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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 74-38-170

BELTX CORPORATION
ANTONIA, MISSOURI
JANUARY 1975

I. TOXICITY DETERMINATION

It has been determined that lint and other dust, generated during sewing and similar operations utilizing nylon stretch knit or lace, nylon non-run, and acetate non-run tricot textile fabrics, are not toxic at concentrations measured during this evaluation of the Panty Department. This determination is based on results of environmental evaluations, data obtained from employee interviews, and the industrial hygienist's personal observations at the time of the evaluation. The investigation was conducted on June 11-12, 1974. All lint and other nuisance dust concentrations were well below (less than 20% of) established Federal standards as well as the 1973 Threshold Limit Values (TLV) by the American Conference of Governmental Industrial Hygienists (ACGIH). Results from the employees' interviews indicated that a few employees may experience occasional itching and/or sneezing possibly attributable to the lint, but these mild symptoms are not considered indicative of either a chronic or an acute toxic condition. It is possible that lint or other nuisance dust may occasionally aggravate certain pre-existing medical conditions such as sinusitis or atopic dermatitis and contribute to the discomfort association with these conditions.

Recommendations are included in this determination to alleviate the minor discomfort to those few predisposed employees and to keep employee exposures to a minimum.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION

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

a. Beltx Corp., Antonia, Missouri
b. Authorized Representatives of Employees
c. U. S. Department of Labor - Region VII
d. NIOSH - Region VII

For the purposes of informing the approximately 25 "affected employees", the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed 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 a 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 an authorized representative of employees regarding exposure of employees to lint and dust generated from sewing operations in the Panty Department, Beltx Corporation, Antonia, Missouri.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

The Beltx Corporation manufactures sanitary panties as well as other feminine personal accessories and apparel. The Panty Department occupies a 4,000 sq. ft. area in Wing Two of the plant. There are around 30 sewing and similar machines of varying types (e.g., tacker, overlock, double needle, trimmer, etc.) which are used in the manufacturing process. Materials used in the process are nylon non-run tricot, acetate non-run tricot, nylon stretch knit, nylon stretch lace, and elastic. Seventy-five percent of the production involves the acetate non-run tricot material. All textile materials, with the exception of elastic, are received in the department in precut form with elastic being sewed, cut, and trimmed during the various sewing type operations. There are approximately 22 female employees involved in these operations.

B. Evaluation Design and Methods

All samples for respirable and total dust were obtained using pre-weighed polyvinyl chloride filters. A total of 10 environmental samples were collected in the workers' breathing zones to characterize employee exposure during representative operations. Gravimetric analyses were performed by the NIOSH Laboratories in Cincinnati. Sample volumes varied from 553 to 709 liters of air and were collected over a sufficient period of time to be representative of an 8-hour time-weighted average concentration.

Non-directed personal interviews were privately conducted by the industrial hygienist with 19 operators at the time of the survey on June 11-12, 1974. These interviews were to elicit complaints which employees believed might be related to work exposures.

C. Evaluation Criteria and Background Information

"Nuisance" or inert dusts have a long history of little adverse effect on lungs when exposures are kept under reasonable control. The lung tissue reaction caused by inhalation of nuisance dusts has the following main characteristics: The air spaces in the lung tissue remains intact, no significant scar tissue is formed, and tissue reaction, if any, is potentially reversible. The dust from materials involved in this request (e.g., nylon, acetate, etc.) meet all the requirements needed to define nuisance dusts.

Occupational health standards are established at levels to protect individuals occupationally exposed to substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime. The Federal occupational health standards relevant to this evaluation are respirable nuisance dusts of 5 mg/M^3 (milligrams of contaminant per cubic meter of air) and total nuisance dusts of 15 mg/M^3. It is noted that these limits are regulatory and may not represent newer suggested limits based upon recent technical information. For

instance, ACGIH has established similar limits for respirable inert dusts of 5 mg/M^3 and for total inert dusts of 10 mg/M^3. It is further noted that such limits are not established for those individuals who may be hypersusceptible due to specific allergies. A small percentage of workers may experience discomfort at these or lower levels of exposure since there is a wide variation in individual susceptibility. In addition, permissible exposures can, on occasion, result in the aggrevation of a pre-existing condition.

