

August 7, 1951

Mr. F. G. Hazard
Industrial Relations Division
Owens-Illinois Glass Company
Toledo 1, Ohio

Dear Bill:

Your letter of July 11 regarding the analyses of dust samples from the Sayreville plant has been received and I am sorry that an answer has been delayed so long. The summer vacation period interferes somewhat with our usual schedule.

It would be best if we could sit down and review our report, as you mention in your letter, but perhaps a few comments on the questions you ask will serve as a substitute for a personal conference.

Percentages on a weight basis. The percentages in all the tables are on a weight basis. Occasionally we may estimate the percentages of the various constituents by making particle counts, but when the results are reported as per cent by particle count, rather than per cent by weight, a note to that effect is included in the report.

Composition of amosite. Like the chemist at the Sayreville plant we were very much surprised to find that the sample of amosite had a quartz content of 21 per cent. At first we thought that such a large amount of quartz represented contamination of the sample, but when it was discovered that the atmospheric dust (sample 7A), collected over a period of 3 hours in the asbestos shredding room, also had a high quartz content, it was obvious that the asbestos contained considerable quartz. For analyzing these samples we employed both petrographic examination and the X-ray diffraction method. Although quartz particles as large as 100 microns were seen in the samples when examined with the petrographic microscope, the lines of the X-ray diffraction pattern were smooth, indicating that the usual amount of fine quartz particles also were present.

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The lines would have been spotty if the sample had contained only large quartz particles.

Since samples of fibrous material cannot be mixed as easily as granular dusts, the question of poor sampling arose. To eliminate this possibility we repeated the x-ray diffraction analysis of the amosite and of the atmospheric dust (7A), using different portions of the samples. The values obtained for quartz were practically the same as before: 20 and 19 per cent, respectively, as compared with 21 and 19 per cent given in the report.

Atmospheric dust at router. A recheck of sample 5A confirms our previously reported finding that the sample contains amosite. In nearly every microscopic field there are one or more fibers and in some there are several fibers. We differentiate amosite from chrysotile by the higher index of amosite and by the usual occurrence of amosite as straight stiff fibers in comparison with the curved fibers of chrysotile.

Asbestos content of dust in boxcar. Since our estimate of the amosite and chrysotile content of the various samples was based merely upon visual examination of the material under the petrographic microscope, the values reported are not very precise. For that reason we listed in the table a range of values, such as 5-10 and 35-45 per cent, rather than a single value. It is quite possible, therefore, that our estimated values for the asbestos components are too high. We have attempted to supplement the petrographic examination of asbestos samples with x-ray diffraction analysis but have not been very successful in obtaining accurate quantitative values. Not only do we lack samples of pure asbestos minerals with which to obtain standard patterns, but in addition the lines of the diffraction patterns of the asbestos minerals are weak in intensity. Possibly chemical analysis, such as used by your research laboratory, is the best method for estimating the asbestos content of mixed dust, provided there are only a few components of the dust and the composition of each one is known and is different from the composition of the other components.

Although our estimate of 27-39 per cent for the asbestos content of the atmospheric dust collected in the boxcar (sample 6A) may be high, I would not expect the true value to be as low as the 6-10 per cent reported by your laboratory. There was sufficient amosite to register a distinct x-ray diffraction pattern, and from this finding we would expect the amosite content alone to be greater than 10 per cent. It is unfortunate that we are unable to obtain with the x-ray diffraction method quantitative values for the asbestos minerals that are as reliable as those for quartz.

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If the asbestos content of the dust in the boxcar is only 6-10 per cent instead of 27-39 per cent and the dust count is about 40 to 50 million, then the exposure of men loading the car probably should not be regarded as a definite hazard but rather as only a potential one. Nevertheless, in view of the fact that we are not certain just what atmospheric concentration of asbestos fibers is the limit of safety, it would be well to apply the protective measures suggested in the report, including the wearing of a respirator and, if possible, some method of reducing the amount of atmospheric dust.

Best personal regards to you.

Sincerely yours,

Thomas W. Purkan
Assistant Director

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