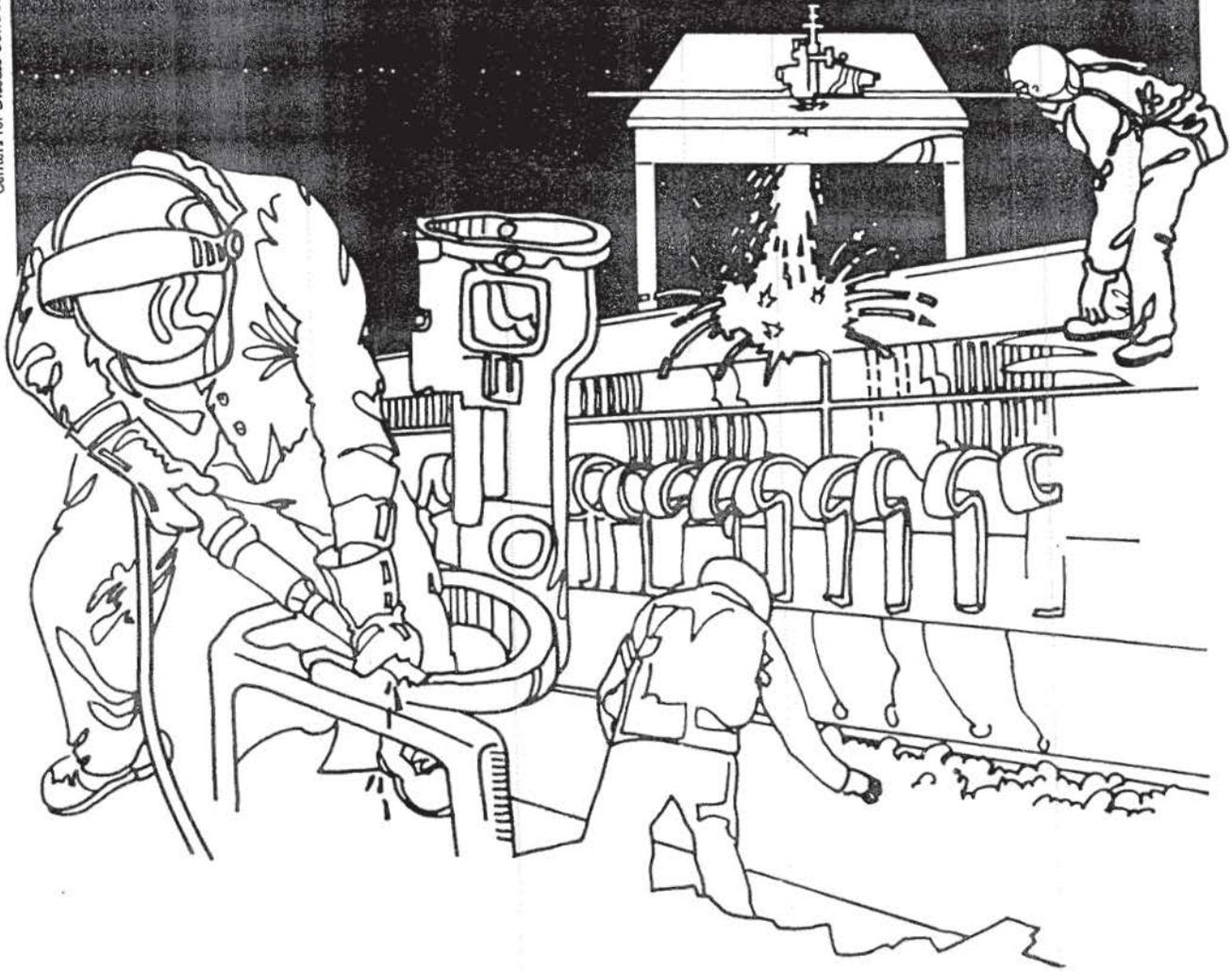


NIOSH



Health Hazard Evaluation Report

HEA 81-095-1091
NORTH POCONO HIGH SCHOOL
MOSCOW, PENNSYLVANIA

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.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 81-095-1091
April 1982
North Pocono High School
Moscow, Pennsylvania

NIOSH Investigator:
Frank A. Lewis

I. Summary

In September 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request from employees at the North Pocono High School to determine whether environmental exposures from the ventilation system were causing employees to experience dizziness, headaches, sore throats, chest tightness, rashes, lethargy and disorientation in the school library and classrooms above the library. No studies were involved in these incidents.

On October 14, 1981, a NIOSH Regional III Industrial Hygienist visited the North Pocono High School and held meetings with the school administration and the teacher's union representative. A walk-through evaluation was conducted and private interviews were also held with several employees.

During the walk-through evaluation, ventilation measurements and microbial-growth samples (on wet film cassettes) were taken for analysis and evaluation. Ventilation measurements in the library and classrooms above the library showed greater than ten (10) changes per hour; and the microbial-growth was identified as *Penicillium chrysogenum*, an organism ubiquitous in the environment.

During the 1981 school period, the incidence of alleged symptomatology was observed by the employees to have been substantially reduced as compared to previous years.

