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INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.
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August 1, 1953

MEMORANDUM ON RESEARCH PROJECTS FOR JOHNS-MANVILLE CORPORATION

Structure and Dust Characteristics of Hy-Sorb

A study of the structure and dust characteristics of Hy-Sorb would require three steps (1) x-ray diffraction to determine if crystalline free silica is present and, if so, the amount (2) screen analysis to give information on the amount of fines, and (3) field studies to determine the amount of dust actually disseminated into the air under actual working conditions.

The first two items are simple routine procedures and require no special consideration. To conduct the field studies it would be necessary to know companies which are using Hy-Sorb and obtain their cooperation to permit sampling during actual use of the material. It would, of course, be possible to simulate working conditions but it is believed that actual in-plant tests would have greater weight.

Laboratory tests have been used in which the dissemination of dust is measured after the dust is dropped through a certain distance. Such tests provide valuable information when studying several compounds in order to obtain comparative data. The results for any one compound would be of

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relatively little value unless it were possible to compare it to another compound. Since only one substance is involved this test might well be omitted.

Relative Toxicity of Marine and Fresh Water Diatomaceous Earth

Since the information desired is relative toxicity, the intratracheal insufflation test is well suited for this purpose. It is proposed, therefore, to study six dusts: namely, natural, calcined, and flux-calcined marine diatomaceous earth and the corresponding fresh water diatomaceous earth. The rat would be used as the experimental animal and the dust administered in a single dose. Sufficient animals would be used in each group to permit sacrifice at 3, 6 and 12 months with the remainder being held for 18 months. Thus, comparative information would be obtained on relative short-time effects as well as long-time effects.

The Relative Toxicity of Various Asbestos Fibers

Again, since the objective is to obtain relative toxicity data, the intratracheal insufflation tests should give meaningful information. The procedure in general would parallel that for the marine and fresh water diatomaceous earth previously outlined. The study could be limited to crocidolite, chrysotile and amosite and we would wish to work closely with you in selecting the material for the test.

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Toxicity of Massive Dose by Inhalation of Diatomite

It is believed that information obtained by the intratracheal insufflation tests of the diatomaceous earth previously outlined would give a partial answer to this question. Periodic intratracheal insufflation tests would give additional information. However, actual inhalation tests would be required for a more precise evaluation. The design of equipment for test procedure for exposing animals intermittently to massive concentrations of the dust can readily be accomplished. In order to have a basis for comparison it would be necessary to conduct chronic exposures. This, in turn, would necessitate fixing a proper level for the chronic exposures. If the intratracheal insufflation tests were conducted first, these data would be helpful in selecting exposure levels. However, if such tests are not conducted first, it is possible that information available on exposures in industry would provide the necessary information.

Threshold Limit for Flux-Calcined Diatomaceous Earth Products

The threshold limits of 5 million particles per cubic foot for quartz was established from human experience through inhalation. So far, no one has ever established a toxicity limit for fibrosis-producing dust through animal experimentation.

It is, of course, possible through animal experimentation to obtain comparative results which would be helpful in indicating the possible magni-

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side of a threshold for this dust in comparison with silica dust. This problem in particular we feel should be given very careful consideration before attempting to answer the question by animal experimentation. While undoubtedly meaningful and worthwhile information could be obtained, a careful appraisal of the limitations of such data should be understood.

Possible Relationship of Asbestosis and Cancer of the Lung

The results published by certain investigators indicating a high incidence of lung cancer in persons suffering from asbestosis, apparently are at variance with the experience of some other observers. There are several possible explanations for the divergence of these observations. It is possible that variations in the type of operation or the characteristics of the fiber may play a role, and confirmatory information is needed regarding the diagnosis of both the asbestosis and the cancer of lung. Until the necessary data are obtained by means of a scientific epidemiologic study, the difference of opinion will continue to exist, and no convincing evidence will be available to either side. It is proposed, therefore, that the study to be undertaken will include:

1. A critical review of the literature with detailed study of cases reported by Merewether and Hauper, who claim a high incidence of lung cancer among workers showing asbestosis.

2. A detailed study of the operations in which these workers were involved with reference to the exact type of fiber to which they were exposed, duration of exposure, and information relating to age, sex and race. Results

CRMC-Motley1000-Subj-000794

of the proposed study on the relative toxicity of chrysotile, amosite and crocidolite fibers would be correlated with this portion of the survey.

3. Statistical study of both asbestosis and carcinoma cases to determine the basis on which the diagnosis was made.

4. A parallel statistical study of a sufficiently large group of unaffected workers to serve as a control.

Before undertaking such an extensive epidemiological survey, it will be necessary to determine whether the required areas for investigation are available. We would wish to know how many plants we might have access to, and to what extent the information outlined above might be accessible.

It is anticipated that a proper study of this sort would reveal information pertinent to the problem of asbestosis, as well as contributing specific knowledge regarding the possible connection between pulmonary carcinoma and asbestosis.

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