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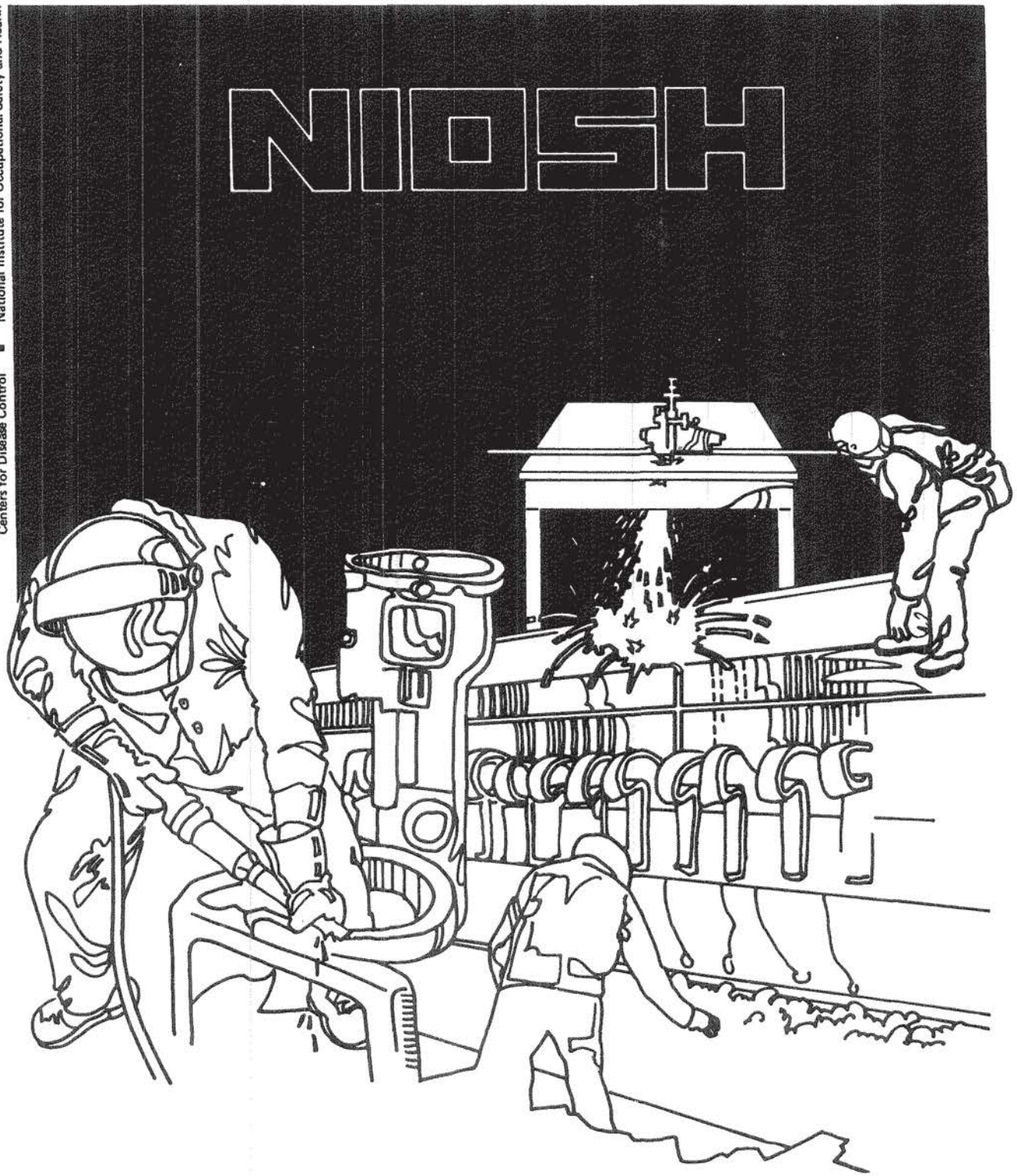

# Health Hazard Evaluation Report

HE 80-136-1291
NABISCO BRANDS, INC.
BEACON, NEW YORK

## PREFACE

The Hazard Evaluations and Technical Assistance Branch of 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 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.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) 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.

HE 80-136-1291
APRIL 1983
NABISCO BRANDS, INC.
BEACON, NEW YORK

NIOSH INVESTIGATORS:
Nicholas Fannick, I.H.
Donald Slovan, M.D.

