfill disposal, and record keeping) is considered. The same conclusion is drawn relative to valve packing when the additional considerations of improved service life and sealability are included.

Consistent with the aforementioned commitments and the economic use of materials, C&P has concluded that positive actions relative to asbestos-containing materials(1) should be taken.

RECOMMENDED C&P PROGRAM

Except as otherwise provided by applicable law, Chemicals and Plastics Business Group will:

Continue to phase out the use of asbestos-containing materials:

- Asbestos-containing insulation shall be replaced with asbestos-free materials as required to maintain structural and functional integrity.
- No asbestos-containing materials shall be purchased after January 1, 1989.
- C&P Standard Practices shall be employed for the identification, removal, modification, and/or disposal of asbestos-containing materials; and for use of asbestos-substitute materials.
- Evaluation of asbestos-substitute materials shall include consideration of health effects as well as suitability for intended service and cost.
- A variance approval procedure shall be employed to cover consideration of uncommon circumstances. Approval must always include endorsement of C&P HS&EA management.

SCOPE

This Recommended Program applies to all C&P operated/hosted facilities. Other components of the Corporation will be apprised of its content.

DELEGATION

The assignment of duties and authority to carry out the Recommended C&P Program defined herein is delegated as follows:

To Central Engineering Department

- Develop and maintain C&P Standard Practices covering:
  - Identification of asbestos-containing materials;

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- Removal, modification and/or disposal of asbestos-containing materials; and

- Use of asbestos-substitute materials.

To Line Operations Management

- Implement C&P Standard Practices for the identification, removal, modification, and disposal of asbestos-containing materials.

- Implement C&P Standard Practices covering asbestos substitute material applications, and communicate the service experience with these materials.

To Manufacturing Services

- Monitor use of asbestos-substitute materials and communicate the service experience with these materials.

To C&P HS&EA

- Audit compliance with governmental regulations and C&P Standard Practices relating to asbestos-containing materials and, where applicable, their substitutes.

C. C. Neely
47071

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REMOVAL AND HANDLING
ASBESTOS-CONTAINING INSULATION MATERIAL

1 GENERAL

1.1 This Practice provides a procedure for the safe removal and handling of asbestos-containing insulation material and compliance with OSHA regulation 29 CFR 1910.1001 and 29 CFR 1910.26 and EPA regulation 40 CFR 61 Subpart M. The purpose of the Practice is to ensure the safety and health of employees directly involved with performing the work and of others, either in the immediate area or downwind, who may be exposed to residual dust/fibers. Insulation material containing asbestos is no longer installed by UCC; therefore, the concern of this Practice is to control renovation and demolition operations involving the removal of old, asbestos-containing insulation.

All insulation materials approved through the use of UCC Insulation Standards have been specified asbestos-free since 1976.

2 STANDARDS

2.1 Permissible Exposure Limits

2.1.1 Employee 8-hour time-weighted average exposure to airborne concentrations of asbestos fibers shall not exceed 0.2 fibers, longer than 5 micrometers, per cubic centimeter of air.

2.1.2 An action level of 0.1 fibers, longer than 5 micrometers, per cubic centimeter of air has been set which triggers the monitoring, medical, and employee information and training requirements.

2.2 Work Practices

2.2.1 Insofar as practicable, demolition, removal or handling of asbestos-containing insulation shall be performed while the material is in a sufficiently wet state to prevent emission of airborne fibers exceeding exposure limits prescribed in 2.1.1 and 2.1.2. See Section 2.6.3 for the specific EPA regulations that control work practices.

2.2.2 Caution signs shall be posted at all approaches to areas which may contain excessive concentrations of airborne asbestos fibers so that an employee may read the signs and take necessary protective steps before entering the area. The signs shall state:

DANGER-ASBESTOS;
CANCER AND LUNG DISEASE
HAZARD - AUTHORIZED PERSONNEL ONLY;
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

In addition to these signs, legible signs warning of the health hazards of asbestos shall be provided and displayed at each location where airborne concentrations of asbestos fibers may exceed the exposure limits listed in Section 2.1.1. See Section 2.6.4.4 for additional requirements for posting signs.

