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PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

MEDICAL DEPARTMENT

HEALTH DIVISION
NEW YORK
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January 9, 1965

Subject: Use of Asbestos in the Petroleum Industry

To Members
Central Committee on Medicine and Health,
and Technical Advisors

Gentlemen:

At the request of the Chairman, Committee on Industrial Hygiene, members of the Medical and Health Committee are being asked to contribute information regarding their environmental health experience with the use of asbestos in the petroleum industry. This inquiry is prompted by reports of epidemiologic studies which revealed manifold carcinogenic effects among building trades workers handling asbestos insulating material.

To preserve the confidential nature of any information developed by a contributing company, Dr. Carl A. Nau (Environmental Health Institute, the University of Oklahoma Medical Center, Oklahoma City, Oklahoma) has agreed to serve as a "third party" and postal center. Those who would prefer not to send the information to me directly can mail it to Dr. Nau who will remove all identifying marks including the postmark and relay it on to me. The information will be collated and presented to the Committee at its next spring meeting if possible. Along with this information the report will include a review of the published information on the subject of asbestos exposure and its physiological effects.

Unless two or more companies can offer some definite data or information, the Survey report will consist of a review of the literature in the hope that it will stimulate future investigations among member companies.

Very truly yours,

Lucian E. Reyes

LER:bgm

cc: G. H. Collings, M.D.
T. E. Allen, M. D.
Paul D. Halley
E. O. Mattocks
N. V. Hendricks

WA-TEX 003883

THE HEALTH OF REFINERYMEN APPLYING ASBESTOS INSULATION

(A Preliminary Audit)

Recent reports describing a high incidence of pulmonary neoplasms among asbestos workers has focused attention on the health of refinery craftsmen engaged in insulation activities. To obtain information relative to the experience of petroleum companies with the health of their insulators, members of the Medical and Health Committee were polled, inviting them to contribute personal information on this subject to a common pool. Assurances were offered that the identity of the donor and source of information would not be revealed to preserve their confidentiality. Before presenting an analysis of the available information on petroleum company experience, a brief history of asbestos as an industrial health hazard is appropriate.

Historical - For 50 years or longer asbestosis has been recognized in the United States as a form of pneumonoconiosis resulting from exposure to asbesto dust. However, it was not until joint medical and environmental studies were conducted by official health agencies in the mills of Pennsylvania and North Carolina about 30 years ago that the relationship between dust concentration, particle size, years of exposure and definitive chest x-ray markings was established. The lung field markings were also shown to correlate well with certain subjective reactions related to pulmonary function.

Important facts concerning the physical character of the dusts associate with asbestosis were revealed in these studies. Although asbestos fibers, ranging in median length from 7-16 microns, were found in the air, these long fibers were relatively few in number. The bulk of suspended dust ranged from about 0.5-3 microns in length and varied in concentration from as little as 1 or 2 million particles per cubic foot of air (mppcf) to 20 or more mppcf, depending on the mechanical operation involved. The correlations also showed that after 15 or more years of exposure the disease reached about the same degree of advancement, as evidenced by chest x-ray markings, regardless of dust intensity.

In these studies there seemed to be no evidence of pulmonary or other thoracic neoplasms and no suggestion of such findings. Subsequently, reports of the occurrence of lung cancer and other malignancies associated with asbestos employment began to appear in the literature. Although the number of such cases appeared large, some investigators felt that the observations did not establish an increased incidence of cancer and that the association was unproved. Many

valid weaknesses were shown to exist in the reports claiming lung cancer as a specific industrial hazard of asbestos workers. However, in 1963 a report published by Selikoff, Churg and Hammond (the latter of the cigarette fame) describ a significant incidence of lung cancer and other pleural tumors as well as cance of the stomach, colon and rectum among asbestos insulators in the construction industry. These insulators were exposed to a variety of materials including fibrous glass, cork and hair felts which contain no asbestos; other insulating materials, such as magnesia, calcium silicate insulating block and insulation cements containing 10-15 percent asbestos. No free silica was present and asbes appears to be the only biologically active material in the exposure. This repor seemed to be free of the statistical weaknesses and other valid criticisms of th earlier reports. Since the date of that report at least 3 additional publicatio by other investigators confirm in part, if not all, the findings of Selikoff and his associates. An important finding in these reports is that these cancers are found some 20-40 years after initial exposure to asbestos, frequently after reti ment from active employment.

Summary of Findings - The response to the poll of the Medical and Hea Committee members regarding this potential problem was nominal for this type of inquiry. Twelve replies representing nine companies were received. Of this numb about 3 companies had made what appears to be a careful examination of their heal records and at least two other companies are engaged or are about to begin both environmental as well as medical surveys of asbestos insulators. A point of special interest is that not all insulating materials used in a refinery consist of or contain asbestos. Considerable quantities of glass wool or rock wool, as well as magnesia, are also used as insulation. These materials are similar in composition to those reported by Selikoff and associates.

