U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

FILE COPY

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 74-41-165
RANCO CONTROLS, DIVISION OF RANCO INC.
WORTHINGTON, OHIO

JANUARY 1975

I. TOXICITY DETERMINATION

It has been determined that a high percentage of employees in the Initial Electric Control Assembly and Inspection Department (Department 110) have periodically experienced cutaneous irritation from occupational exposure to fibrous glass. This determination is based on interviews with exposed employees, limited cutaneous examinations, observations of work practices, and on available information relevant to fibrous glass health hazards.

Measured concentrations on October 9, 1974 for total airborne particulates were all found to be well below existing standards for fibrous glass dust.

II. DISTRIBUTION AND AVAILABILITY OF THE DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

a) Ranco Controls, Division of Ranco Inc., Worthington, Ohio
b) U.S. Department of Labor - Region V
c) NIOSH - Region V

For the purposes of informing the approximately 35 "affected employees," the employer will promptly "post" the Determination Report in a prominent place where "affected employees" work for a period of 30 calendar days.

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 written request by any 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 the management of Ranco Controls regarding exposure of employees in the Initial Electric Control Assembly and Inspection Department to fibrous glass spicules. The request was precipitated by employee and management concern regarding several cases of fibrous glass dermatitis and the possibility of harmful effects upon other organ systems.

IV. HEALTH HAZARD EVALUATION

A. Evaluation Progress

The Ranco Controls in Worthington, Ohio was visited on October 9, 1974, by NIOSH investigators, Mr. Raymond Ruhe, Mr. Jerome Flesch, and Dr. James B. Lucas. A brief preliminary meeting was held with management representatives to explain the nature of the visit and to obtain background information. Following this meeting, a survey of the Initial Electric Control Assembly and Inspection areas was conducted.

B. Description of the Process - Conditions of Use

Ranco Controls manufactures a wide range of thermostatic electric switches for use in the refrigeration and air conditioning industries. The work site is housed in a modern, well lighted building, and the housekeeping was noted to be excellent. Switch components are mounted on small, thin, pre-shaped and cut fibrous glass reinforced plastic insulator panels. As various parts are attached to the insulator panel, several light machining operations are required (screw assembly machines, Dennison presses). While the panels have been pre-shaped, these operations are sufficient to generate a minute amount of fibrous glass dust. This dust tends to accumulate on work or machine surfaces and in wooden boxes in which panels and partially finished switches are placed for storage or transport to the next assembly station.

Recently, panels have been washed and waxed in another facility prior to being received in the department. This has eliminated the introduction of fibrous glass generated by the preliminary cutting and shaping of the panels, partially alleviating the problem. However, as mentioned, subsequent operations still generate some fibrous glass dust. Twice a day vacuuming of the work area also has been introduced to reduce the problem of fugitive dust. Management has also taken steps for the substitution of a new non-fibrous glass containing panel insulator. Current plans call for the introduction of this component in the very near future. This will effectively eliminate the fibrous glass problem.

C. Evaluation Methods

1. Employee Interviews

Employees were privately asked non-directed questions followed by directed questions regarding their health and employment by the NIOSH physician who is a board certified dermatologist. Employee's responses were recorded for future tabulation.

2. Environmental Sampling

Total airborne particulate concentrations were measured using a Model RDM-101 Respirable Dust Monitor manufactured by the Technology Division of GCA Corporation. Particulate concentrations obtained with this instrument are reported by its manufacturer to be within ± 25% of the true concentration with a 95% confidence level. NIOSH has recently confirmed the accuracy of this instrument.

D. Evaluation Criteria

The occupational health standards promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974, Vol. 39, No. 125, Title 29, Chapter XVII, Part 1910, Subpart G, Table G-3) applicable to the substance concerned in this evaluation is as follows:

	8-Hour Time-Weighted-Average Exposure Standard	
Substance	Mppcf[a]	Mg/M^3[b]
Inert or Nuisance Dust[c]		
Respirable Fraction	15	5
Total Dust	50	15

[a] Millions of particles per cubic foot of air.

[b] Approximate milligrams of particulate per cubic meter of air.