2.2.2.1 An appropriate barricade, using caution or barrier tape for example, shall be erected around the perimeter of outdoor areas as a supplementary, protective measure to discourage unauthorized entry.

2.2.3 Insofar as practicable, removed insulation shall be wetted and placed directly into labeled plastic bags (or other suitable containers) for disposal at an approved landfill. Otherwise, place plastic sheeting beneath the job site, mist spray the removed insulation with water, and then place in plastic bags. When wet methods of removal/cleanup are impractical, e.g., when temperatures are below freezing, vacuuming or sweeping may serve as an effective alternate cleanup method. Sweeping compound shall be applied to the work area to prevent dust generation when sweeping. See Sections 2.6.3.7 and 2.6.4 for specific work practice requirements.

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2.2.4 Label Specifications - Container caution labels shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

DANGER - CONTAINS ASBESTOS FIBERS;
AVOID CREATING DUST;
CANCER AND LUNG DISEASE HAZARD

2.2.5 Regulated Areas - Employers must identify as regulated areas any locations in their workplaces where there may be occupational exposures to airborne concentrations of asbestos above the PEL. Only authorized persons may enter regulated areas which must be clearly posted. Eating, drinking, and smoking are prohibited in regulated areas.

2.2.6 Housekeeping - All external surfaces in any place of employment shall be maintained free of accumulation of asbestos fibers. Special attention should be given to cleaning scaffolds used in demolition work. Clean-up of asbestos dust is prohibited with compressed air, dry-sweeping or any dry clean-up process.

2.2.7 Waste Disposal - Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated disposable clothing, that is consigned for disposal and which may produce airborne concentrations of asbestos fibers in excess of permissible exposure limits, shall be collected and disposed of in sealed leak-tight containers to an approved landfill. See Section 2.6.4 for specific disposal requirements.

2.3 Personal Protective Equipment

2.3.1 Respiratory Protection - Employees engaged in the spraying (wetting-down) of asbestos, the removal; in the demolition of pipes, structures, or equipment covered or insulated with asbestos; and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment having high efficiency filters selected from among those approved by the Mine Safety and Health Administration, Department of the Interior, or the National Institute of Occupational Safety and Health, Department of Health and Human Services described in 30 CFR Part 11. Compliance with exposure limits prescribed in 2.1, Permissible Exposure Limits, shall not be achieved by the use of respirators, except:

1. During the interval necessary to install or implement feasible engineering and work practice controls,

2. In work operations such as maintenance and repair activities or other activities which the employer establishes that engineering and work practice control procedures are not feasible,

3. In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the PEL,

4. In emergencies.

Where respirators are permitted the employer shall provide a powered, air purifying respirator in lieu of any negative pressure respirator specified in Table 1 whenever:

a. An employee chooses to use this type of respirator; and

b. This respirator will provide adequate protection to the employee.

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TABLE 1

RESPIRATORY PROTECTION FOR ASBESTOS, TREMOLITE, ANTHOPHYLLITE, AND ACTINOLITE FIBERS

Airborne Concentration of Subject Materials or Combination of These Materials	Required Respirator
1. Not in excess of 2 f/cc (10 x PEL)	1. Half-mask air-purifying respirator equipped with high-efficiency filters.
2. Not in excess of 10 f/cc (50 x PEL)	1. Full facepiece air purifying respirator high-efficiency filters.
3. Not in excess of 20 f/cc (100 x PEL)	1. Any powered air-purifying respirator equipped with high efficiency filters. 2. Any supplied-air respirator operated in continuous flow mode.
4. Not in excess of 200 f/cc (1000 x PEL)	1. Full facepiece supplied air respirator operated in pressure demand mode.
5. Greater than 200 f/cc (greater than 1,000 x PEL) or unknown concentration)	1. Full facepiece supplied air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

2.3.2 Special Clothing - The employer shall provide and require use of special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed. Contaminated clothing must be stored in closed containers such as sealed lockers. It should be changed daily.

