U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION REPORT
HE 80-38-744

LONGMONT TURKEY PROCESSORS, INC.
LONGMONT, COLORADO

SEPTEMBER 1980

I. SUMMARY

In December 1979 the National Institute for Occupational Safety and Health (NIOSH) received an employer request to evaluate chest tightness and breathing difficulties at Longmont Turkey Processors, Longmont, Colorado. The request originated from an employee's medical problems suspected to be an allergic reaction to dust in the work environment. The request specified that approximately 30 administrative personnel were potentially exposed to toxic dust generated from turkey feathers.

NIOSH conducted an industrial hygiene evaluation during January 17-18, 1980. Other factors evaluated in this study included analysis of the ventilation system, description of the normal work routine of the employee who suffered the allergic problems, and individual environmental monitoring of the areas in question. None of the areas evaluated in this study produced exposures above the evaluation criteria of 10 mg/M^3 for total particulate (nuisance dust) exposure. It should be recognized that there is no criteria for dust containing feather particulates which may produce one of two types of allergic reaction in susceptible individuals: (1) upper respiratory/asthmatic syndrome or (2) an allergic alveolitis type reaction.

Based on the data obtained in this investigation, NIOSH determined that a health hazard did not exist to workers exposed to total particulate dust. However, there is a segment of the general population whose allergic reaction to pollens, foods, dust, etc., should be recognized and measures should be taken to reduce and/or eliminate immunologic responses for susceptible persons. Therefore, it is believed that an exposure did and could occur to a suspectible person, i.e., a person may become reactive while working in an environment. Recommendations to limit employee exposure are included on page 6 of this report.

KEYWORDS: SIC 2010 (Meat Products), allergic problems, allergic alveolitis, upper respiratory/asthmatic syndrome, turkey feathers, immunologic responses.

II. INTRODUCTION

On December 5, 1979, an authorized representative of Longmont Turkey Processors, Inc., Longmont, Colorado, submitted a request pursuant to Section 20(a)(6) of the Occupational Safety and Health Act of 1970.[1] The request stated that approximately 30 employees were potentially exposed to nuisance dust containing suspected allergic materials.

Personal communications with the requestor during our January visit, as well as phone conversations with the requestor on February 28, 1980, and March 4, 1980, discussed the findings and recommendations at that time.

III. BACKGROUND

Longmont Turkey Processors, Inc. produces a variety of turkey meat products. The plant is a large three-story building which houses the entire operation, i.e., from receiving, processing, and shipping to performing the various administrative duties required to run the operation. The actual food preparation process begins when trucks bring in the live turkeys into a receiving area which is also housed inside the three-story building. Once unloaded the turkeys are sent through a number of different process stations before they are eventually packaged and sent to the retailer.

The majority of these food processes occupy approximately 75 percent of the plant's building. An additional one-eighth of the building is used as a rendering plant and the remaining portion of the plant houses the administrative offices for the company. Therefore, individuals working in each of these departments are essentially susceptible to many of the fine dust particles that are ubiquitous throughout the building. This is also true outside the plant itself, i.e. upon inspection of the parking lots, vacant lots, and other properties around the plant, it became noticeable that fine particles of turkey feathers and dust were around these areas as well.

The work routine of the employees in the administrative offices, as well as the employee who experienced the allergic difficulties, is relatively the same in terms of their potential for exposure to the contaminants in question. This routine can be summarized as follows:

> Employees arrive at work between 7:00-8:00 A.M. and are either dropped off in front of the plant or park their cars in the lots adjacent to the plant; the majority of their work period is spent in the administrative offices; approximately

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[1]Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 19 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative to employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

one-half hour is spent for lunch, during which the employees either eat in the general area or go out for lunch, and finally, the employees go home after the eight-hour work day via the same areas they entered.

IV. EVALUATION DESIGN AND METHODS

A. Environmental

Samples were taken in areas frequented by the employees who work in the administrative departments, i.e., entrances and exits to the plant, as well as the lunchroom and offices. The following is a description of the techniques used to determine the suspected exposure.

