

# *Current Intelligence Bulletin 4*

June 24, 1975 , October 7, 1975,  
October 8, 1976

CHROME PIGMENT



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
CENTER FOR DISEASE CONTROL

NATIONAL INSTITUTE FOR OCCUPATIONAL  
SAFETY AND HEALTH  
5600 FISHERS LANE  
ROCKVILLE, MARYLAND 20852

June 24, 1975

Dear Colleague:

A letter from the Lead Chromate Task Force of the Dry Color Manufacturers' Association (DCMA), dated June 18, 1975, to NIOSH regarding recently published information associating lung carcinoma with exposure to chromate pigments is attached for your review. The DCMA has already notified pigment manufacturers and their employees and customers of these findings. The result of epidemiologic investigation of chromate pigment production personnel and feeding studies in laboratory animals are expected from the DCMA later this year. Copies of the articles referred to in the letter from DCMA are available upon request from this office.

You will be kept apprised of future information as it becomes available.

Sincerely yours,

J. William Lloyd, Sc.D.  
Director  
Office of Occupational Health  
Surveillance and Biometrics

Attachment



E. I. DU PONT DE NEMOURS & COMPANY  
INCORPORATED

WILMINGTON, DELAWARE 19898  
CENTRAL RESEARCH & DEVELOPMENT DEPARTMENT

HASKELL LABORATORY  
FOR  
TOXICOLOGY AND INDUSTRIAL MEDICINE

June 18, 1975

Mr. Edward J. Baier  
Deputy Director  
National Institute of Occupational Safety and Health  
Public Health Service  
Department of Health, Education, and Welfare  
Danac Building  
5600 Fishers Lane  
Rockville, Maryland 20852

Dear Mr. Baier:

This letter is written on behalf of the Lead Chromate Task Force of the Dry Color Manufacturers' Association. Earlier this year I had occasion to inform you of a program of investigation sponsored by the Dry Color Manufacturers' Association which had as its intent an expansion of knowledge of the toxicity of lead chromate pigments and of any relationship that might exist between exposures to pigment dust and lung cancer. The program consists of a ninety-day feeding study with rats and dogs and an epidemiologic study in three manufacturing plants, two of which make lead chromate pigments and a third which makes lead chromate and zinc chromate pigments.

A final report on the feeding study will become available within a few weeks. The epidemiologic study is proceeding as scheduled and a final report will be available later this year.

It is the purpose of this letter to inform you that member companies of the Dry Color Manufacturers' Association have decided to notify employees in the manufacturing plants as follows:

- (1) Recently published research results suggest that excessive exposures to the dust of lead chromate pigments, lead-molybdenum chromate pigments, and zinc chromate pigments could have a relationship with causation of lung cancer;
- (2) the suggested relationship is under investigation by the means above described; and

Edward J. Baier

- 2 -

June 18, 1975

- (3) the effort to control dust within the limits of the existing OSHA regulation will be continued.

It has been decided to send similar notification to pigments customers of the manufacturing companies.

The recent publications which have prompted this decision at this time are:

- (1) Langard, Sverre and Tor Norseth. A Cohort Study of Bronchial Carcinomas in Workers Producing Chromate Pigments. Brit. Jour. Indus. Med. 32 62-65 (1975).
- (2) Maltoni, Cesare. Occupational Carcinogenesis International Congress Series No. 322 (ISBN 90 219 02281) Cancer Detection and Prevention, Proceedings of the Second International Symposium, Bologna, (April 1973).

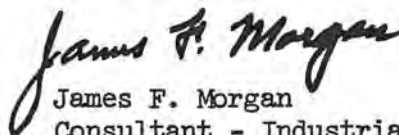
Another development was transmission privately of results from a series of pellet implant studies in rats with chromate materials at the Chester Beatty Institute in England.

The results of these studies singly or collectively are not regarded by DCMA as conclusive with respect to either lead chromate or zinc chromate. The results from the epidemiologic study of lead chromate workers are awaited before forming further judgment. These results will be sent to you as soon as possible.

As you requested I am sending you herewith copies of the notifications that are being presented to employees (Item VI) and to customers (Item V).

Attached also for your convenience are copies of the two recent publications.

