



NIOSH HEALTH HAZARD EVALUATION REPORT:

**HETA #2002-0253-2894
Blue Ribbon Packing
Indianapolis, Indiana**

February 2003

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

The NIOSH logo, consisting of the word "NIOSH" in a bold, italicized, sans-serif font. The "N" is significantly larger and more prominent than the other letters.

PREFACE

The Hazard Evaluations and Technical Assistance Branch (HETAB) of the National Institute for Occupational Safety and Health (NIOSH) conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health (OSHA) Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from 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.

HETAB also provides, upon request, technical and consultative assistance to Federal, State, and local agencies; labor; industry; and other groups or individuals to control occupational health hazards and to prevent related trauma and disease. Mention of company names or products does not constitute endorsement by NIOSH.

ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Melody M. Kawamoto, M.D., M.S., and Mark M. Methner, Ph.D., C.I.H., of HETAB, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS). Field assistance was provided by Gregory Burr, C.I.H., Boris D. Lushniak, M.D., Tania Carreon-Valencia, Ph.D., and Kelvin Wren, M.D. Desktop publishing was performed by Robin Smith. Review and preparation for printing were performed by Penny Arthur.

Copies of this report have been sent to employee and management representatives at Blue Ribbon Packing and the OSHA Regional Office. This report is not copyrighted and may be freely reproduced. Single copies of this report will be available for a period of three years from the date of this report. To expedite your request, include a self-addressed mailing label along with your written request to:

NIOSH Publications Office
4676 Columbia Parkway
Cincinnati, Ohio 45226
800-356-4674

After this time, copies may be purchased from the National Technical Information Service (NTIS) at 5825 Port Royal Road, Springfield, Virginia 22161. Information regarding the NTIS stock number may be obtained from the NIOSH Publications Office at the Cincinnati address.

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

Highlights of the NIOSH Health Hazard Evaluation

Evaluation of Blue Ribbon Packing

In August 2002, at the request of the Indiana Occupational Safety and Health Administration, NIOSH investigators conducted a health hazard evaluation at the Blue Ribbon Packing fresh-produce packaging facility in Indianapolis, Indiana. Employees handling tomatoes and other produce, and assembling ink-coated cardboard trays were reported to have skin rashes and other lesions.

What NIOSH Did

- We watched employees doing their work to look for possible causes of the reported skin problems.
- We collected and analyzed cardboard and dust samples.
- We talked to employees confidentially.
- We examined skin lesions that employees reported.

What NIOSH Found

- Eight employees had visible skin lesions that might have been caused or made worse by workplace exposures.
- Five employees with no visible work-related lesions had skin symptoms that might have been caused or made worse by workplace exposures.
- Exposures to skin irritants, such as dust, cardboard ink, tomato juice and pulp, and alcohols in the hand sanitizer, might have caused or aggravated skin problems.
- Some produce, such as cilantro, might have caused some allergy-related skin problems.
- There is a chance of possible temporary hearing loss related to noise from the cardboard baler.

What Blue Ribbon Packing Managers Can Do

- Educate employees about the causes of work-related skin problems and how they can protect themselves.
- Instruct employees to change to new gloves when their gloves are damaged.
- Reduce the use of potentially irritating hand sanitizers.
- Evaluate the cardboard baler for noise. Provide hearing evaluations and hearing protection if noise is higher than levels recommended for workplaces.

What Blue Ribbon Packing Employees Can Do

- Make sure that the gloves are protecting the skin. Replace torn gloves.
- Do not touch other parts of the body with hands that are soiled by vegetables or fruits..
- If clothes are wet or soiled by vegetables and fruits, change to clean ones.
- Before leaving work, wash skin that is soiled by vegetables or fruits.
- Report any skin problems and other conditions (such as hearing loss) if they seem to be related to work.



