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ENVIRONMENTAL HEALTH COMMITTEE
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EXHIBIT
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ENVIRONMENTAL EFFECTS OF ASBESTOS

I. Background:

Asbestos is a hydrated calcium-magnesium silicate having a fibrous structure. Although not a true mineral, it is referred to as a mineral having flexible fibers. More than 90% of the asbestos used in this country is produced from Canadian mines as the mineral chrysotile [$H_4Mg_3Si_2O_9$].

The fibrous and nonflammable characteristics of asbestos are utilized in the production of fireproof fabrics, packing, insulation, roofing, flooring, and automobile brake linings. Asbestos is used in the chlor-alkali industry as the diaphragm in diaphragm cells. This diaphragm acts as a membrane between anode and cathode and serves to keep the cell products separated.

II. Asbestos in Air:

Asbestos dust has long been recognized as a health hazard. Prolonged exposure results in a pulmonary fibrosis known as asbestosis. Thus for lung ailments associated with asbestos have been limited to those who work with the material routinely. Recently, however, there has been increasing concern that asbestos may be a dangerous ingredient in urban air pollution.

The fibrosis associated with asbestos predominates in the basal portion of the lungs. It is a diffuse fibrosis which forms a collar about the terminal bronchioles, eventually choking them off. This reduces the efficiency of the lungs causing gradually increasing shortness of breath. Enlarged hearts are often noted in advanced stages of the disease as a result of the additional load placed on the heart by the inefficient lungs. If exposure is stopped, the prognosis with early to moderately advanced asbestosis is good. Unlike silicosis the disease does not tend to progress after exposure is stopped.

Research on asbestosis has indicated that the long fibers are more toxic than the short. One study indicated that the fibrosis-producing character of asbestos was nearly eliminated by grinding the fibers so that none were more than 20μ in length. It has been reported that typical bronchiolar fibrosis is produced by fibers 20 to 50μ in length, but not by those less than 20μ.

Based on the above findings, prevention of asbestosis is dependent upon preventing exposure to high concentrations of long (>10μ) fibers. The definition of what constitutes a high concentration presents a problem. Currently, the maximum permissable atmospheric concentration to which workers may be exposed is listed as 5 million particles per cubic foot of air. In setting up this figure only fibers less than 10μ in length were counted. It now appears that a standard based upon a maximum concentration of long fibers may have to be established. The problem is further compounded by the fact that at present there is no practical absolute method for routine measurement of airborne asbestos fibers. As the long fibers present the hazard, a simple gauze mask offers ample worker protection and

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II. Asbestos in Air: (continued)

is more comfortable than a dust mask. This type mask has not yet been approved by the United States Bureau of Mines.

An additional hazard encountered by workers exposed to high asbestos concentrations is a rare type of cancer, mesothelioma. In the general population, one person in 10,000 dies of mesothelioma. The mesothelioma death rate for asbestos workers is one in ten.

It has also been shown that asbestos workers who smoke have a death rate from all forms of lung cancer which is 92 times that of non-smokers in the general population. Smokers who are not asbestos workers die of lung cancer at a rate 12 times that of non-smokers. The relationship between asbestos and smoking is not understood. One theory suggests that asbestos in the lungs acts as a blotter, absorbing and retaining cancer causing components of the smoke.

Asbestos particles enter the air in the urban environment through the disintegration of asbestos products or as it is sprayed on girders and beams during building construction. The Johns-Manville Corporation, largest company in the field, is engaged in developing equipment to eliminate or substantially reduce the dust generated during manufacturing and construction. They have entered a joint asbestos safety effort with the U.S. Public Health Service, AFL-CIO International Association of Heat and Frost Insulators and Asbestos Workers and the Mount Sinai School of City University of New York.

Additional sources may be incinerators and solid waste disposal sites where dust problems are not properly controlled. The many and varied uses of asbestos indicate that it is probably present in significant quantities in the refuse handled by such facilities.

III. Asbestos in Water:

Asbestos does not appear to present a water pollution hazard. The particles are insoluble and can be readily recovered and removed using standard solids removal techniques. Care must be taken in the disposal of such waste asbestos to prevent problems of the type mentioned above for dumps and incinerators. Sewage treatment plants servicing high asbestos use industries may encounter high concentrations of asbestos in sludge generated during the treatment process. This factor should be carefully considered and investigated with regard to sludge disposal technique.

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THE USE OF ASBESTOS AT HOOKER

Hooker's principal use of asbestos is in the cell renewal area where it is deposited on cell diaphragms. The dangers associated with handling asbestos in this area appear to be minimal due to the short time asbestos fiber is contacted with air.

The asbestos used in the operation is supplied by GAF in 50 lb. burlap bags. Used bags are discarded and not re-used in or out of the plant.

