U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 77-91-451

CHEMETRON CORPORATION
MONTICELLO, INDIANA

DECEMBER 1977

I. TOXICITY DETERMINATION

It has been determined on the basis of environmental samples, employee interviews, observation of work practices and a review of pertinent literature that a health hazard due to employee exposures to nuisance dust, crystalline silica, and other materials considered company confidential utilized in the production of stick electrodes and dual shield cord wires did not exist within the worksite at the time of this evaluation (October 3, 1977).

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office at the Cincinnati address.

Copies of this report have been sent to:

a) Chemetron Corporation, Monticello, Indiana
b) Authorized representative of employees - Local 6982 - USW
c) United Steelworkers International
d) U.S. Department of Labor - Region V
e) NIOSH - Region V

For the purpose of informing the approximately 50 "affected employees" the employer shall promptly "post" for a period of 30 calendar days the Determination Report in a prominent place(s) near where exposed employees work.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by an employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH), received such a request from an authorized representative of Local 6982 of the United Steelworkers of America regarding employees exposure to asbestos, silica and chromates. Reported symptoms included shortness of breath, exhaustion and tension.

IV. HEALTH HAZARD EVALUATION

A. Conditions of Use

The Chemetron Corporation in Monticello, Indiana produces stick electrodes and dual-shield cord wires for use in welding. The materials used and the processes involved in the manufacture of these products are company confidential. It can be stated however that a large number of the materials involved are relatively inert and fall into the nuisance dust category. Several silica or silica containing compounds are also used. Representatives of Chemetron stated that the use of all substances containing asbestos or chromates had been discontinued at least one year prior to the time of this evaluation.

B. Evaluation Methods

An initial walk-through survey was conducted at Chemetron on August 8, 1977. Information was obtained on the processes involved and a request was made for release of confidential information on the composition of the various products involved. A request was also made for bulk samples of the substances containing silica. The bulk samples were submitted for analysis using X-ray diffraction to determine free silica content.

A follow-up survey was conducted on October 3, 1977. Environmental samples were collected using FWSB filters to determine total and respirable dust concentrations. Respirable samples were collected using two-stage, 10-millimeter (mm) nylon cyclones operated at a flow rate of 1.7 liters per minute. The filters were initially analyzed gravimetrically to determine total milligrams (mg) of dust. The filters were subsequently analyzed by X-ray diffraction to determine total milligrams of crystalline silica. The limits of detection for quartz and cristobalite, two polymorphs of crystalline silica, were 30 and 40 micrograms, respectively. Two area samples were also taken on AA filters in the dual-shield cord wire process for a soap substance used in that area. Brief medical interviews were also conducted with twenty-two employees.

C. Evaluation Criteria

Nuisance Dusts - Nuisance dusts have little adverse effects on the lungs and do not produce significant disease or toxicity when exposures are kept under reasonable control. These dusts are biologically inert in that when inhaled the architecture of the alveoli remains intact; little or no scar tissue is formed; and any reaction provoked is potentially reversible. Excessive concentrations in workroom air may reduce visibility, cause unpleasant accumulations in the eyes, ears, nose and secondarily cause injury to the skin due to vigorous cleansing procedures necessary

for their removal. The 1976 American Conference of Governmental Industrial Hygineists (ACGIH) threshold limit value (TLV) for dusts so classified, examples of which are cellulose, synthetic graphite, limestone and titanium dioxide, is 10 mg/M^3. The current Occupational Safety and Health Administration (OSHA) standard for nuisance dust is 15 mg/M^3.

Crystalline Silica - The primary health effects associated with inhalation of free silica is a form of pneumoconiosis termed silicosis. Onset of this malady may vary from several years to twenty years or more. The concentration of free silica present in the environment generally determines the course of the disease. As the silicon dioxide is deposited in the lungs, the silica stimulates production of fibrotic nodules. The nodules in turn compress the alveoli (air sacs) thereby decreasing the lung function and producing restrictive type pulmonary disease.

Early silicosis termed "simple silicosis" is normally diagnosed by chest X-ray examination. Individuals with this disease are usually asymptomatic, and lung function impairment is non-existent. As the severity of silicosis increases, the symptoms become prevalent and these are marked by intolerance to exertion, episodes of coughing, and production of a thick sputum. Silicosis of this severity is diagnosed as "conglomerate silicosis" which is irreversible. Conglomerate silicosis incapacitates the affected worker regardless of termination of exposure.

