

PRELIMINARY SURVEY REPORT:
CONTROL TECHNOLOGY FOR MANUAL TRANSFER OF CHEMICAL POWDERS

AT

North American Philips Lighting Corporation
Danville, Kentucky

REPORT WRITTEN BY:
Frank W. Godbey

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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Division of Physical Sciences and Engineering
Engineering Control Technology Branch
4676 Columbia Parkway
Cincinnati, Ohio 45226

PLANT SURVEYED: North American Philips Lighting Corporation
Vaksdahl Avenue
P.O. Box 88
Danville, Kentucky 40422

SIC CODE: 3641

SURVEY DATE: May 30, 1984

SURVEY CONDUCTED BY: Frank W. Godbey

EMPLOYER REPRESENTATIVES CONTACTED: Paul J. Zepp, Supervisor of Personnel
- (606) 236-3100

EMPLOYEE REPRESENTATIVES CONTACTED: No Employee Representatives

I. INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) is the primary Federal agency engaged in occupational safety and health research. Located in the Department of Health and Human Services (formerly DHEW), it was established by the Occupational Safety and Health Act of 1970. This legislation mandated NIOSH to conduct a number of research and education programs separate from the standard setting and enforcement functions carried out by the Occupational Safety and Health Administration (OSHA) in the Department of Labor. An important area of NIOSH research deals with methods for controlling occupational exposure to potential chemical and physical hazards. The Engineering Control Technology Branch (ECTB) of the Division of Physical Sciences and Engineering has been given the lead within NIOSH to study the engineering aspects of health hazard prevention and control.

Since 1976, ECTB has conducted a number of assessments of health hazard control technology on the basis of industry, common industrial process, or specific control techniques. Examples of these completed studies include the foundry industry; various chemical manufacturing or processing operations; spray painting; and the recirculation of exhaust air. The objective of each of these studies has been to document and evaluate effective control techniques for potential health hazards in the industry or process of interest, and to create a more general awareness of the need for or availability of an effective system of hazard control measures.

These studies involve a number of steps or phases. Initially, a series of walk-through surveys is conducted to select plants or processes with effective and potentially transferable control concepts or techniques. Next, in-depth surveys are conducted to determine both the control parameters and the effectiveness of these controls. The reports from these in-depth surveys are then used as a basis for preparing technical reports and journal articles on effective hazard control measures. Ultimately, the

information from these research activities builds the data base of publicly available information on hazard control techniques for use by health professionals who are responsible for preventing occupational illness and injury.

This plant was visited as part of a study of dust control during the manual handling of dry chemical powders and the manual transfer of those materials to some type of processing device, i.e. V-blender, Banbury mixer, etc. Ultimately, this project will result in a concise article describing dust control techniques during manual transfer of chemical powders.

II. PLANT AND PROCESS DESCRIPTION

PLANT DESCRIPTION

This facility consists of a modern brick, steel, and concrete reinforced industrial building containing approximately 332,000 square feet of floor space situated on 32 acres of land. The plant employs approximately 400 workers and operates three shifts, seven days per week, in the manufacture of electric light bulbs and tubes.

PROCESS DESCRIPTION

Raw materials for glass are received at the batch house bulk storage area where they are stored in separate storage bins. These raw materials are then processed through an enclosed, automated mixing procedure to produce the required composition for glass manufacturing. Materials are then automatically transferred to the appropriate melting tank for manufacturing. The molten glass is then transported to the various forming processes to produce the finished product. The finished product is delivered to the warehouse for distribution.

POTENTIAL HAZARDS

The major dry ingredients in the area of interest - batching of dry materials - are silica and lead.

III. CONTROLS

PRINCIPLES OF CONTROL

Occupational exposures can be controlled by the application of a number of well-known principles, including engineering measures, work practices, personal protection, and monitoring. These principles may be applied at or near the hazard source, to the general workplace environment, or at the point of occupational exposure to individuals. Controls applied at the source of the hazard, including engineering measures (material substitution, process/equipment modification, isolation or automation, local ventilation) and work practices, are generally the preferred and most effective means of control both in terms of occupational and environmental concerns. Controls which may be applied to hazards that have escaped into the workplace environment include dilution ventilation, dust suppression, and housekeeping. Control measures may also be applied near individual workers, including the use of remote control rooms, isolation booths, supplied-air cabs, work practices, and personal protective equipment.

In general, a system comprised of the above control measures is required to provide worker protection under normal operating conditions as well as under conditions of process upset, failure and/or maintenance. Process and workplace monitoring devices, personal exposure monitoring, and medical monitoring are important mechanisms for providing feedback concerning effectiveness of the controls in use. Ongoing monitoring and maintenance of controls to insure proper use and operating conditions, and the education and commitment of both workers and management to occupational health are also important ingredients of a complete, effective, and durable control system.

These principles of control apply to all situations, but their optimum application varies from case-to-case. The application of these principles are discussed below.

This electric light bulb and tube manufacturing operation uses local and general exhaust ventilation to remove or dilute potential air contaminants generated during the processing of dry materials. The ventilation systems designs appear to be based on the American Conference of Governmental Industrial Hygienists' Ventilation Manual.

WORK PRACTICES

Workers are reportedly instructed to use good work practices and receive updates and reinforcement as needed.

MONITORING

Employees are given preemployment physicals. Employees in the batch mixing department receive annual examinations including hearing tests, chest X-rays, and blood and urine tests for lead. There is a full-time nurse and a part-time contract physician on duty. The company's staff performs periodic air sampling for silica and lead.

PERSONAL PROTECTION

Safety glasses, respirators, hearing protection, and protective clothing are provided on an "as-needed" basis.

IV. CONCLUSIONS AND RECOMMENDATIONS

This plant represents a general type of automated dry materials handling operation and does not have sufficiently unique manual batching controls to warrant performing an in-depth study. Therefore an in-depth survey is not recommended.