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R. J. Ham

December 21, 1967

TO: F. H. MACKIE

FROM: K. E. KUEPER *KK*

DUST EXPOSURE - SURVEY RESULTS AND POLICY RECOMMENDATIONS

We recently concluded the asbestos dust survey which was conducted at Chambers Works Construction over the past year. The survey was performed under the guidance of A. L. Lynch, Medical Section, Chambers Works Plant.

Results of the environmental survey show that employees are being exposed to a total dust particle count that does not exceed 1 per cent of the current Threshold Limit Value (TLV) established for asbestos dust by the American Conference of Governmental Industrial Hygienists. These results were obtained in shops where designed ventilation systems were installed on all power equipment and a controlled cleanliness program existed. The total particle count is many orders of magnitude less than the established TLV of 5,000,000 particles per cubic foot for asbestos dust. ✓

The acquired results would indicate that presently we do not have a problem of concern. However, Federal and State legislation enacted over the past few years has placed on the employer the burden of proof for continuous conformance with established TLV's. In view of this responsibility and trends in decisions of compensation claims, it becomes imperative that an effective industrial hygiene program be adopted. The need for such a program becomes acute when pre-employment medical examinations are not required for the employees.

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With the above mentioned responsibility in mind, the survey results would indicate that a permanent quality control program be initiated to provide not only quantitative data for internal evaluation of dust control efficiency but also to document air quality analysis needed to demonstrate conformance with established TLV's and provide effective defense in litigation cases. Environmental monitoring once a month should suffice for general work areas. If circumstances should arise which involve unusual dust generation, special monitoring will be required to evaluate the potential exposure severity.

Equipment performance and ventilation specifications should be established for effective dust emission control. Work procedures and protective equipment requirements also should be initiated. We request that you consider adopting the following recommendations to be applied at all site locations to acquire satisfactory environments from dust exposure:

1. Maintain an air sampling program with documented results. This is essential for the over-all health exposure and possible litigation suits. Perform random personnel sampling on a frequency of once a month at each field shop location where there is knowledge of exposure to asbestos dust. The site Safety Supervisor should be responsible for acquiring the air sample and all technical information associated with the sample. Arrangements can be made through Dr. Zapp, Director, Maskell Laboratory, for a qualified interpretation of the sample. Results should then be documented at each site location.

To acquire the sample, the following instrument is recommended: "Mighty-Mite Air Sampler" - Unice Model 440-A-SP with micro-impinger. The approximate cost of the instrument is \$160.00.

2. Equipment

- a. Isolate power equipment operations in the shops from other shop facilities.
- b. Install exhaust ventilation on all power equipment to remove dust particles at point of origin and maintain atmosphere total dust count below the Threshold Limit Value of 5,000,000 particles per cubic foot. All possible dust from cutting and shaping functions should be collected by an effective exhaust and collector system. Collector should not vent off collected dust particles to the atmosphere. ✓

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3. Applied Methods In Working With Materials

- a. Initiate a controlled shop cleanliness program. Use a vacuum to remove dust particles from shop equipment, work tables, ledges, floors, etc. Hand cutting should be done so that wherever possible scrap and dust particles fall into a container.
 - b. Open cartons of material with care. Dust is shaken loose from shipping abuse and is one of the most severe sources of asbestos dust quantities with which we are presented. The carton can be vacuumed prior to opening by cutting a hole in the carton and introducing a vacuum hose.
 - c. Asbestos cements must be handled with great care. A system to avoid man handling and mixing by hand is beneficial. This may be accomplished by procurement of the cement in small plastic bags where water may be introduced and the cement kneaded without dust exposure.
 - d. The spray application of materials containing asbestos fiber should be prevented. Several states have enacted legislation outlawing this application of limpit insulating material.
4. Smoking should be prohibited in shops with asbestos dust exposure and when operating tools and equipment performing work which produces dust.

5. Respiratory Protection

Severe conditions may dictate the need for respiratory protective devices. However, every attempt should be made to avoid these devices since they never adequately protect the people in adjacent areas. Respiratory protective devices are, when required, an admission of a problem. Since the law accepts even a casual exposure as hazardous, the environment should be maintained so that protective respiratory devices can be avoided.