What To Do For More Information:
We encourage you to read the full report.
If you would like a copy, either ask your health and safety representative to make you a copy or call 1-513/841-4252 and ask for HETA Report 2002-0253-2894



**Health Hazard Evaluation Report 2002-0253-2894
Blue Ribbon Packing
Indianapolis, Indiana
February 2003**

**Mark M. Methner, Ph.D., CIH
Melody M. Kawamoto, M.D., M.S.**

SUMMARY

In May 2002, the National Institute for Occupational Safety and Health (NIOSH) received a request from the Indiana Occupational Safety and Health Administration (IOSHA) to evaluate Blue Ribbon Packing, a tomato-packing plant in Indianapolis, Indiana. Employees handling tomatoes and other produce and assembling ink-coated cardboard trays were reported to have skin lesions. NIOSH investigators made two visits to the facility in August 2002.

On the first visit, NIOSH investigators noted that the skin and gloves of employees assembling cardboard trays were coated with pigment from the cardboard, and that the gloves were torn at the fingertips. An ink-coated cardboard sheet from the plant, analyzed for 30 elements (metals) by inductively coupled plasma-atomic absorption, was found to contain sodium, magnesium, potassium, copper, and iron. Gas chromatography/mass spectrometry showed di(propyleneglycol) propyl ether to be the dominant organic compound in the cardboard ink. A bulk sample of dust from a bundle of unfolded cardboard, examined by polarized light microscopy, contained 85% fibrous material, mostly sub-angular to sub-rounded in shape.

On the second visit, NIOSH investigators conducted confidential employee interviews and skin examinations. Forty (93%) of the forty-three eligible employees participated in the survey. Seventeen (42.5%) of the participating employees reported skin lesions. According to the NIOSH dermatologist's assessment, four (23.5%) of the participants reporting skin lesions had visible lesions that were possibly caused by work and another four (23.5%) had lesions that were possibly aggravated by work. Their lesions included folliculitis (inflammation of the hair follicles), erythema (redness of the skin), and papules or plaques (raised skin lesions) on the face, neck, upper chest or back, arms, or hand. Participants who had skin lesions that were not related to work had acne, milia, or warts. Five participants who did not have work-related skin lesions reported irritation, itching, discoloration, or rash that occurred during or shortly after work. Some of them were able to identify a specific produce (e.g., cilantro) as the cause of the symptom.

Additionally, the confidential employee interviews revealed symptoms consistent with temporary hearing loss related to noise from the cardboard baler. NIOSH investigators recommended that the company evaluate this potential health hazard.

The dust, pigments, and organic compounds from coated cardboard; acidic tomato juice and pulp; allergy-causing produce such as cilantro; and alcohols in the hand sanitizer that were found at the plant are potential health hazards that can affect the skin. Thirteen (32.5%) of the employees surveyed had skin symptoms or visible skin lesions that were possibly caused by or aggravated by these types of work exposures. Recommendations to prevent skin symptoms and lesions are provided in this report.

Keywords: 1987 SIC 0723: Crop Preparation Services. Produce, tomatoes, cilantro, cardboard, produce trays, ink, di(propylene glycol) propyl ether, hand sanitizer, ethyl alcohol (ethanol), isopropanol, skin lesions, skin rashes, dermatitis, noise.

TABLE OF CONTENTS

Preface	ii
Acknowledgments and Availability of Report	ii
Highlights of the HHE Report	iii
Summary	iv
Introduction	1
Background	1
Methods	1
Evaluation Criteria	1
Occupational Skin Diseases	2
Results	3
Walkthrough Survey	3
Industrial Hygiene Survey	4
Medical Survey	4
Skin Lesions and Symptoms	4
Noise and Hearing	5
Discussion and Conclusions	5
Noise and Hearing	5
Recommendations	6
Skin Symptoms and Lesions	6
Noise and Hearing	6
References	6

INTRODUCTION

On May 10, 2002, NIOSH received a request from the Indiana Occupational Safety and Health Administration (IOSHA) to evaluate Blue Ribbon Packing, a tomato-packing plant in Indianapolis, Indiana. Employees handling tomatoes and other produce, and assembling ink-coated cardboard trays were reported to have skin rashes and other skin lesions. NIOSH visited the facility to evaluate the potential causes of the reported skin lesions by observing work processes and collecting cardboard and dust samples for analysis of chemical composition and physical characteristics. NIOSH also conducted confidential employee interviews and skin examinations to determine the prevalence and type of skin lesions among employees.