Based on the environmental findings, NIOSH has determined that no significant health hazard exists in the library and classrooms above the library. The previously reported problems were likely due to a combination of uncomfortably high temperatures and low humidity; and the identification of the *Penicillium chrysogenum* mold should present no hazard to individuals with normal immune systems. However, in the interest of preventing any potential problems, it is recommended that fresh air, humidity and temperature conditions conform to standards set for satisfactory air quality and any employees who continue to exhibit symptomatology should be checked for allergic response to dust and/or microbes (e.g. *Penicillium chrysogenum*).

KEYWORDS: SIC 8211 (Secondary Schools); Microorganisms, humidity, temperature, air exchanges, fresh air intake, *Penicillium chrysogenum*, dizziness, headaches, sore throat, chest tightness, rashes, lethargy, disorientation.

II. Introduction

In September 1981, NIOSH received a request from employees at the North Pocono High School, Moscow, Pennsylvania for a health hazard evaluation of the library and classrooms above the library. Employees were reportedly experiencing dizziness, headaches, sore throats, chest tightness, rashes, lethargy and disorientation thought to be due to the ventilation system feeding into these areas.

III. Background

The library and classrooms above the library used to have windows but with the new extension they no longer do; these are now interior rooms. Both areas now have new but distinctly separate ventilation systems. Occurrences of symptomatology are random and noticed only when employees are at the school site. The library and classrooms encompass about 8-12 teachers and numerous students.

There have been problems with the temperature control units in reacting to sudden changes in outdoor air temperature. It seems that the units are overshooting the temperature set point (68°F) and raising the indoor temperature to over 80°F. The indoor air then becomes very warm and dry since there is no humidifier in the system.

Consulting engineers had been called in during the spring of 1981 and resulted in recommendations made to prevent any possibility of "stagnant" or "contaminated" air from being introduced into these areas. These steps are either completed or are under consideration by the school administration.

IV. Evaluation Design and Methods

Ventilation studies were conducted using smoke tubes and portable moving vane velometer. The ventilation systems in the library and classrooms above the library were studied for air movement and air exchange rate.

Water damage from a roof leak resulted in the growth of "mold" on some of the books and film cassettes in the library. A mold growth sample from two film cassettes labels was obtained and sent to the Center for Disease Control, Atlanta, Georgia for identification.

The absence of any substantive evidence of specific air contaminants causing the reported symptomatology negated the introduction of any air monitoring equipment for this study.

VI. Results and Discussion

During the NIOSH survey, no unusual incidents were observed during the several hours spent in the library and classrooms. The overall incidence of occurrence has been reduced substantially as compared to previous years.

Ventilation measurements taken in the library and the classrooms above the library show greater than ten (10) changes per hour which is a more than satisfactory air exchange rate for this type of dwelling. The indoor air is recirculated with 30% fresh air being introduced into the ventilation system.

On the other hand, studies of indoor areas with uncomfortably high temperatures ($>78^{\circ}\text{F}$) and low humidity ($<40\%$) have been found to cause or enhance eye and upper respiratory problems and even dermatitis. Also, dizziness, disorientation, headaches and lethargy have been attributed to sinus and inner ear problems stemming from or being aggravated by such conditions.

The organism growing on the film cassette labels was identified as *Penicillium chrysogenum*, an inhabitant of a variety of organic substrata with world-wide distribution in the soil. The main interest in the organism is its capacity to produce the antibiotic, penicillin. However, of interest for this study is the mold most associated with the mildew of book binding materials, *Penicillium chrysogenum*.

Apparently, this organism is ubiquitous in the environment and can thrive on a variety of organic materials. Normally, *Penicillium chrysogenum* presents no hazard to individuals with normal immune systems.³

VII. Recommendations 1,2,3

The following actions should be taken under consideration by the school administration:

1. The intake of fresh air should be at least 20% and provision to keep the humidity in a 40-50% range (based on ASHRE standards for satisfactory air quality).
2. Temperature controls should function to keep within a comfortable range of 68-70°F.
3. A high efficiency filter and/or electrostatic precipitator and a humidifier used either in the central cooling and heating system or as portable units in each of the problem areas should be considered if symptoms recur or persist.
4. Employees who continue to exhibit the reported symptomatology should be checked for allergic response to dusts and/or microbes (e.g. *Penicillium chrysogenum*).

VIII. Authorship and Acknowledgements

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IX. References

1. American Society of Heating Air Conditioning and Refrigeration Engineers, Heating Ventilating and Air Conditioning Guide, 1981
2. G.H. Green, Indoor Humidity and Respiratory Health, Respiratory Technology - Vol. II, No. 3, 1975
3. Memo - Clinical Laboratory Results - Anthony W. Smallwood, Jan. 18, 1982

X. Distribution and Availability of Determination Report

Copies of this report are available from NIOSH, Division of SDTT, 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 can be obtained from the NIOSH Publications Office at the Cincinnati address.

Copies of this report have been sent to:

1. Principal, North Pocono High School, Moscow, Pennsylvania
2. Teacher Requestors of North Pocono High School, Moscow, Pennsylvania
3. NIOSH, Region III
4. OSHA, Region III

For the purpose of informing the 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.

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