Depending on the cell size, forty to eighty pounds of asbestos is needed to coat a diaphragm. Four to six diaphragms are handled each day. The proper amount is weighed out and emptied into a vat containing a weak NaOH solution. This mixture is then circulated to insure a uniform slurry. Asbestos is deposited on the outer surface of the diaphragm by submerging the hollow diaphragm in the asbestos-NaOH slurry and applying a vacuum to the inside. Following deposition, the diaphragm is removed from the vat and air dried with the vacuum still applied.

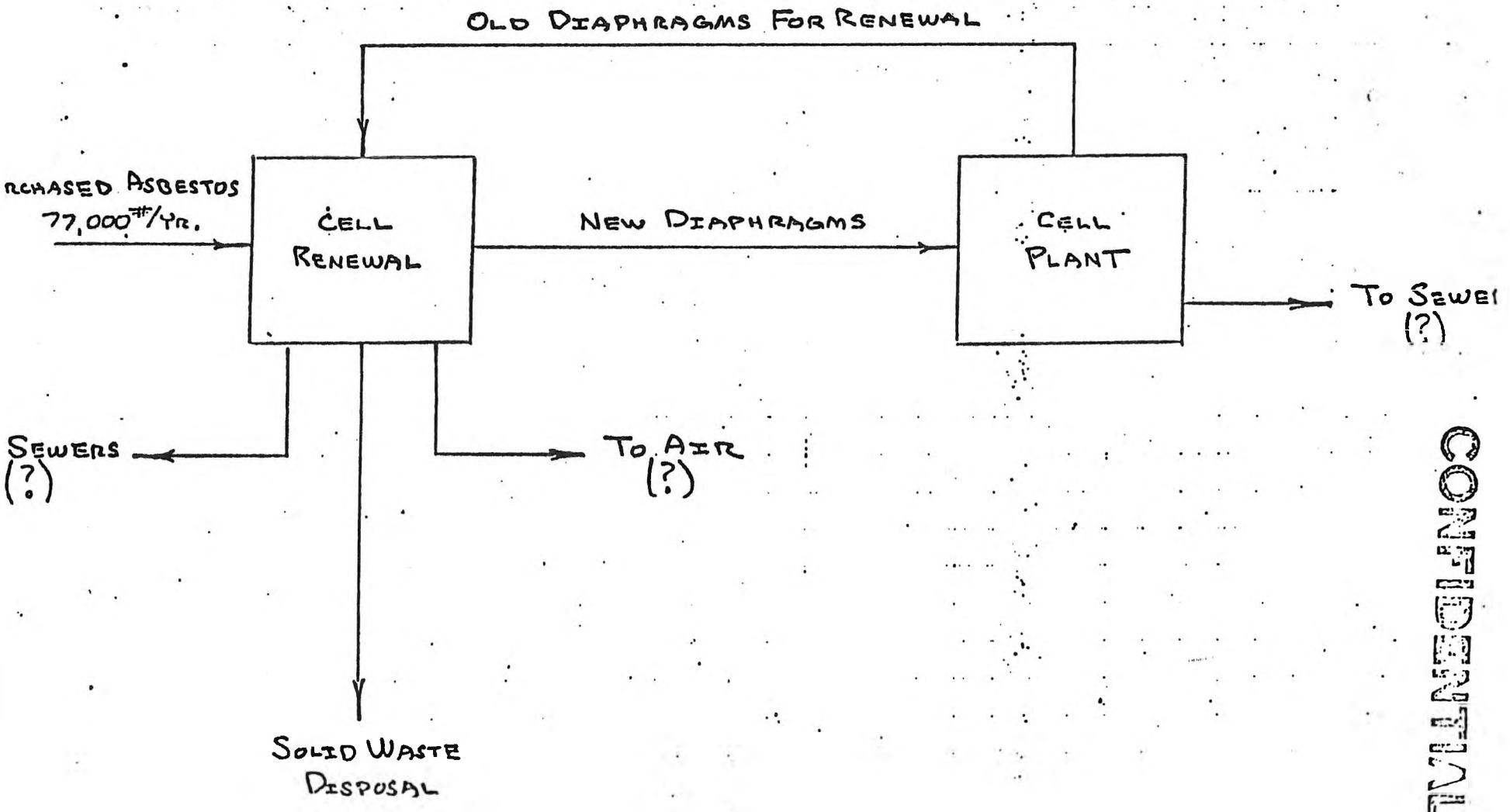
Asbestos dust does not present a serious problem as the weighing and transfer period is the only time during which the dry fiber is exposed to air. Exposure to a worker is minimized through use of a dust mask.

Good housekeeping practices in the work area also serve to minimize asbestos dust. The relationship of smoking and asbestos to the occurrence of cancer has been stressed to all employees.

Waste asbestos is disposed of at a land fill site. The material is transported wet and covered to prevent dusting. At the disposal area it is covered with earth immediately to prevent drying out.

Asbestos Material Balance

Basis: 270 T/D Chlorine Plant



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