BACKGROUND

Blue Ribbon Packing, a subsidiary of Caito Foods, Inc., packages domestic and foreign-grown tomatoes and other produce into display-ready consumer-sized containers for distribution to supermarkets and grocery stores. Approximately 50 full- and part-time employees work at the plant. Most employees are Spanish-speaking and do not speak English. The workforce does not have union representation.

Skin lesions were reported among employees who fold coated cardboard produce trays or work on the packaging lines. IOSHA inspectors' suspected that the skin lesions were related to ink and dust from the cardboard boxes and the acidity of tomato juice (pH of 3 to 4).

METHODS

On August 6, 2002, a NIOSH team of two industrial hygienists and an occupational health physician visited Blue Ribbon Packing to observe the tray assembly and packing processes, and to assess the scope of the reported skin lesions. NIOSH investigators collected bulk samples of cardboard as well as dust from the surface of a bundle of cardboard sheets. Samples from an ink-coated cardboard sheet were analyzed for 30 minerals and metals by inductively coupled plasma-atomic absorption. Organic compounds

were analyzed by gas chromatography/mass spectrometry. The bulk dust sample was analyzed by polarized light microscopy (PLM) to determine the physical characteristics (i.e., form and structure) of the particulate.

Because many employees reported current skin lesions, the NIOSH team scheduled a follow-up visit to determine the prevalence and type of skin lesions among employees. On August 26, 2002, a NIOSH team consisting of an occupational health physician, an occupational dermatologist, an occupational health epidemiologist, and an occupational medicine resident conducted a medical survey at the plant. All 43 employees at work on the day of the survey were eligible to participate. The NIOSH team described the survey activities in English and Spanish at the beginning of the day and 40 employees agreed to participate. The occupational health physician and epidemiologist conducted confidential interviews in the language of each participant's choice. The interview included questions about allergies, asthma, skin conditions and aggravating factors, use of skin care products, frequency of work clothes changes, glove use, handwashing and bathing frequency, and work outside of Blue Ribbon Packing. At the end of the interview, each participant indicated his or her skin symptoms and lesions on a drawing of the human body (body map). All participants who reported skin symptoms and skin lesions were offered a limited examination of the affected skin by the NIOSH dermatologist, who assessed whether the lesions were work related. Employees with skin lesions were informed about the type of lesion they had and, when indicated, advised to seek or continue medical care.

EVALUATION CRITERIA

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for the assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects even though their exposures are maintained below these levels. A small

percentage may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy). In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the criterion. These combined effects are often not considered in the evaluation criteria. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increases the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: (1) NIOSH Recommended Exposure Limits (RELs),¹ (2) the American Conference of Governmental Industrial Hygienists' (ACGIH®) Threshold Limit Values (TLVs®),² and (3) the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).³ Employers are encouraged to follow the OSHA limits, the NIOSH RELs, the ACGIH TLVs, or whichever are the more protective criterion.

OSHA requires an employer to furnish employees a place of employment that is free from recognized hazards that are causing or are likely to cause death or serious physical harm [Occupational Safety and Health Act of 1970, Public Law 91-596, sec. 5(a)(1)]. Thus, employers should understand that not all hazardous chemicals have specific OSHA exposure limits such as PELs and short-term exposure limits (STELs). An employer is still required by OSHA to protect their employees from hazards, even in the absence of a specific OSHA PEL.

A time-weighted average (TWA) exposure refers to the average airborne concentration of a substance during a normal 8- to 10-hour workday. Some substances have recommended STEL or ceiling values which are intended to supplement the TWA where there are recognized toxic effects from higher exposures over the short-term.

Occupational Skin Diseases

Not all skin diseases have an identified environmental or occupational cause. Some other skin diseases are not related to environmental or occupational exposures (e.g., acne among young adults). For many skin diseases, the exact factors causing the disease are unknown (e.g., psoriasis, rosacea). Some skin diseases such as contact dermatitis and contact urticaria are known to be caused by exposures outside of work as well as at work (e.g., contact dermatitis to household products, perfumes, creams). Other skin diseases may not be caused by environmental exposures, but may be worsened by them (e.g., lesions of psoriasis produced at sites of skin friction or injury, rosacea worsened by heat, wet work initiating dyshidrotic eczema).