## I. SUMMARY

In May, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request from employees to investigate respiratory problems in the printing department of Nabisco Brands, Inc., Beacon, New York. A NIOSH physician and an industrial hygienist visited the plant in May, 1980. At that time a general inspection of the plant was made and various employees of the print shop were interviewed. An industrial hygiene survey for oil (ink) mist was performed in February, 1981 and a resurvey was made in August, 1982.

Interviews conducted with nine of 17 employees of the printing department did not suggest any significant respiratory problem. There did appear to be a number of skin problems, some of which were consistent with an occupational origin (defatting of the skin due to solvents and contact dermatitis).

Exposures of the pressmen to oil mist ranged from about 1 to 3 milligrams per cubic meter of air ($mg/M^3$). The Permissible Exposure Limit, established by the Occupational Safety and Health Administration (OSHA), is 5 $mg/M^3$.

Based on the findings presented in this report, NIOSH concludes that employees at the Nabisco printing plant were not exposed to excessive concentrations of oil mist, and that no health hazard from exposure to oil mist existed at the time of the survey. However, because of the presence of dermatitis consistent with exposure to or contact with various solvents used in the printing department, Nabisco should investigate the permeability of the protective gloves currently used to determine if a more effective barrier is available.

KEYWORDS:SIC 2572: (Printing), oil (ink) mist, dermatitis

## II. INTRODUCTION

In May, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a confidential request to investigate respiratory problems in the printing department of the Nabisco Brands, Inc., Beacon, N.Y. Plant employees are represented by the Graphic Communications Union, Local 414. A NIOSH physician and industrial hygienist visited the plant in May, 1980. Industrial hygiene surveys for oil (ink) mist were performed in February, 1981 and August, 1982.

## III. BACKGROUND

This plant prints boxes for Nabisco, Brands, Inc. Four large, multicolor, offset presses are used to produce "sheets" of boxes at the rate of 5,000 to 7,000 impressions per hour. A typical run is 24 to 72 hours, after which the plates are changed and the press is cleaned. Much care is taken to produce a high quality product, but once the plates are aligned and the colors adjusted, the presses essentially run automatically. A typical press crew consists of a head pressman, one or two assistants and a feeder. Mechanics and stockmen circulate in the press area. The sheets are cut, scored, stacked and packaged in other areas of the plant.

The press area is about 200' x 400', with a ceiling about 15'-18' high. The building is about 50 years old and is air-conditioned.

The Occupational Safety and Health Administration (OSHA) had surveyed the press area for solvent vapors generated while cleaning the presses in 1979, and found no overexposure to organic vapors.

## IV. EVALUATION DESIGN AND METHODS

### A. Environmental

The offset inks used at this facility are oil based. As the request for the health hazard evaluation mentioned respiratory problems, it was decided to survey for exposure to oil mist. OSHA had previously sampled the workplace and concluded that no exposure to excessive concentrations of solvent vapor existed at the time of their survey.

The oil mist samples were collected on 37 millimeter membrane filters, over a 3 to 4 hour sampling time at a collection rate of approximately 2 liters per minute. One of the samples was collected immediately above the product as it was taken off the press and represents a "worst case" concentration. The other samples were attached to the collars of the pressmen to abtain "breathing zone" samples.

The filters were later treated with chloroform to extract any oil collected on the filters. The chloroform extract was then analyzed using fluorescence spectrophotometry as the analytical technique (NIOSH method No. P&CAM 159). Essentially, the spectographs are compared with a spectrograph generated by a sample of the bulk material--in this case a bulk of the inks used. This survey was complicated by the fact that the three presses each used different inks-- press 60 used 6 inks, press 61 used 4 and press 63 used 6. Presses 60 and 63 used one ink in common. The spectographs of the samples were very complicated, with each having several peaks. All the bulk samples and all the filter samples produced spectographs with fluorescent peaks near 400 nanometers (nm). It was decided to use the bulk sample with the smallest 400 nm peak as the standard, and the results of analysis of the filter samples were reported as though all fluorescence was due to oil from the one bulk sample. Based on this assumption, the results of the analyses must be treated as maximum concentrations and the true exposures probably are less than those reported.

B. Medical

The medical evaluation consisted of personal interviews conducted by a NIOSH occupational health physician. Nine hourly employees were interviewed about their general medical conditions with an emphasis on respiratory or dermatological problems.

## V. 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 important, however, 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, or 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 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 potentially increase 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 envronmental evaluation criteria for the workplace are: 1) NIOSH Criteria Documents and recommendations, 2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLV's), and 3) the U.S. Department of Labor (OSHA) occupational

health standards. Often the NIOSH recommendations and the ACGIH TLV's are lower that the corresponding OSHA standards. Both NIOSH recommendations and ACGIH TLV's usually are based on more recent information than are the OSHA standards. The OSHA standards also may be required to take into account the feasibility of controlling exposures in various industries where the agents are used; the NIOSH-recommended standards, by contrast, are based solely on concerns relating to the prevention of occupational disease. It should be noted that industry is legally required to meet only those levels specified by OSHA standards.

