

April 9, 1963

Mr. H. W. Volkman
Newmont Mining Corporation
300 Park Avenue
New York 22, N.Y.

Dear Mr. Volkman:

The question raised in your letter of March 28 is one which we have dealt with many times in the past, but not at such a distance as that involved in this instance. It will be difficult, I fear, to achieve the degree of collaboration between your people and ourselves that would yield the best results. However, we are willing to make the effort. I should hope that the result of our collaboration would be that your Company would develop its own facilities for analytical work of the type needed, and we can assist you in that matter, as well, having had experience in such developments previously.

The point is that we do not take on analytical work, of the type required here, in any other way than that of providing advice and guidance in achieving an effective type of industrial hygiene. As a research organization in occupational medicine, we cannot afford to perform routine services of this type unless we can both instruct and learn. As an example of what I mean by way of advice, I might comment on the second paragraph of your letter. We have investigated the question which you have raised concerning the correlation of analytical findings in the blood and urine with the hemoglobin of the blood and with porphyrinuria - we know the answer, which is that there is no such correlation at a time when any useful purpose would be served thereby. Both the decrease in the hemoglobin and the appearance of Coproporphyrin III in abnormal quantities (when they result from excessive absorption of lead) are evidences of lead intoxication, the interference with the formation of hemoglobin (which causes the increase in the production of Coproporphyrin III) being the earliest evidence of such intoxication. This, therefore, is to be avoided, and the use of determinations of porphyrinuria as a "screening test" is unsatisfactory, being too late to prevent difficulty.

The measurement of the rate of excretion of lead in the urine, or, better, the determination of the concentration of lead in the blood, is based upon a different principle - namely, that of keeping the exposed individual or group below the level of absorption (of lead) that is capable of causing even incipient illness. This can be done,

as we have shown, and it is the one effective expression of industrial hygiene in the lead trades. You may consider, at this point, that I am speaking boldly, even rashly. This, however, is not the case. We have investigated various aspects of this matter for more than 30 years, and the facts are no longer in doubt. This is why we are willing to make use of facilities which are intended primarily for research, in order to promote methods of industrial hygiene which are soundly based upon knowledge and experience. When we can work with the people in an industrial organization, and engage in full exchanges of information and advice, we are pleased to do so. We confidently expect, in such situations, to go along with the job until the group concerned is prepared to go it alone, when we retire from it.

It would be wise, I think, in connection with your new operations to obtain information on the status of some of the workmen (with respect to lead absorption as revealed by analyses of blood and urine) before they enter upon their work. These then could be followed periodically to establish the degree of severity of the exposure. We have ample information on which to interpret the findings provided we start from scratch. If this is not feasible, however, we should have fairly good information as to the previous occupational experience of the persons so investigated.

In order to set up some sort of schedule of observations that will serve your purposes, I should know as much as possible about your present and past operations (the latter are important to me only if men who have been involved in them are to transfer their efforts to the new operations), about the previous history of the workmen, the number of workmen involved, their schedule of work, and similar pertinent matters. If the number of men is small, all of them can be studied; if large, perhaps only representative men need be investigated. It is of the utmost importance that these matters be taken fully into account in setting up a schedule of analytical work, for otherwise, the information obtained will be of little value, so that our time and facilities, as well as your money, will be wasted. Our procedure is that of providing containers and full instructions for the collection of samples. It is possible to rely upon analytical results on the blood alone (or, in suitable instances, on the urine alone). It is wise, at first, however, for many reasons, to analyse both urine and blood. A form for recording the appropriate information on each man by whom a sample is supplied accompanies the containers. As indicated above, we prefer to obtain duplicate samples of blood, and a sample of urine, approximately 100 ml. in volume, from each man.

The results are examined on the background of the available information about the plant and the men, are interpreted, and the signed report is submitted, preferably to the responsible physician, with whom we would expect to establish professional relations.

A charge is made to cover the actual cost to us of the services

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rendered (and in this instance also, to cover any shipping charges), in order to preserve our funds for the purposes of research for which they are intended. (As a unit of a municipal university, the University of Cincinnati, we perform all professional services at cost.) This cost is \$12.50 per sample analysed (the two blood samples are considered as one), and therefore, the cost of both blood and urine (i.e., the cost per man) is \$25.00.

We shall, of course, carry out the determinations on the blood alone, if that is the desire of your people. Your purposes will be served better, however, at first, by having both. There is a problem here as to the periodicity of these analytical surveys. This will depend upon the environmental conditions. If there is an actually hazardous situation, it will have to be investigated with such frequency as to head off the hazard. If the conditions are satisfactory, on the other hand, the analyses may be infrequent. The proper use of the analytical information is that of establishing the significance of the exposure, so as to know where, and to what extent, better measures of control are required. On this basis the necessary measures of control should be taken, and if successful, the hygienic problems will be solved. It remains only to check from time to time to see that proper conditions are being maintained.

In some industries the analytical information is obtained to check up on individual men, so as to remove them from dangerous conditions before they are in a dangerous state. This may be necessary and it can be done, but it is not the most desirable procedure. It is much wiser to use the information as the index of the danger of the entire operation, than to eliminate the danger by appropriate means (usually by suitable engineering), and then, as indicated above, use the analytical data as an effective means of monitoring.

In due course, as you may wish, I can provide you or the appropriate people in your organization, with the published material which provides the full background on which these matters may be understood fully. I shall await your further advice.

Very truly yours,

Robert A. Kehoe, M. D.

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