

MAGNITUDE OF LEAD EXPOSURE IN MARION, INDIANA PLANT

OF

ANACONDA WIRE AND CABLE COMPANY

Air samples were taken in the immediate vicinity of a melting pot in which scrap lead from cables was being melted. Detailed observations were made over a period of an hour and a half in order to note the conditions which were most favorable for the distribution of particulate lead compounds in the atmosphere. It so happened that the end of one shift and the beginning of another came during these observations. This period involved the removal of dross from the melting pot, an operation which occurs once per day, and which involves much greater dissemination of dust than that associated with any other procedure. Air samples were taken from several points about the pot, at the height of the operator's face, during the period of normal operation. These samples were composited into Sample #1. Another series of samples, similarly combined as Sample #2 were obtained during the filling of the pot and during the removal of the dross.

The analysis of these samples yielded the following results:-

Sample #1	21,440.0 ml. contained 0.002 mg/Pb equivalent to 0.09 mg. per cu. meter.
Sample #2	21,635.0 ml. contained 0.006 mg. Pb equivalent to 0.28 mg. per cu. meter.

The values for particulate lead in atmosphere are usually expressed in terms of 10 cubic meters of air, and on this basis it is currently accepted that values in excess of 5

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milligrams per 10 cubic meters are unsafe. Some workers give slightly lower values, in some instances as low as 1.5 milligrams per 10 cubic meters. The evidence, however, is very good in indicating that basic exposures as low as that involved in breathing air containing 2 milligrams of lead per 10 cubic meters, are substantially safe for all workers regardless of susceptibility factors.

On this basis of comparison the values observed in the vicinity of the pot may be regarded as indicative of safety, in that the basic lead concentration has appeared to be in the neighborhood of 1 milligram per 10 cubic meters, while the brief periodic exposure, during dressing and shoveling is of the order of 2.5 to 3.0 milligrams per 10 cubic meters. My experience in industry leads me to believe that this degree of exposure does not induce sufficient lead absorption to cause lead poisoning.

This conclusion is fully verified by the results obtained in the examination of 2 employees whose work has involved daily exposure to such lead as is regularly distributed into the atmosphere around the pot. Neither of the two workmen showed any clinical evidence of occupational lead absorption. Neither had a lead line, despite the presence of conditions in the mouth (pyorrhea) which are favorable to the development of lead deposits in the gum tissue. Neither of them showed any blood changes (anemia or stippling) suggestive of lead absorption. Neither of them had abnormal quantities of lead in their blood and urine. Merritt Guyer had 0.04 mg. Pb per liter of urine, and 0.03 mg. Pb per 100 grams of whole blood, while John Ditsler had 0.03 mg. Pb per liter of urine and 0.035 mg. Pb per 100 grams of whole blood. These are quite within the limits of values found in perfectly normal persons with no occupational exposure to lead compounds.

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I conclude, therefore, from the combination of these data, that the occupational conditions studied at this time are not such as to entail the risk of lead poisoning in workmen. It is also my opinion that the conditions described as in existence at the time of the plaintiff's employment, while probably involving somewhat greater exposure than that which occurs at present, were not sufficiently different in type or magnitude to justify an opinion that lead poisoning would have resulted from the exposure. Good clinical evidence would be required, therefore, to convince me that the plaintiff had lead poisoning at the time it was claimed that he had. By good clinical evidence I mean that characteristic symptoms, associated with lead line of the gums, perhaps, and certainly with excessive numbers of "stippled" red blood corpuscles, should have been present. The presence of abnormal quantities of lead in the urine or blood or in both at that time, would have been convincing, while the lack of such evidence is a serious fault in the plaintiff's claim. Returning to the subject of "stippled" erythrocytes (red blood corpuscles) it is necessary to demonstrate the presence of abnormal numbers before significance can be attached to the phenomenon. "Stippled" erythrocytes occur in the blood of normal persons up to ten or more per fifty microscopic fields, and they are found in increased numbers in a wide variety of conditions which have nothing whatever to do with lead absorption. Their presence, without reference to numbers, or without knowledge of other concomitant changes in the blood, is wholly without diagnostic significance.

Signed

Robert A. KKHOB

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