[c] The American Conference of Governmental Industrial Hygienists (ACGIH) in its Threshold Limit Values for Nuisance Particulates recommends that employee exposure to fibrous glass be controlled to 30 Mppcf or 10 mg/M^3 for total dust (1974).

Occupational health standards for substances are established at levels designed to protect workers occupationally exposed on an 8-hour per day, 40-hour per week basis over a working lifetime. Because of wide variation in individual susceptibility, some workers may experience discomfort at or below the levels of the Standard. Some persons who have pre-existing medical conditions may also experience aggravation of their condition or actually develop illnesses at or below these levels. Thus, various recommended Standards do not represent absolute protection to all workers and an evaluation of the work place cannot be based entirely upon comparisons made against such Standards. The Federal Occupational Health Standards do however represent the legal minimum level for substance control.

In the case of fibrous glass or other substances classed as nuisance particulates, toxic or health effects generally have not been demonstrated at levels significantly higher than all recommended standards and these standards are based primarily upon comfort factors. It is also important to note that direct contact with many substances may lead to significant absorption, dermatitis, or discomfort, and that standards relating to air concentrations are irrelevant in such situations.

E. Evaluation Results

1. Employee Interviews and Examinations

A total of 13 employees were interviewed. This represents the entire first shift in Department 110 who handle the fibrous glass containing panels. Several individuals who work with Bakelite panels were not interviewed. The average age of the employees was 52 (range 25-63) and the average number of years of employment with Ranco was 24 (range 2-33). All the employees were White women except for a single White male.

Eleven of the 13 workers gave histories typical of fibrous glass dermatitis. Intense itching, which was out of proportion with an inconsistently present erythematous rash, was the leading symptom. Four women, who initially noted symptoms following introduction of the fibrous glass containing panels, have remained asymptomatic for prolonged time periods and are apparently well "hardened" to their exposure. Three women have been under medical care for the problem but no active cases of dermatitis were noted on the day of the visit. The most common area of involvement mentioned was the arms, although the face, eyelids, neck, finger webs, and legs were occasionally affected. A number of employees were noted to be

using West's 411 protective cream or other skin creams and lotions to lessen the incidence of symptoms.

Nearly all persons interviewed had noted an intensification of symptoms during periods of hot, humid summer weather. Several factors probably contribute to this seasonality: (1) increased perspiration resulting in more glass spicules clinging to the skin, (2) less longer sleeved protective clothing is worn and (3) a large floor fan results in more spicules becoming airborne.

2. Environmental Sampling

Fifteen air measurements were made at various work stations using the Model RDM-101 Dust Monitor. No dust was detectable at six stations and readings varied between 0.1 and 0.7 mg/M^3 at other test sites. Thus, the highest readings observed were far below any standard as yet proposed for fibrous glass or other nuisance particulates.

V. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that exposure to fibrous glass has resulted in a high incidence of fibrous glass itch or dermatitis among employees in the Initial Electric Control Assembly and Inspection Department of Ranco Controls. In most instances these effects have been minor and transient in nature. Several steps taken by the Company to minimize the problem have improved the situation but not entirely eliminated it. The ultimate solution to the problem will require the substitution of a non-fibrous glass containing panel and management is contemplating this change for the near future.

For the interval prior to this process change it is recommended that West No. 211 protective cream be made available. This preparation, in contrast to No. 411 which is now in use, is dust resistant and provides some protection against irritating dusts, greases, and fibrous glass. The preparation now being used (No. 411) is solvent resistant and protects against petroleum and chlorinated hydrocarbons as well as other organic solvents.

VI. AUTHORSHIP AND ACKNOWLEDGMENT

Report Prepared By:

James B. Lucas, M.D.
Medical Officer
Medical Services Branch

Jerome P. Flesch
Chief, Hazard Evaluation
Services Branch
Cincinnati, Ohio

Raymond L. Ruhe
Industrial Hygienist
Cincinnati, Ohio

Originating Office:

Jerome P. Flesch
Chief, Hazard Evaluation
Services Branch
Cincinnati, Ohio