Very truly yours,



James F. Morgan  
Consultant - Industrial Hygiene

JFM/egg  
Attachments

(31)



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
CENTER FOR DISEASE CONTROL

NATIONAL INSTITUTE FOR OCCUPATIONAL  
SAFETY AND HEALTH  
5600 FISHERS LANE  
ROCKVILLE, MARYLAND 20852

October 7, 1975

Dear Colleague:

This is a further follow-up to information released by this office on June 24, 1975, concerning the potential carcinogenicity of chromate pigments.

On October 2, 1975, the Dry Color Manufacturers' Association (DCMA) informed NIOSH of the progress of an epidemiologic study sponsored by the DCMA and presented some preliminary results from an analysis of mortality data collected to date. These preliminary results are based on an examination of the relative frequency of deaths from cancer and other causes among the first 38 deaths identified by the researchers in a group of 580 workers exposed to lead chromate. Lung cancer was the cause of death for nearly 29 percent of the deceased workers. This figure was contrasted with estimates from other industrial populations in which lung cancer represented 7 to 9 percent of all deaths. Further review of the data revealed that lung cancer deaths accounted for 85 percent of all cancer deaths. These preliminary findings suggest an unusually high lung cancer risk among workers exposed to lead chromate pigments.

You will be kept apprised of future information as it becomes available.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "J. William Lloyd". The signature is fluid and cursive, with a large initial "J" and "L".

J. William Lloyd, Sc.D.

Director

Office of Occupational Health  
Surveillance and Biometrics

October 8, 1976

#### 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,  $0.2 \text{ mg/m}^3$ ; for chromium, soluble chromic, or chromous salts,  $.5 \text{ mg/m}^3$  as Cr; and for chromic acid or chromates,  $0.1 \text{ mg/m}^3$  as  $\text{CrO}_3$ ).

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.

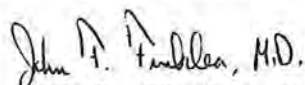
The three-plant cohort analysis included a total of 548 men among whom 53 deaths had occurred prior to December 31, 1974. Standardized

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.

  
John F. Finklea, M.D.  
Director

# NIOSH

## *Current Intelligence Bulletin* *Reprints-Bulletins 1 thru 18 (1975-1977)*

NO.	TITLE	DATE	PAGE
1	- CHLOROPRENE	January 20, 1975	(1)
2	- TRICHLOROETHYLENE (TCE)	June 6, 1975	(9)
3	- ETHYLENE DIBROMIDE (EDB)	July 7, 1975	(19)
4	- CHROME PIGMENT	June 24, 1975 October 7, 1975 October 8, 1976	(27)
5	- ASBESTOS Asbestos Exposure During Servicing of Motor Vehicle Brake and Clutch Assemblies	August 8, 1975	(35)
6	- HEXAMETHYLPHOSPHORIC TRIAMIDE (HMPA)	October 24, 1975	(43)
7	- POLYCHLORINATED BIPHENYLS (PCBs)	November 3, 1975	(51)
8	- 4,4-DIAMINODIPHENYLMETHANE (DDM)	January 30, 1976	(59)
9	- CHLOROFORM	March 15, 1976	(65)
10	- RADON DAUGHTERS	May 11, 1976	(77)
11	- DIMETHYLCARBAMOYL CHLORIDE (DMCC) REVISED	July 7, 1976	(81)
12	- DIETHYLCARBAMOYL CHLORIDE (DECC)	July 7, 1976	(85)
13	- EXPLOSIVE AZIDE HAZARD	August 16, 1976	(87)
14	- INORGANIC ARSENIC - RESPIRATORY PROTECTION	September 27, 1976	(93)
15	- NITROSAMINES IN CUTTING FLUIDS	October 6, 1976	(97)
16	- METABOLIC PRECURSORS OF A KNOWN HUMAN CARCINOGEN, BETA-NAPHTHYLAMINE	December 17, 1976	(103)
17	- 2-NITROPROPANE	April 25, 1977	(111)
18	- ACRYLONITRILE	July 1, 1977	(119)



**U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE**  
**Public Health Service**  
**Center for Disease Control**  
**National Institute for Occupational Safety and Health**