Occupational skin diseases can occur in a variety of ways, depending on the work conditions or exposures. In general, the causes of occupational skin disorders can be grouped into the following categories:

- Physical insults (e.g., friction, pressure, trauma, changes in temperature and humidity)
- Biologic causes (e.g., plants, bacteria, fungi, protozoa, arthropods).
- Chemical insults (e.g., water, alcohols, solvents).

Exposed areas of the skin, such as hands and forearms, which have the greatest contact with irritants or allergens, are most commonly affected. If a chemical gets on clothing, it can produce rashes at areas of greatest contact, such as thighs, upper back, armpits, and feet. Dusts can produce rashes where the dust accumulates and is held in contact with the skin, such as under the collar and belt line, at the tops of socks or shoes, and on the flexed side of joints (e.g., front of the elbow, back of the knee). Irritants and allergens can be transferred to other areas of the body (such as the face and neck) by unwashed hands or from areas of accumulation (such as under rings or between fingers).

The work-relatedness of skin diseases may be difficult to prove. The accuracy of the diagnosis is related to the skill level, experience, and knowledge of the medical professional who makes the diagnosis and confirms the relationship with a workplace exposure. Guidelines are available for assessing the work-relatedness of dermatitis,⁴ but

even with guidelines the diagnosis may be difficult. The diagnosis is based on the medical and occupational histories and physical findings. The importance of the patient's history of exposures and disease onset is clear. In irritant contact dermatitis there are no additional confirmatory tests. Patch tests or provocation tests are discouraged because of a high false-positive rate. In many instances, allergic contact dermatitis can be confirmed by skin patch tests using specific standardized allergens or, in some circumstances, by provocation tests with nonirritating dilutions of industrial contactants.⁵

Because people with contact dermatitis can develop long-term dermatologic problems, prevention is key. Strategies in the prevention of contact dermatitis include identifying allergens and irritants, substituting substances or materials that are less irritating and less allergenic, establishing engineering controls to reduce exposure, utilizing personal protective equipment (PPE) such as gloves and special clothing appropriately, emphasizing personal and occupational hygiene, establishing educational programs to increase awareness in the workplace, and providing health screening.^{6,7,8} The introduction of PPE must be considered carefully since it may actually create problems by occluding allergens or irritants or by directly irritating the skin. Similarly, the excessive pursuit of personal hygiene in the workplace may actually lead to misuse of soaps and detergents, which can result in irritant contact dermatitis.⁹ The effectiveness of gloves depends on the specific exposures and the types of gloves used. The effectiveness of barrier creams is controversial,¹⁰ and at times workers using barrier creams may have higher prevalence rates of contact dermatitis compared to those who do not use the creams.¹¹

RESULTS

Walkthrough Survey

Work activities at the Indianapolis plant include folding cardboard to make produce trays, manually packaging tomatoes and other produce (such as cilantro, corn, peaches, and potatoes) into pint- or quart-sized display-ready plastic containers; handling produce crates, boxes, and trays; clean-up; and compacting waste cardboard.

Approximately 50 full- and part-time employees perform these activities five to six days a week from 7:00 a.m. to about 3:30 p.m., depending on the workload.

Unfolded precut cardboard for produce trays arrives at the plant in large bundles. One employee is permanently assigned to fold the cardboard into trays. Other employees are temporarily assigned to this task on a rotating basis. One tray assembler's fingertips and wrists and his wrist-length vinyl gloves were coated with green pigment matching the color on the cardboard. His gloves were noted to be torn at the fingertips after approximately one hour of use. The hands of the other tray assembler, who was not using gloves, were also coated with green pigment. Company managers stated that, to address employee concerns, they had changed the type of cardboard trays at least twice before.