One company reports that among a group of about 40 insulators there was one case of bronchogenic carcinoma after some 16 years of exposure and one case of adenocarcinoma of the rectum after some 20 years of exposure. Two other employees have had lung biopsies performed; one with 25 years of exposure showing a single asbestos body in the specimen and the other with 20 years of service with fibrous thickening of the alveolar septa but no asbestos bodies in the specim There was no significant pathology in these specimens.

In another company one plant reports a suspected case of asbestosis which occurred some 10 years ago, but the outcome of the case is lost to antiquity At another plant of the same company one insulator had a lower lobectomy and it was suspected that the fibrosis was caused by asbestos. A biopsy disproved this

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5 MPPCF too high, invisible

allegation. X-ray examinations of 7 additional insulators at this plant, each of whom has had 18 or more years of exposure, revealed no significant findings. At still another plant roentgenography of all the insulators revealed broncho-vascular markings which was not apparent among other refinery people. No significance was attached to these markings by the contributing physician.

A third company reported examination of insulators at all their plants The majority have less than 15 years service and their chest x-ray films and othe tests appear normal. Two employees with more than 15 years service are reported to have a bronchitis.

All other reporting companies state that their insulators appear healt and that there have been no unusual illnesses among the group. No results of any dust surveys were reported although one or two companies state that the inhalatio exposure to asbestos is insignificant. It is pertinent to point out that the so-called MAC for asbestos dust is 5 mppcf and that some investigators consider this value to be too high. It is equally important to point out that dust concentrations below about 5 mppcf of air are generally invisible to the naked eye even to that of the experienced observer.

Conclusion - The data obtained to date from the Medical and Health Committee is inadequate to resolve the question as to the degree of hazard which asbestos poses to refinery insulators. This is so because the total number of refinery insulators (about 150) covered by the contributing companies' reports is insufficient for reliable statistical treatment and it is uncertain in every case that the morbidity and mortality records of retired refinery insulators or former refinery insulators have been included in the reports. Since the usual diagnostic examinations are frequently inadequate to detect certain cancers in their early stages, the disease may not be revealed until it has progressed to advanced stages late in life.

To obtain an adequate population sample of refinery insulators for statistical reliability and comparison with published data, at least 500 employees should be covered in the survey. Since there are only a relatively few insulators of long tenure in any one plant, the survey would require the full cooperation of at least 10 companies to obtain meaningful results. As a matter of interest, Selikoff reports that the expected mortality from lung and plueral cancers over a 20 year period in a population of 500-600 persons is about 6 and for the same length of time, the expected mortality from neoplasms of the stomach, colon and rectum is about 9 for the same size population.

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based on some personal observations of insulating activities, it is my opinion that the inhalation exposure to asbestos among refinery insulators is neither minimal nor insignificant and I urge the Medical and Health Committee to continue studying this potential health problem.

1. "A Study of Asbestosis in the Asbestos Textile Industry" - Public Health Bulletin #241, August 1938, U.S. Government Printing Office.

2. Braun, D.C. and Truan, T. D. - "An Epidemiological Study of Lung Cancer in Asbestos Miners" - AMA Archives of Industrial Health, Vol. 17 (June) 1958.

3. Selikoff, Churg and Hammond - "Asbestos Exposure and Neoplasia" - JAMA Vol. 188, No. 1, 1964.

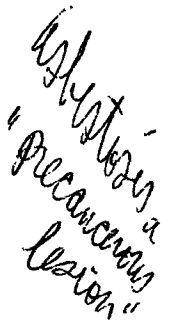
4. Elwood, P.C. and Cochrane, A.L. - "A Follow-up Study of Workers from an Asbestos Factory" - British Journal of Industrial Medicine, Vol. 21, No. 4, 1964.

5. Dutra, T.R. and Carney, J.D. - "Asbestosis and Pulmonary Carcinoma" - Archiv of Environmental Health - Vol. 10, No. 3, 1965.

6. Williams, W.F. - "Asbestosis and Lung Cancer" - Archives of Environmental Health - Vol. 10, No. 1, 1965.

7. Asbestosis Symposium - New York Academy of Sciences - Summer of 1964.

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Precancerous Lesions		Etiologic Age
BONES AND BONE MARROW: Blood dyscrasias:	Hyperplastic, hypoplastic, aplastic, or hemolytic anemia. Thrombocytopenic purpura with spleen not markedly enlarged. Transitory leukopenia, monocytosis.	Benzol and derivativ radioactive substan radiation.
LUNGS: Pneumoconioses: Chronic Pneumonia:	Bituminosis, asbestosis, "lipoid" pneumonia, chronic chemical pneumonia, arsenical dermatosis, chromate ulcer of hands, perforated nasal septum (chromate, arsenic).	Asbestos, arsenic, t oil, mist, chrome s chrome pigments, ni carbonyl.

Many of these pre-cancerous manifestations regress spontaneously from exposu to the causative agent ceases, however, some of them are followed by or transformed in malignant growths. It is advised, therefore, to examine certain workers periodically such reactions when they are known to be exposed to these carcinogenic agents, and whe warning signals appear the worker should be removed from his environment.

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