HAZARD EVALUATION AND TECHNICAL ASSISTANCE REPORT
HETA 90-185-L2088
GENERAL FOODS, POST DIVISION
MODESTO, CALIFORNIA
DECEMBER 1990

Hazard Evaluations and Technical Assistance Branch
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National Institute for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, Ohio 45226

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I. INTRODUCTION

On February 27, 1990, the National Institute for Occupational Safety and Health (NIOSH) received a confidential employee request to investigate a problem in the General Foods, Post Division plant in Modesto, California. The requestors described a problem of dirty air, lack of ventilation and symptoms of headaches, fatigue, and respiratory illnesses. On September 11 & 12, 1989, NIOSH investigators conducted an environmental survey at the Modesto plant. During this survey, background information on the nature of the request was obtained, reports of previous environmental investigations were reviewed, a walk-through survey of the building was conducted, and environmental samples were collected in the building.

II. BACKGROUND

The General Foods Modesto plant produces Kool Aid, Grape-Nuts, and a variety of bran cereals. The plant was built in 1974, and is a six-floor building containing 4 product lines: Kool Aid, Grape Nuts, bran cereal, and a sweetened cereal line. The sweetened cereal line is used only occasionally for new products and was not in operation during the survey. The plant employs about 150 hourly workers and 20 salaried. The hourly workers are represented by the Teamsters Union, local 386. The plant operates 3 shifts per day, 5 days a week. The product lines are shut down around noon on Friday and cleaned. This usually takes until sometime Saturday morning. The lines are restarted Monday morning.

The cereal lines start with the milling and blending area where grains are taken from silo storage, cracked, ground, sized, etc. before going to the product lines. In the bran line, the grains are mixed with corn syrup, sugars and other ingredients, and cooked in the bran cooker for 45 minutes. The bran is then partially dried in a rotary drum dryer, processed into flakes, dried again, and then vitamins, flavorings, etc. are added before the product goes to storage. These steps take place up and down between the 3rd and 6th floors. Fruit blending is done on the second floor where nuts and fruits are added for the Fruit and Fiber cereal. The finished product is stored on the first floor prior to packaging. The packaged cereal is then stored in the warehouse for shipment.

The Grape-Nut line proceeds in a similar fashion where the ingredients are milled and blended, mixed, baked, ground, sized, stored, and packaged. This process covers the 5th to 2nd floors, and the final product is packaged and warehoused on the first floor. The Kool Aid line starts with the blending of the Pre-mix on the 4th floor, which contains the coloring, flavor, and other ingredients. The Pre-mix is then blended with sugar (about 95% of the product), stored in a hopper, sifted and then fed to the packaging area on the first floor. The product is packaged in cans and pouches, boxed, and stored in the warehouse.

The workforce is mostly involved in packaging and storage of the product. The cereal lines have only 2 workers per line, per shift, involved in the process prior to packaging. The milling and blending area has 2 operators per shift. Similarly, the Kool Aid line has a blender and a Pre-mix operator and then 13 other workers in the packaging area.

The plant shares one full-time nurse (EMT) with the adjacent California Vegetable Concentrate plant (formerly the two plants were owned by the same company). The EMT conducts the physicals for both plants. Physicals are given annually if the workers are over 50 years of age, every two years if over 40 years of age and every five years for those under 40 years of age. The exception is the annual audiogram which is conducted for all plant employees due to noise levels in the plant.

III. MATERIALS AND METHODS

The survey consisted of: (1) a walk-through tour of the plant with emphasis on following the process flow of the different product lines; (2) interviews with employees of all product lines and management representatives; and (3) an environmental survey of the dust levels in the plant.

Personal breathing-zone total dust samples were collected on mixed cellulose ester membrane filters at a flow rate of 2.0 Lpm using Gilian Model HFS 513S personal sampling pumps. The filters were analyzed gravimetrically according to NIOSH method 0500[1].

IV. EVALUATION CRITERIA

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for 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 if their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a preexisting 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 evaluation 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, such contact may increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent becomes available.

The primary sources of air contamination criteria generally consulted include: (1) NIOSH Criteria Documents and Recommended Exposure Limits (RELs); (2) the American Conference of Governmental Industrial Hygienist's (ACGIH) Threshold Limit Values (TLVs)[2]; and (3) the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) standards[3]. These sources provide environmental limits based on airborne concentrations of substances to which workers may be occupationally exposed in the workplace environment for 8 to 10 hours per day, 40 hours per week for a working lifetime without adverse health effects.

A discussion of the substance evaluated in this survey is presented below. The industrial evaluation criteria for the substances evaluated in this survey are also included. A time-weighted average (TWA) exposure refers to the average airborne concentration of a substance during a normal 8- to 10-hour workday.

Total Dust

Particulate aerosols which do not show a marked toxic effect and are not otherwise classified are lumped into a category of nuisance dusts. These dusts have a long history of little adverse effect on lungs and do not produce significant organic disease or toxic effect when exposures are kept under reasonable control. Excessive exposures to nuisance dusts in the workplace may reduce visibility, may cause unpleasant deposits in the eyes, ears, and nasal passages, or cause injury to the skin or mucous membranes. The current OSHA PEL for Particulates Not Otherwise Classified (PNOC) is 15 milligrams per cubic meter of air (mg/M^3) measured as total dust. The ACGIH has a TLV of 10 mg/M^3 for PNOC measured as total dust[4].