Produce arrives at the plant in large crates or boxes. All foreign produce is inspected by the United States Department of Agriculture (USDA) prior to release into the U.S. All produce, domestic and foreign, is washed and non-leafy produce is coated with a Food and Drug Administration (FDA)-approved protective agent before arriving at the plant. Most employees work on the tomato packaging lines, but a team of four employees are intermittently assigned to a special line that handles other produce. On the day of the walkthrough survey, employees on the packaging lines were repackaging tomatoes. They removed pint-sized plastic containers from cardboard trays, emptied the tomatoes from the plastic containers, discarded damaged tomatoes, repackaged intact tomatoes, and replaced the containers into the trays. Juice and pulp on intact tomatoes, plastic containers, and cardboard trays were wiped off with paper towels. A few employees used vinyl gloves, but most did not. Male employees are rotated from packaging tasks to move produce, crates, boxes, trays, and containers to and from the packaging lines. All employees clean-up their work area at the end of the shift. Waste cardboard is baled periodically.

The company provides 11 uniform shirts with laundry service to each employee. Employees may opt to buy company tee-shirts, for which laundry service is not available. Vinyl gloves are available for all employees who choose to use them. Wash facilities include one washtub sink in the lunch area between the packaging area and the tray assembly area, and sinks in the restrooms. The hand-cleaning products provided for employees at the time of the NIOSH visits were Dermapro® Lotion Soap, which contains <4% ethanolamine according to its material safety data sheet (MSDS), and Purell® Instant Hand Sanitizer, which contains 62% ethyl alcohol and <5% isopropanol according to its MSDS.

Industrial Hygiene Survey

Based on the analytical methods employed, the relative abundance of metals within the ink/cardboard matrix (from high to low) were: sodium, magnesium, potassium, copper, and iron. Additionally, di(propyleneglycol) propyl ether was found to be the dominant organic compound in the ink. The particulate matter collected from the surface of the cardboard boxes was 85% fibrous material. The majority of the fiber shapes were in the sub-angular to sub-rounded category.

Medical Survey

On August 6, 2002, Blue Ribbon Packing provided the NIOSH team with a list of 54 employees. On August 26, 2002, five persons were no longer working at the plant and six employees were absent for a variety of reasons (e.g., medical leave, sick leave, day off). Forty (93%) of forty-three eligible employees participated in the survey and completed all components of the survey. Participants included 21 full-time employees, 18 of whom had worked at the plant for two or more years, and 19 part-time employees, 17 of whom had worked at the plant for less than 6 months.

Skin Lesions and Symptoms

Seventeen (42.5%) of the forty survey participants reported skin lesions. Conditions were determined to be possibly caused by work exposures if the participant did not have an underlying skin condition and the lesion was consistent with the

known effects of potential work exposures. Conditions were determined to be possibly aggravated by work if the participant had a skin condition that was not caused by work but could have been made worse by work exposures. According to the occupational dermatologist's assessment, four (23.5%) of the seventeen participants who reported skin lesions had visible lesions that were possibly caused by work exposures, and another four (23.5%) had lesions that were possibly aggravated by work exposures. Their lesions included folliculitis (inflammation of the hair follicles), erythema (redness of the skin), and papules or plaques (raised skin lesions). The lesions were located on the face, neck, upper chest or back, arms, or hand. The remaining nine participants with skin lesions had either acne (pimples), milia (tiny skin cysts), or warts, which are not related to work. Five participants that did not have visible work-related skin lesions reported irritation, itching, discoloration, or rash that occurred during or shortly after work. Some of them were able to identify a specific produce (e.g., cilantro) causing the problem. Thus, 13 (32.5%) of all participants had skin symptoms or visible skin lesions that were possibly caused or aggravated by workplace exposures.

Most of the participants with possibly work-related skin lesions were full-time employees, and most of the participants with possibly work-related skin symptoms were part-time employees (Table 1). Six (15%) of the forty participants reported preexisting allergy or asthma, two of whom had possibly work-related skin lesions, and one of whom had possibly work-related skin symptoms. Three participants reported working outside of Blue Ribbon Packing, but those who had visible work-related skin lesions reported that the lesions appeared after beginning work at Blue Ribbon Packing and before starting the other job.

