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LEAD CHROMATE - AN UPDATE

On July 7, 1976, the National Institute for Occupational Safety and Health (NIOSH) received the final report of a study of lead chromate workers sponsored by the Dry Color Manufacturers' Association (DCMA). This report included final results of an epidemiologic study (preliminary results were reported by NIOSH in October 1975) along with the findings of an industrial hygiene study.

Prior to this, there have been limited reports (since 1940) of lung cancer among chrome pigment workers in Germany, Norway, and the United States. Studies of laboratory animals have indicated the potential for chrome pigments to produce tumors at the site of implantation or injection.

The study of lead chromate workers recently conducted for DCMA by Equitable Environmental Health, Inc., included three lead chromate plants in operation since the mid-1920's, 1941, and 1949, respectively. Employees of two plants were found to have had only lead chromate exposures, while workers in the third plant (analyzed separately) also had zinc chromate exposure. The industrial hygiene study of the three plants showed that nearly one-half of the samples reached or exceeded OSHA standards for lead and chromium. (The standards in effect at the time of this study were: for lead, 0.2 mg/m^3 ; for chromium, soluble chromic, or chromous salts, $.5 \text{ mg/m}^3$ as Cr; and for chromic acid or chromates, 0.1 mg/m^3 as CrO_3).

The levels of lead and chromium found in this study were assumed to be lower than levels in the past because of some process changes and modifications of engineering controls and work practices; however, this difference could not be quantitated because of changes in analytical methods.

The three-plant cohort analysis included a total of 548 men among whom 53 deaths had occurred prior to December 31, 1974. Standardized

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mortality ratios (SMRs) were determined by comparing the observed deaths due to major causes with the number of expected deaths based on the 1960 male population of the state in which each plant was located. For all employees in two plants (with only lead chromate exposure), a 3-fold excess of respiratory cancer was observed (SMR 313.7 compared with an expected 100). Workers employed prior to 1960 (allowing for a 15-year "latency" period) were analyzed separately. For all persons in this group, regardless of length of employment, the SMR for respiratory cancer was 173.5; for persons who were hired prior to 1960 and who had worked there for at least 10 years, this SMR was 236.4.

Employees of the third plant (with both lead and zinc chromate exposure) were all hired before 1960 and had an SMR of 237.1 for respiratory cancer. In addition, 5 deaths due to stomach cancer were observed; this was 7 times the expected number.

Although the small number of observed deaths did not justify statistical tests, the Equitable Environmental Health researchers agree that this apparent excess of respiratory cancer in lead chromate workers is "consistent with the hypothesis that lead chromate is a respiratory carcinogen."

These findings are in accord with the NIOSH Criteria for a Recommended Standard on Hexavalent Chromium (December 1975) which states that lead chromate should be regarded as a human carcinogen.

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