Area samples were collected for dust on pre-weighed AA 0.8μ pore density cellulose membrane filters at a flow rate of 1.5 liters per minute with vacuum pumps. These samples were post-weighed to determine the amount of particulate collected during the sampling period. The samples were not analyzed for their protein fraction (i.e., that antigen suspected of producing the allergic reaction) because it was determined that all the dust in and around the plant would, by nature of the industry, have some portion of protein present in the material. Thus, acknowledgment of the presence of the protein would give little information beyond knowing that the portion was present in the collected samples.

B. Medical

The medical evaluation used in this survey consisted of having a NIOSH Medical Officer evaluate those symptoms manifested by the employee as described by the attending physician. Several of the workers in the administrative office were questioned regarding respiratory difficulties.

V. EVALUATION CRITERIA

A. Environmental

The exposure limits to toxic chemicals are derived from existing human and animal data and industrial experience to which it is believed that nearly all workers may be exposed for an 8-10 hour day, 40-hour work week, over a working lifetime with no adverse effects. However, due to "variations in individual susceptibility, a small percentage of workers may experience effects at levels at or below the recommended exposure limit; a smaller percentage may be more seriously affected by aggravation of a pre-existing condition or by development of an occupational illness."

In this study only one environmental exposure criteria, total particulate (nuisance dust) could be referenced to assess the workers' exposure to the suspected contaminant evaluated at Longmont Turkey Processors. The present health criteria for Nuisance Particulate has been tabulated below.

Substance	Adopted 8-Hour Time Weighted Average (TLV-TWA)
Total Particulate (Nuisance Dust)[1].....	10 mg/M3*

[1] American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), 1979.

* mg/M3 = approximate milligrams of substance per cubic meter of air.

B. Toxicology

1. Total Particulate (Nuisance Dust)

Nuisance dust has little adverse effects on the lungs and does not produce significant disease if exposures are kept under reasonable control. These dusts are biologically inert in that when inhaled the structure of the alveoli remains intact and little or no scar tissue is formed, and any reaction provoked is potentially reversible. Excessive concentration in the work area may decrease visibility and cause eye, ear, and nose discomfort. This can also create injury to the skin due to vigorous cleansing procedures necessary for their removal.

2. Turkey Feather and Dust-Allergens

Allergic diseases are due to a sensitivity which certain persons develop to normally harmless substances. A susceptible person who is exposed to these substances has symptoms of disorder in the respiratory organs, the digestive organs, or the skin. The most common of these disorders are hayfever, asthma, stomach, intestinal disturbances, rashes due to contact, eczema, and hives.

Substances capable of producing allergy are called allergens. When a particular allergen is absorbed by the body, the minute cells in the tissue manufacture special substances called antibodies...which interact with it. This produces an irritation in the susceptible tissues; for example, the nose, the bronchial tubes, or the skin. The range and variety of things to which susceptible persons may become sensitive are almost endless and sensitivity usually occurs only after repeated exposure to the substance.

Dust associated with poultry raising or processing, either from turkeys, chickens, pigeons, etc., can cause mucous membrane irritation (Boyer, R. S., et al., 1974; Zavaleta, D. and Wilson, W. O., 1979; Christensen, L. T., et al., 1975; and Stahvljak-Beritic, D., et al, 1977). In addition, two types of immunologic (allergic) disorders can occur in susceptible persons exposed to these poultry: First, an upper respiratory or asthmatic syndrome and, second, an allergic alveolitis.

The former is characterized by sneezing, nasal congestion, and wheezing occurring soon after exposure, the latter by cough, shortness of breath, fever, and muscle aches occurring several hours after exposure. Either type of immunologic reaction can be precipitated by minimal, perhaps immeasurably small exposures.

VI. RESULTS AND CONCLUSIONS

A. Environmental

Employee exposure to suspected airborne concentrations of total particulate (nuisance dust) containing turkey feather materials were evaluated. Also, an evaluation of the general ventilation system and work routine was assessed. The following are the results and conclusions of this evaluation:

1. Total Particulate (Nuisance Dust)

A total of six area samples were collected in four separate locations during the investigation (refer to Table 1). Each of the samples showed minimal levels when compared to the evaluation criteria of 10 mg/M^3. These results would indicate that a health hazard did not exist to this contaminant during the day sampled. The results and conclusions concerning exposure to turkey feathers and turkey feather dust will be discussed in the medical portion of this section.