Although twenty-seven (67.5%) of the participants reported any use of gloves at work, only four reported that they used gloves more than half the time. The reasons participants gave for using gloves included folding green boxes (23 participants) or handling badly damaged tomatoes (3 participants) or cilantro (2 participants).*

*One participant used gloves for more than one reason.

Thirty-seven (92.5%) of the participants reported that they changed their uniform daily and the three remaining participants reported that they changed their uniform every two days. All participants reported bathing at least once a day. Those who bathed only before work did not have work-related skin symptoms or lesions. Almost all participants reported frequent hand washing (i.e., before the meal break, after bathroom breaks, and before leaving work). On the day of the survey, almost all participants were observed to wash their hands at the sink in the lunch area before eating.

Noise and Hearing

At least one survey participant reported muffled hearing related in time to use of the cardboard baler, which was described to make a sudden, loud, and sharp noise. Because the cardboard baler was not in use at the time of the NIOSH site visits, and the finding of noise-related symptoms was made on the last site visit, NIOSH investigators did not assess noise from the cardboard baler.

DISCUSSION AND CONCLUSIONS

Eight of the seventeen survey participants who reported skin lesions had visible lesions that were possibly caused or aggravated by work. The remaining nine participants' skin lesions were not related to work. Five participants who did not have work-related skin lesions had skin symptoms that were possibly caused by or aggravated by work. A variety of workplace factors could explain the possible work-related skin symptoms and lesions, and include the following:

- Mechanical irritation of the skin by dust and pigments from the green-coated cardboard trays.
- Irritation and drying of the skin by fat-soluble organic solvents, such as di(propylene glycol) propyl ether, found in the chemical analysis of the coating of the green cardboard tray.

Changing the produce tray cardboard to a type that does not transfer ink to the skin may reduce skin contact with pigment. However, this may not reduce the risk of skin lesions

since the same or other potential skin irritants may still be present.

- Irritation of the skin by tomato juice and pulp because of its acidity. Lesions on the face, neck, and chest could be explained by transfer of tomato juice from hands to other parts of the body.
- Dryness and irritation of the skin by the alcohols in the hand sanitizer if used repeatedly over prolonged periods of time.
- Allergic reactions to certain produce, such as cilantro.

Although more than half of the participants reported using gloves for folding boxes, the gloves are probably not protective because they tear easily during this activity and do not cover the wrists. The survey did not distinguish use of the hand sanitizer and lotion soap. Thus, the amount of protection from frequent hand washing could not be determined.

Noise and Hearing

The reported symptoms of temporary muffled hearing related in time to noise from the cardboard baler are consistent with a noise-induced temporary hearing loss. Excessive noise exposure may cause a temporary change in hearing or a temporary ringing in the ears (tinnitus). These short-term problems usually go away within a few minutes or hours after noise exposure ends. However, repeated exposures to loud noise can lead to permanent hearing loss or tinnitus.

RECOMMENDATIONS

Skin Symptoms and Lesions

In general, a combination of strategies should be used to prevent occupational skin diseases. The following measures may be useful in reducing or preventing future skin lesions and symptoms among employees at Blue Ribbon Packing:

- Employees should be trained about potential skin irritants and allergens in the workplace and how to prevent exposure and adverse effects.
- Employees should be instructed on the possibility of transfer of irritants and allergens by the hands to other parts of the body, in particular, the face, neck, and chest.
- Employees handling produce should use non-latex protective gloves to prevent skin contact with plant irritants and allergens.
- Employees who assemble produce trays should continue to be provided with non-latex protective gloves. Protective sleeves, such as vinyl sleeves, may be useful when skin at or above the wrists is affected.
- The vinyl gloves currently in use are adequate as long as they are not damaged. Because damaged gloves are not protective, employees should be instructed to change into new gloves as soon as their gloves are damaged.
- Handwashing should continue to be encouraged and employees should be informed that they may need to wash other parts of the body, such as the face and neck.
- Special attention should be given to soaps and skin cleansers for potential irritant and allergenic properties. For example, the alcohols in the hand sanitizer are potential irritants; and lanolin and fragrances, which are found in some soaps and moisturizers, are potential allergens and may cause dermatitis in sensitive individuals. To minimize the risk for skin irritation, it may be prudent to remove the hand sanitizer, or to inform employees on when it should be used.