V. RESULTS

The results of the total dust samples collected are summarized in Table 1. The two operators in the Blending and Milling area had total dust exposures of 0.38 and 1.7 mg/M^3, both well below the ACGIH TLV of 10 mg/M^3 and the OSHA PEL of 15 mg/M^3. The exposures in the Kool Aid line were, as expected, higher. The PMOs in the Kool Aid lines had TWA exposures of 3.5 mg/M^3 (pouch line) and 7.7 mg/M^3 (can line). The pouch line was not operating during most of the first sample period. However, the exposures were fairly constant over the two sampling periods.

The Helper that was sampled in the Kool Aid line had an exposure of 4.6 mg/M^3. The Helper rotated every 30 minutes between working on the Kool Aid pouch line and in the warehouse. A short-term sample was collected on this Helper while doing rework (tearing open pouches that did not meet quality control specifications and pouring the contents into a collection hopper). The exposure during this 22-minute period was quite high, 49.3 mg/M^3. This was observed to be a dusty operation where the ventilation on the rework station appeared to be inadequate.

A personal breathing-zone sample was collected on the Mixing Operator while a batch of Kool Aid Pre-mix was prepared. This 30-minute operation resulted in an exposure of 6.1 mg/M^3. The operator wore a dust respirator during the batch preparation.

VI. DISCUSSION AND CONCLUSIONS

The predominant exposures observed at this plant were to nuisance dusts. The Kool Aid lines are quite dusty, particularly, when there are line interruptions which result in Kool Aid being spilled onto the floor. The rework stations for cans and pouches are sources of high short-term exposures to dust. The ventilation on the rework stations appeared to be inadequate to handle the dusts being generated. This is borne out by the sample collected on a helper during rework (49.3 mg/M^3 for a twenty-minute sample). The company was installing a new ventilation system during our visit which was to be operational in one to two weeks. The increased ventilation of this system may improve the conditions in the Kool Aid line.

It should be noted that there was an increased amount of general room dust in the morning of the day we sampled due to the removal of a ventilation hose from the top of a Kool Aid hopper on the second floor. However, exposures in the Kool Aid packaging lines were consistently higher in the afternoon (after the loose hose was reconnected) as compared to the morning.

Other observations made in the plant include: 1) The intake filter for the HVAC system on the 6th floor, facing west above the silos was totally plugged with dust. Consequently, the filter had torn so that all incoming air was by-passing the filter. More frequent maintenance of the HVAC filters are indicated. 2) Several workers and management personnel commented on the excessive dust levels encountered during the twice yearly cleaning of the dust collector bags. Respiratory protection should be considered during this operation until the exposures can be documented. 3) Since respirators are being used in some operations, the plant needs to have a complete respiratory protection program. Most elements are in place for a respirator program except for medical determination of worker ability to wear respirators. 4) The clean-up procedure for the bran cooker and the milling & blending area where respirators are used should be written up in detail. There are several aspects of the cleanup in the bran cooker area which involve strong caustics and acids. The current evening operator in the bran cooker area, who conducts most of the area cleanup on the weekends, has apparently developed safe procedures for avoiding exposure to these materials. These procedures should be fully documented so that other personnel who might have to do the cleaning will know how to approach it safely. Likewise, the automated caustic/acid handling system in the bran cooker area should be completed so as to minimize worker handling of these chemicals.

VII. RECOMMENDATIONS

1. Ventilation of the rework areas in the Kool Aid lines needs to be improved. The current ventilation is not effective and the exposures are quite high during this task. Employees should wear dust respirators until the ventilation system is corrected.

2. The plant should develop a comprehensive respirator program which incorporates all the requirements of the OSHA standard 29 CFR 1910.134.

3. The frequency of maintenance of HVAC filters should be increased, particularly in the 6th floor HVAC, on the west side of the building above the grain silos.

4. Written procedures should be developed for a number of the job tasks which involve potentially toxic exposures. This should include the cleanup of the milling & blending area where respirators are used, the bran cooker cleanup, the cleanup of the dust collector bags, and the acid mist cleanup of the large continuous oven. Worker exposures in these various tasks should be documented to insure that they are being properly protected.

5. The automated caustic/acid cleaning system in the bran cooker area should be completed. This system would reduce the amount of worker handling of these toxic materials.

VIII. REFERENCES

1. NIOSH (1984). Manual of analytical methods: 3rd edition, Vol. 1. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH), DHHS (NIOSH) Publication No. 84-100.

2. Threshold Limit Values and Biological Exposure Indices for 1989-1990. American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.

3. 29 CFR 1910.1000 (March 1989). Code of federal regulations. Washington, DC: U.S. Government Printing Office of the Federal Register.

4. Occupational Health Guidelines for Chemical Hazards. National Institute for Occupational Safety and Health and Occupational Safety and Health Administration. January 1981. DHHS (NIOSH) Publication No. 81-123.

TABLE 1
SUMMARY OF TOTAL DUST MEASUREMENTS
GENERAL FOODS USA, POST DIVISION
MODESTO, CALIFORNIA
SEPTEMBER 12, 1990

Operator/Area	Time On	Time Off	Conc. (mg/M^3)	Comments
Blending Oper./ Blending & Mill	06:59	10:58	0.38	Spent most of his time in control room
PMO / Kool Aid	07:05	11:43	2.5	Pouch line, packaging
	11:43	14:59	4.9	
TWA			3.5	
PMO / Kool Aid	07:06	11:42	7.4	Can line, line down 15 min
	11:42	14:59	8.0	
TWA			7.7	
Helper/ Kool Aid	07:10	10:28	3.7	Package line, rotates every 30 minutes to warehouse
	10:28	14:36	5.4	
TWA			4.6	
Helper/ Kool Aid	14:36	14:58	49.3	Rework on packages
Blending Oper / Blending & Mill	10:58	15:03	1.7	In control room mostly
Mixing Oper / Kool Aid	11:06	11:34	6.1	Prepare Pre-mix batch