Approximate cost of survey - \$2200.00

Equipment Purchased 330.00

Sample interpretation
at \$10.00 per 1870.00

(Dr. R. J. Manella - University of Pittsburgh)

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CHAMBERS CONSTRUCTION

ASBESTOS DUST EXPOSURE CONTROL

November 20, 1967

The preliminary personnel monitoring survey carried out during August 1967, on Chambers Works confirmed earlier environmental surveys (Ref. 1 and 2) on Chambers Works and in the Spruance Shops which demonstrated that the total particle count, not corrected for asbestos content, does not exceed one per cent of the current Threshold Limit Value (TLV) established for asbestos dust by the American Conference of Governmental Industrial Hygienists (ACGIH-1966). The personnel monitor samples were collected in filters over four to five hour periods. Since impingers were not employed, the respirable fraction cannot be estimated but can be ignored as the total particle count is many orders of magnitude less than the established TLV.

However, these results should not serve as a basis for complacency but rather should provide a base for establishing a permanent monitoring program. Federal and State (i.e., New Jersey) legislation enacted over the past ten years has placed the burden of proof for continuous conformance with established TLV's on the employer. In view of this major shift in responsibility for ambient air quality control and the trends in compensation claim decisions, an effective Industrial Hygiene program becomes imperative. This responsibility becomes acute when pre-employment medical examinations are not available for the employees.

Standards for equipment performance and ventilation specifications should be established as soon as possible to incorporate those current practices and design features which by these surveys have demonstrated effective dust

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emission control. Work procedures and protective equipment requirements also should be formalized to provide not only an internal operating standard for other departments of the Du Pont Company but also for the guidance of outside contractors employed by Du Pont under contract.

A permanent quality control program is recommended to provide not only quantitative data for internal evaluation of dust control efficiency, but also to document air quality analysis needed to demonstrate conformance with established TLV's and provide effective defense in litigation cases. Under current conditions a continuous daily monitoring program does not appear to be necessary or desirable. However, a formal program for sampling and analyzing the work atmosphere with a frequency which will include all phases of asbestos usage should be established and consistently administered for as long as a TLV for asbestos remains in force. In general, once a month should suffice for general work areas. If circumstances which involve unusual dust generation should arise, special monitoring will be required to evaluate the potential exposure severity.

Insofar as possible, personal monitoring (sampling equipment carried by a selected employee continuously during his work assignment) should be employed. Only in this manner can a truly representative sample of the atmosphere inhaled by the employee during his eight-hour work day be obtained. Such equipment is available and has been applied successfully on Chambers Works.

A further requirement for an effective monitoring program will include the employment of fully qualified (preferably certified) Industrial Hygienists to directly conduct collection of the samples and to carry out the dust counting. The documentation of field notes and analytical results and the preparation of reports also should be the responsibility of the Industrial Hygienist.

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Equipment Specifications

A. Station Sampling - Portable (Ref. "Air Survey" Memorandum of October 21, 1966).

1. The "Froen-12" powered "Unice Constant Rate Uni-Jet Air Sampler" or the "Unice Automatic Uni-Jet Air Sampler" fitted with an improved standard widget impinger ("Unice 2000") in series with an 0.8 micron pore size "Millipore" filter (Cat. No. MAW0037A0) is acceptable for use in all explosion hazard areas and was used in the collection of samples reported in part one of the Chambers Works and Spruance Works surveys (Ref. 1 and 2). The sample must be collected at a uniform standard, 0.1 cubic feet per minute rate (Cfm), and at least one cubic foot of air should be sampled. These units will operate unattended for three to four hours. A dry sampler, the "Unice Model 2.8 Respirable Dust Sampler" could be used to separate the respirable from the nonrespirable fraction, but is not recognized by the Asbestos Textile Institute.
2. As an alternate the rechargeable battery powered "Unice Model 440 Mighty Mite Air Sampler" may be used. This Midget sampler was used successfully for personnel monitoring on Chambers Works (Part 3). For explosion hazard areas, the slightly larger "Talmatic" Model 150 sampling unit equipped with an intrinsically safe (Factory Mutual approval) battery circuit is recommended. Either of these units perform satisfactorily with either the "Millipore" filter alone or in series with the standard Midget impinger or the newer Microimpinger (personnel monitoring). Four to five hours of sampling at 0.1 Cfm will be delivered per single battery charge. Longer periods will be obtained at lower sampling rates with either the filter alone (0.05-Cfm) or the microimpinger (0.02 Cfm). Larger capacity batteries are available.