2.3.3 Hygiene Facilities and Practices - At any fixed place of employment exposed to concentrations of asbestos fibers in excess of permissible exposure limits, the employer shall provide change rooms for employees working regularly at the place. Two separate lockers or containers shall be provided each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes. Employees exposed to asbestos during their work shift must shower before leaving the plant and must not leave wearing contaminated work clothing. Employees working in asbestos areas must have ready access to filtered air lunchrooms and must wash their face and hands prior to eating or smoking. Protective clothing must not be worn in the lunchroom unless cleaned before hand.

2.3.4 Laundering - Laundering of asbestos-contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of prescribed exposure limits. Those performing laundering of asbestos-contaminated clothing must be informed of all requirements listed in Section 2.3, Personal Protective Equipment. Contaminated clothing shall be transported in sealed impermeable containers and labeled in accordance with Section 2.2.5, Label Specifications. If disposable coveralls are used, they should be placed into containers with asbestos for disposal.

2.4 Industrial Hygiene Responsibility

2.4.1 Monitoring - Employee exposure monitoring shall be conducted to determine compliance status with regard to permissible exposure limits and respiratory protection requirements. Environmental/Area monitoring shall be conducted along the periphery of the restricted area to assure that fugitive emissions exceeding permissible exposure limits do not extend past the

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demarcated area. Samples shall be collected using 25 mm diameter mixed cellulose filters and a 50 mm extension cowl. Samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. Monitoring is required at least every 6 months for employees whose exposures to asbestos is at or above the action level. Samples must be analyzed using a phase contrast microscope calibrated using a phase shift test slide and equipped with a Walton-Beckett graticule. The filter samples must be prepared using acetone-triacetin cleaning solution and be counted in accordance with the "A" rules contained in the NIOSH 7400 method.

2.5 Training

2.5.1 All employees who are exposed to airborne asbestos concentrations in excess of the exposure limit listed in Section 2.1.1 with or without the use of respirators shall participate in a training program at the time of or prior to initial assignment and at least annually afterwards that includes these information topics:

1. Health affects associated with asbestos exposure.

2. Relationship between exposure to asbestos and smoking in producing lung cancer.

3. Nature of operations which could result in exposure to asbestos and necessary protective steps to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping and protective clothing.

4. Purpose, proper use, fitting instructions, and limitations of the respirators used to protect against asbestos fibers.

5. Review of all provisions contained in 29 CFR 1910.1001, Asbestos.

6. Purpose for and description of the asbestos medical surveillance program.

7. Instructions for handling spills as well as emergency and clean-up procedures.

2.5.2 Training records shall be maintained by the location and shall be readily available to all affected employees and to OSHA personnel upon their request.

2.6 Federal EPA Regulation, 40 CFR 61, Hazardous Air Pollutants; Subpart M - National Emission Standard for Asbestos

2.6.1 Applicability - These requirements apply to the demolition of structures or renovation of equipment and piping that involves removal of insulation that contains friable asbestos materials. Friable asbestos material means any material containing more than 1 percent asbestos by weight that hand pressure can crumble, pulverize, or reduce to powder when dry. Demolition means the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations; on the other hand, renovation means to alter one or more facility components in any way without taking out load-supporting structural members. Planned renovation operations include scheduled and unscheduled operations in which the amount of friable asbestos material that will be removed or stripped within a given time period can be estimated or predicted based on operating experience. Adequately wetted means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

2.6.2 Key Notification Requirements

1. Timing - The EPA must be notified with a written notice of intention to demolish or renovate according to these timing requirements:

a. As early as possible before renovation begins if planned, but not necessarily scheduled, renovation operations are predicted to involve the stripping or removing of at least 260 linear feet on piping or 160 square feet on other facility components of friable asbestos materials within a year.

UCC 015705

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