

June 10, 1960

Dr. S. I. Gleason
Director of Research Department
Wynn Oil Company
1151 West Fifth Street
Azusa, California

Dear Doctor Gleason:

In response to your request I am glad to write a letter containing a brief summary of the investigation of the potential hazard of lead absorption among your Company's employees in association with their handling of your products.

Purpose

A question has arisen as to the effects of the contact of the skin of men with a lead-containing product designed for use as an aid to lubrication. The lead compound is contained in a formulation of which the essential vehicle is a petroleum oil. This formulation is made available in the form of a concentrate, which then is to be added to a lubricating or hydraulic fluid in a proportion not to exceed 2 percent by volume. The hygienic question concerns primarily the safety of workmen whose skin - hands, etc. - would come into contact with the final lubricant containing 2 percent of the formulation, from the aspect of the percutaneous absorption of the lead compound, on the one hand, and from that of cutaneous irritation on the other.

Procedure

In considering these matters the best and most stringent test of the potentialities of the material for harm appeared certainly to be that of determining the facts represented in the experience of a small group of men who had been employed for varying prolonged periods of time in preparing and packaging the concentrated formulation for distribution. Accordingly, the operations of the plant were inspected, the nature of the work engaged in by the men and the extent of their daily contact with the product was observed, and a group representative of the conditions under study was selected for investigation.

The individual men, thirteen in number, were examined thoroughly by a physician and reported on fully. Samples of the blood and urine of the men were obtained by the physician, and forwarded to The Kettering Laboratory for analysis. The findings were assembled and examined minutely. The results of the analyses for lead were compared individually and collectively with those obtained by the analysis of the blood and urine

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of large numbers of normal individuals (persons with no occupational exposure to lead) and with corresponding numbers of persons employed by groups in lead-using and lead-handling operations.

Results

1. The employees under investigation were in a satisfactory state of good health and capability for their jobs. No evidence of irritation or damage to the skin of the men was found in either their clinical histories or their physical status.

2. The analytical findings in the blood and urine of the men, without exception, were such as to demonstrate clearly and unequivocally, that they had not absorbed significant quantities of lead in the course of their extensive occupational contact with the lead-containing concentrate. The average concentration of lead in the blood of the men (26 determinations, 2 from each man) were 0.03+ mg. per 100 grams, while that in the urine (13 determinations) was 0.03- mg. per liter. The highest concentration of lead in the blood was 0.045 mg. per 100 grams (average of 2 results) which is well within normal limits, and the highest in the urine was 0.05 mg. per liter.

Conclusion

The significance of these observations lies in (1) the failure of any of these men to develop signs of cutaneous irritation in consequence of the daily and very frequent contact of their skin with the concentrate on the one hand; and (2) in their failure to absorb the lead compound through their skin under these same conditions.

The conditions of exposure were sufficiently severe to justify the conclusion that there is no occupational hazard, with respect to potential lead absorption in association with the handling of this product, and that the potential hazard of dermatitis in connection with its handling is evidently no greater than that involved in the handling of a variety of commonly used petroleum oils.

It is recognized that a full and more detailed report of the details of this investigation would be required to satisfy the critique of other investigators or of professional hygienists. This in brief, however, is a fair statement of the facts that emerge from the full consideration of the methods and results.

Yours sincerely,

Robert A. Kehoe, M. D., Director
The Kettering Laboratory