The NIOSH 1974 Criteria Document recommends respirable free silica exposure should not exceed 0.05 mg/M^3. The OSHA standard for respirable silica is calculated by dividing 10 mg/M^3 by the percent quartz + 2. The ACGIH 1976 TLV and the OSHA standard for quartz (total dust) is 30 mg/M^3 divided by percent quartz + 3.

D. Evaluation Results and Discussion

The results of the filter samples for nuisance dust are given in Table 1. In most cases both respirable and total dust samples were collected on each individual. In areas where low dust concentrations were expected, only total dust samples were taken. The table shows that respirable dust concentrations varied from 0.2 mg/M^3 to 4.0 mg/M^3 and total dust concentrations ranged from 0.6 mg/M^3 to 6.2 mg/M^3. All sample concentrations were below the respective standards for respirable and nuisance dust.

A review of the data in Table 1 shows the first six employees sampled were involved in the production of stick electrodes. As expected the highest dust levels were measured on those individuals who were involved in the dry portion of the operation which included the weigher and packer. The wet portion of the operation, mixer and slug press operator, had only low level dust exposures. To further evaluate the employee's exposures, bulk samples of silica or silica containing materials were analyzed by X-ray diffraction to determine the percent free silica. Five of the bulk samples contained no detectable free silica, one was 65 percent free silica and the seventh sample was 100 percent free silica.

Analysis for free silica of the personal samples revealed only one sample which had a detectable quantity. This was sample 49 which was collected on the packer. This was a total dust sample and contained 0.09 mg/M^3 of free silica. A high volume sample taken in the area indicated a two percent free silica content in the dust. Therefore the sample does not exceed the standard for free silica. (On the day the samples were collected, the 65 percent free silica compound was in use.)

The remainder of the samples listed in Table 1 were collected in the dual-shield cord wire production area. Dust concentrations in general were higher than in the stick electrode area but were all below existing standards and recommended criteria. Analyses of the samples by X-ray diffraction revealed no detectable levels of free silica.

Samples were also collected in the dual-shield cord wire area for the powdery soap material used in that process. An analysis to determine the pH of the dust was conducted. The pH of the bulk sample was determined on a 0.05 percent (w/v) solution to be 11.8. The two filter samples had pH's of 9.6 and 10.6. Several employees in this area reported experiencing eye and throat irritation. Strong alkaline soap dust has been reported as producing such symptoms. The long term effects of such exposure is unknown, but in the case of the exposure at Chemetron, it is for only short periods of time during each shift and appears to be of no threat to the health of the employees.

Of the twenty-two employees who were interviewed, fifteen reported no health complaints. The other seven reported one or more of the following problems: eye, skin or throat irritation and/or chest tightness. The reported symptoms were all related to conditions being "too dusty." However, as previously stated, the standards for dust were not exceeded. This evaluation is based on the conditions in the plant during the day of this survey. It is possible, due to the number of formulations used, that "dusty" conditions may exist at other times, but based on the data collected during this survey and also on observation of work practices, no health hazards existed at the time of this evaluation.

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Table 1

CHEMETRON CORPORATION
MONTICELLO, INDIANA

October 3, 1977

Nuisance Dust

Sample Location	Sample Number	Sampling Period	Sample Volume (liters)	Respirable Dust (mg/M^3)	Total Dust (mg/M^3)
Weigher	31	15:10-21:45	671	1.3	
	45	15:10-21:45	592		5.9
Mixer	62	15:15-21:45	663	0.2	
	53	15:15-21:45	585		1.0
Slug Press Operator	47	15:20-21:47	577		0.4
Cleaning Man	39	15:25-22:30	637		0.6
Worker at Oven Entrance	52	15:27-22:30	634		0.6
Packer	49	17:40-22:42	543		1.6
Line 8 Operator	50	15:37-22:36	610	1.8	
	48	15:37-22:36	538		6.2
Line 3 Operator	36	15:40-22:35	603	0.8	
	57	15:40-22:35	537		3.9
Line 4 Operator	46	15:47-22:35	608	4.0	
	54	15:47-22:35	537		5.7
Line 2 & 3 Helper	40	15:55-22:35	578	1.0	
	33	15:55-22:35	510		5.1
Line 12 Operator	42	15:58-22:37	576	0.6	
	44	15:38-22:37	508		2.7
Line 2 Operator	32	17:35-22:33	537		3.0