Noise and Hearing

Shortly after the medical survey, NIOSH investigators telephoned Blue Ribbon Packing to recommend that the company evaluate noise from the cardboard baler and institute a hearing protection program if one is indicated. When noise measurements are made, noise levels should be documented as peak values as well as 8-hour TWAs using personal dosimeters and sound level

meters. More information on noise and the hearing protection program can be found on the internet at the OSHA and NIOSH websites.^{12,13} IOSHA offers consultation services as well as information about noise and hearing protection.

REFERENCES

1. NIOSH [1992]. Recommendations for occupational safety and health: compendium of policy documents and statements. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 92-100.
2. ACGIH [2002]. 2002 TLVs® and BEIs®: threshold limit values for chemical substances and physical agents. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
3. CFR [1997]. 29 CFR 1910.1000. Code of Federal Regulations. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.
4. Mathias CGT [1989]. Contact dermatitis and workers' compensation - Criteria for establishing occupational causation and aggravation. *J Am Acad Dermatol* 20:842-848.
5. Fisher AA [1986]. *Contact Dermatitis*, ed 3. Philadelphia: Lea and Febiger.
6. Mathias CGT [1988]. Occupational dermatoses. *J Am Acad Dermatol* 6:1107-1114.
7. Mathias CGT [1990]. Prevention of occupational contact dermatitis. *J Am Acad Dermatol* 23:742-748.
8. National Institute for Occupational Safety and Health (NIOSH) [1988]. Proposed national strategy for the prevention of leading work-related diseases and injuries - Dermatological conditions. Cincinnati: US Department of Health and Human Services, DHHS Publication (NIOSH) 89-136.

9. Mathias CGT [1986]. Contact dermatitis from use or misuse of soaps, detergents, and cleansers in the workplace. In Occupational Skin Disease: State of the Art Reviews - Occupational Medicine. Philadelphia: Hanley and Belfus.

10. Orchard S [1984]. Barrier creams. Dermatol Clin 2:619-629.

11. Varigos GA, Dunt DR [1981]. Occupational dermatitis - An epidemiological study in the rubber and cement industries. Contact Dermatitis 7:105-110.

12. OSHA. Noise and hearing conservation. <http://www.osha.gov/SLTC/noisehearingconservation>.

13. NIOSH. Noise and hearing loss prevention. <http://www.cdc.gov/niosh/noise/noisepg.html>.

Table 1
Prevalence of Skin Symptoms^a and Lesions^b
Among Blue Ribbon Packing Employees
by Employment Status

Blue Ribbon Packing - Indianapolis, Indiana
HETA 2002-0253-2897
August 26, 2002

	Number (%)	
	Full time	Part time
Visible lesions possibly caused by work	4 (10.0)	0
Visible lesions possibly aggravated by work	4 (10.0)	0
Symptoms possibly aggravated or caused by work	1 (2.5)	4 (10.0)
Symptoms or visible lesions not related to work	3 (8.5)	7 (17.5)
No symptoms and no visible lesions	9 (22.5)	8 (20.0)

^a Symptoms were considered possibly work-related if the onset was after beginning work at the plant and were reported to be related to specific work exposures (e.g., cilantro) or occurred only during and shortly after work hours.

^b Visible lesions were those examined by the occupational dermatologist, who used clinical judgment to make a determination about work-relatedness.

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226-1998

OFFICIAL BUSINESS
Penalty for private use \$300



To receive NIOSH documents or information
about occupational Safety and Health topics
contact NIOSH at:

1-800-35-NIOSH (356-4674) Fax:
1-513-533-8573 E-mail: pubstaft@cdc.gov
or visit the NIOSH web site at:
www.cdc.gov/niosh/homepage.html

SAFER • HEALTHIER • PEOPLE™

|