For all practical purposes, the materials used in this department do not cause dermatitis problems since allergic sensitization from these materials is extremely rare. In fact, the experience with millions of individuals who wear such materials demonstrates the rarity of adverse reactions to the textiles involved in this evaluation. Similarly, experience has shown that primary irritant contact dermatitis is not a problem with cloth of this composition and texture. Primary irritant contact dermatitis due to textiles usually involves the mechanical action (rubbing) of the fibers against the skin which may result in inflammation and itching in certain predisposed individuals (usually atopic or allergy prone). The textiles used in the Panty Department are smooth-type materials in comparison with wools and other available cloth products which are far coarser and may cause irritation in predisposed persons.

D. Evaluation Results and Discussion

Personal sample results for total inert dusts (Table 1) varied from less than 0.1 mg/M^3 to a maximum of 1.8 mg/M^3 which is less than 20% of the Federal health standard of 15 mg/M^3 or ACGIH's TLV of 10 mg/M^3. Personal sample results for respirable inert dusts varied from 0.1 mg/M^3 to a maximum of 0.6 mg/M^3 which is again less than 20% of the Federal standard of 5 mg/M^3 or ACGIH's TLV of 5 mg/M^3. All results were well below those concentrations which should cause chronic or acute health effects.

Interviews with employees identified a few employees with occasional complaints of itching (primarily around the mouth and nose areas) and sneezing. One employee complained of daily sneezing and itching but sneezing was not observed nor was any redness of the skin or dermatitis evident at time of the survey. Although several women complained of sinus conditions, only one felt it was aggrevated by the work environment, and the others had experienced similar symptoms prior to employment at Beltx. Several employees related that they had noticed mild irritation of skin and increased sneezing during the first few weeks in the Panty Department, but none of these symptoms persisted with continued employment. The vast majority of employees had no complaints from a health standpoint which could be attributed to the work environment.

It is our understanding that company policy allows for, and in some cases requests, employee transfers to other departments for various reasons including health problems which the working environment may aggrevate. Prior to the survey, one employee in the Panty Department was treated by her private physician for a skin condition and was transferred to another department. Evaluation of this employee's dermatitis, based on data obtained during the survey, did not result in any conclusive or objective evidence that the dermatitis was due to environmental conditions. This problem has subsequently cleared completely. No other skin conditions were identified during the survey.

Housekeeping appeared adequate at the time of the survey.

Air sample results show that airborne concentrations of dusts and lint are well below those limits which are considered to be a hazard to employees. Evaluation of the information obtained from employees' interviews does not appear to indicate an apparent problem although a few employees may be predisposed to occasional symptoms which may be aggrevated by environmental conditions.

V. RECOMMENDATIONS

In view of the above, the following recommendations are made:

1. Pre-employment screening of prospective employees should be made to hire those individuals who are not predisposed to cutaneous or respiratory tract symptoms. Prospective employees should be carefully screened for histories of hay fever, asthma, eczema (atopic diathesis). Such persons, while at no greater risk than nonatopics in terms of developing allergies to substances in the environment, are predisposed to develop irritation from stimuli which are insufficient to evoke such responses in persons without this genetic predisposition. Persons with histories of chronic sinusitis are also unusually prone to symptoms (headaches, nasal irritation, sneezing, etc.) from minimal exposures to dust or substances in the work place. Individuals with histories of these medical conditions should probably not be placed in the Panty Department. Individuals currently employed who have such predispositions which are aggrevated by the work environment should be transferred to other departments by mutual agreement between the employee and management.

2. Housekeeping should be maintained at least on a level noted during this evaluation.

VI. AUTHORSHIP AND ACKNOWLEDGEMENTS

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TABLE I

PERSONAL AIR SAMPLE RESULTS - PANTY DEPARTMENT - JUNE 12, 1974

Operation	Sample No. & Type	Liters of Air Sampled	Dust Concentration mg/M^3
Leg Elastic	PVC-30-T*	582	0.2
Inspector	PVC-28-T*	553	<0.1
Reese Tacking	PVC-32-T*	663	0.2
Leg Elastic	PVC-26-T*	639	0.6
Crotch	PVC-35-T*	656	1.8
Grip Tacker	PVC-33-T*	648	0.5
Waist Elastic	PVC-29-R**	678	0.2
Packer	PVC-31-R**	683	0.6
Stay Tack	PVC-34-R**	709	0.4
Side Seam	PVC-36-R**	692	0.1

mg/M^3 - milligrams per cubic meter of air

*T - Total dust sample. The Federal health standard for total inert dust is 15 mg/M^3, and the ACGIH-TLV is 10 mg/M^3.

**R - Respirable dust sample. The Federal health standard and the ACGIH-TLV for respirable inert dust is 5 mg/M^3.