2. Ventilation and Work Routine

The ventilation system used in the administration area is a heating/cooling system separate from the other departments and is known as a constant volume dual duct system. The unit contains a filter section and a blower which delivers a constant volume mixture of 80 percent recycled and 20 percent outside air (at minimum conditions). The return air passes through slots in the ceiling and is drawn back to the main portion of the system which is located on the roof. From here a portion of the return air is exhausted to the outside (minumum 20 percent) and a portion is returned to the air supply unit (maximum 80 percent). Fresh air (minumum 20 percent) is then drawn in from the outside-roof top area. Thus, it is the later portion of the above description--the 20 percent fresh air coming from the roof--which could potentially effect the susceptible allergenic employee. That is, along with this ventilation unit are numerous other exhaust stacks which emit various size particulates and odors which can re-enter any of the makeup air systems in the building. Normally these type particles and odors are harmless; however, to one who is allergic to such agents, this working environment can be extremely uncomfortable. Further concerns regarding sensitivity and the relationship between work routine, daily activities, etc., are discussed in subpart B. (Medical) of Section VI.

B. Medical

A large number of the workers were interviewed. None of those interviewed had medical complaints.

Based on the medical information obtained in this investigation, it does appear that a susceptible person could become reactive while in an environment where such poultry contaminants are found, e.g., the workplace, around the home, outdoor environments, etc. That is, antigens associated with such poultry dust can be found in any of these environments. A susceptible person should be cognitive that a reaction could take place and/or precipitate continual discomfort while in or around such environments. The concentration or distance which can precipitate a mild or severe reaction is questionable; however, it has been cited that one can become reactive by simply living within a mile of such environments (Korn, D.S., et al, 1968). Also it was determined that the severity was based on the location of the residence in relation to the wind direction. Therefore, one living downwind of poultry raising or processing could become reactive by the particulates from these sources.

VII. RECOMMENDATIONS

The following recommendations are offered to assist in reducing and/or eliminating exposures to the contaminants described:

A. Environmental

A routine inspection of the ventilation system used for the administration offices should be done on a regular basis. Emphasis should be directed towards the filtration unit used in this system. Therefore, more frequent filter changes may be required, as well as using a more efficient filtration unit.

B. Medical

1. Because of the possibility of allergic sensitization from poultry products, particularly feathers, dander, and droppings, workers with a history of allergic sensitization should be counseled about their increased risk of sensitization before being assigned to a specific job area.

2. To better place new employees, the company may wish to include a more thorough screening process than the current one which only addresses freedom from disease which may be transmitted via poultry products.

VIII. REFERENCES

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XI. DISTRIBUTION AND AVAILABILITY

Copies of this determination report are currently available upon request from NIOSH, Division of Technical Services, Information Resources 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:

1. Longmont Turkey Processors, Inc.
2. U.S. Department of Labor/OSHA - Region VIII.
3. NIOSH - Region VIII.
4. Colorado Department of Health.
5. State Designated Agency.
6. Colorado State Compensation Insurance Fund.
7. Colorado Department of Labor and Training.

For the purpose of informing all employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1

Summary of Area Sampling for
Total Particulate

Longmont Turkey Processors, Inc.
Longmont, Colorado

Area Description	Sample Number	Sampling Time	mg/M3 Total Particulate
Hallway	AA1	360	< 0.01
Main Entrance	AA2	360	1.53
Back Exit	AA3	360	2.31
Lunchroom	AA4	360	< 0.01
Office Desk	AA5	360	< 0.01
Office Desk	AA6	360	< 0.01
	EVALUATION CRITERIA		10 mg/M3
	NIOSH LIMIT OF DETECTION		0.01 mg/M3

mg/M3 = milligrams of substance per cubic meter of air.