Equipment Specifications (Continued)

B. Personnel Monitoring

1. The "Unice Model 440 Mighty-Mite Air Sampler" for non-explosion hazard areas or the Model 150 "Telmatic" for explosion hazard limitations is the instrument of choice (see A-2). In the near future a third model (440-A-SF) equipped with total volume read-out will be available. For total dust count only the "Millipore" filter is required for sample collection. Where respirable as well as total count is required, the microimpinger is used in series with the filter. Whichever system is elected, the collection device should be located as closely as possible to the man's breathing zone without interfering with his work assignments.
2. As an alternate solution to the sampling problem in explosion hazard locations, the Model UIR-175 "Uni-Jet Air Sampler" fitted with a 6 ml orifice may be substituted for the battery operated pump. However, without additional calibration for use with the microimpinger, dust collection would be limited to filter operation. A one pound charge of "Froem-12" will activate the sampler for four to five hours and aspirate a five to six cubic feet sample.

A. L. Lynch
A. L. Lynch
Medical Division

REFERENCES:

1. Thatcher, L. V. - "Interim Report - Asbestos Survey" - January 27, 1967, addressed to K. E. Kemper, Division Safety Superintendent, Construction Division - Lowviers Building
2. Thatcher, L. V. "Asbestos Survey - Interim Report (Results of Spruance Construction Survey)" - April 11, 1967, addressed to K. E. Kemper (address as in 1).

CHAMBERS CONSTRUCTION
ASBESTOS DUST EXPOSURE CONTROL
(Mechanical Aspects)

November 13, 1967

The personnel and environmental sampling done at this site reveals we have reasonable control of the asbestos hazard at this time. The following conclusions and recommendations (if adopted) should establish similar satisfactory environments at any site.

- 1) Maintain an air sampling program. This is essential to the overall safety endeavor anyway. Respirable dust particles from nearly any source are hazardous and a nuisance.
- 2) Isolate machine operations in the shops from other shop facilities.
- 3) All possible dust from cutting and shaping functions must be collected by an effective exhaust and collector system (preferably wet collector). System should not vent off to the atmosphere collected dust particles.
- 4) Keep shop equipment, ledges, etc. vacuumed clean. Hand cutting should be done so the scrap and dust fall into a container wherever possible.
- 5) Open cartons with care. Dust is shaken loose from shipping abuse and is a source of hazardous asbestos dust quantities. The carton can be vacuumed prior to opening if deemed necessary by cutting an opening in the carton and introducing a vacuum hose.
- 6) Asbestos cements must be handled with great care. A system to avoid nonhandling and mixing by hand is beneficial. This may be accomplished by a dispensing system or procurement of the cement in small plastic bags where water may be introduced and the cement "kneaded" with no dust exposure.
- 7) Smoking should be prohibited in shop and when operating tools and equipment performing dust producing work.
- 8) Severe conditions might dictate the need for respiratory protective devices; however, every attempt should be made to avoid this since it never adequately considers the people in adjacent areas. Furthermore, respiratory protective devices, when required, are admission of a problem. Since the law accepts even a casual exposure as hazardous, the protective devices should be avoided.
- 9) Exhaust and ventilation should maintain atmosphere total dust count below the Threshold Limit Values as established by the American Conference of Governmental Industrial Hygienists.

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E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

315 W. 11th Street
Wilmington, Delaware
ENGINEERING DEPARTMENT

To: CONSTRUCTION DIVISION
R. L. KEMPER
DIVISION SAFETY SUPERINTENDENT
LOVELL'S BUILDING

From: L. V. TRATCHER
SAFETY ENGINEER

Subject: ASBESTOS SURVEY - INTERIM REPORT #2
(RESULTS OF SPRUANCE CONSTRUCTION SURVEY)

In reply please use subject listed below.

Date: April 11, 1967

C.C.: H. B. Boyce - Lovell
C. A. Parks, Jr. - Lovell
R. A. Minard - Spruance
Dr. W. E. Neeld, Jr. -
Chambers
A. Lynch - Chambers

Please refer to our first report dated January 27, 1967.

We are attaching a list of our findings from the survey made March 11, 1967. No personal monitoring was done; however, the concentrations indicated the environment at the time to be well below the T.L.V. of 5,000,000 particles per cubic foot. It should again be pointed out that this limit value is subject to sudden change as has occurred in the cases of many hazardous materials. However, our present level is less than .1% of T.L.V.

LVT:knt
Attach.

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