The Occupational Safety and Health Administration has established a Permissible Exposure Limit (PEL) of 5 milligrams per cubic meter of air ($mg/M^3$) for exposure to oil mist. This PEL is a time weighted average and refers to the average airborne concentration of a substance during a normal 8 to 10 hour workday. The American Conference of Governmental Industrial Hygienists (ACGIH) lists no health consequences to exposure to oil mist other than dermatitis and states that the PEL "would appear to provide a considerable margin of safety against even relatively minor changes in the lungs..."[1].

## VI. RESULTS AND DISCUSSION

### A. ENVIRONMENTAL

Table I contains the results of the analyses for oil mist of the six samples collected in the printing department at the Nabisco Brands facility in Beacon, N.Y. Concentrations of oil mist ranged from 0.8 to 6.0 $mg/M^3$. The results are listed as concentrations rather than as exposure levels because difficulties in quantifying the outcome of the analyses have lead NIOSH to make assumptions resulting in the maximization of the oil mist found on the filter samples. The results listed in Table I should be considered maximum concentrations and not true exposure levels. One of the samples was collected immediately above the product as it was taken off the press and represents a concentration of 6 $mg/M^3$. This represents a "worst case" concentration which is greater than the other samples which were collected as "personal samples" with the filters attached to the collars of the pressmen, representing breathing zone concentrations. All of the personal samples represent levels less than the PEL of 5 $mg/M^3$.

### B. Medical

Of six printing room employees randomly selected for interview, three reported skin problems that they considered to be mild, including drying of the skin on the hands, an allergic reaction to the protective glove material and eczema. Except for one worker who reported occasional shortness of breath, no respiratory symptoms or other health problems were reported. Neither the six workers nor the shop steward could identify any individuals currently employed with respiratory problems. Of five former employees identified as having reported respiratory problems, three could

not be located for interview, one said that he had no respiratory problems and the last former employee had common allergies to dust, wool, pollen, etc. which resulted in asthmatic symptoms such as wheezing and shortness of breath.

Hospital records of the four employees of the plant who had died during the preceding year included as the causes of death; two lung cancers, one myocardial infarction, and one cancer of the colon. The two individuals with lung cancer were identified as heavy smokers.

There does not appear to be a significant respiratory problem among the printing plant employees. There did appear to be skin problems consistent with an occupational origin (defatting of the skin due to contact with solvents). These findings are consistent with the low levels of exposure found by environmental sampling and with the low order of toxicity of the major exposure, ink mist. It should be noted that the printing plant employees, as in many offset printing plants, spend considerable time away from the presses and exposure to solvents occurs during clean-up and preparation of the presses, and not during the normal operation of the presses.

NIOSH considers that no health hazard due to exposure to oil mist exists in the pressroom at the Nabisco facility.

Because of the presence of a few cases of skin dermatitis consistent with exposure to or contact with solvents, Nabisco should investigate the permeability of its current protective gloves to the various solvents used in the printing plant to determine if a more effective barrier is available for use.

## VII. REFERENCE

1. American Conference of Governmental Industrial Hygienists. Documentation of the threshold limit values. 4th ed. Cincinnati, Ohio: ACGIH, 1980

## VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report prepared by:

Nicholas Fannick
Industrial Hygienist
NIOSH/Region II

Originating office:

Hazard Evaluation and
Technical Assistance Branch
Division of Surveillance
Hazard Evaluations, and
Field Studies

## IX. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

The requestor
Nabisco Brands, Inc.
NIOSH/Region II
OSHA/Region II
New York State Dept. of Health
Graphic Communications Union, Local 414

For the purposes 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.

TABLE 1

Oil Mist Concentrations

HETA 80-136
Nabisco Brands, Inc.
Beacon, N.Y.

| LOCATION | concentration (mg/M3) |
|---|---|
| Immediately over newly printed stock | 6.0 |
| Press 60 (pressman) | 3.1 |
| Press 61 (pressman) | 0.8 |
| Press 61 (#2 pressman) | 2.0 |
| Press 63 (#2 pressman) | 3.5 |
| Press 60 (asst. pressman) | 0.9 |

OSHA Permissible Exposure Limit = 5 milligrams per cubic meter of air

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