

WALK-THROUGH SURVEY REPORT:
CONTROL TECHNOLOGY FOR BAG OPENING, EMPTYING, AND DISPOSAL
AT
Lakewood Chemical Company
East Palestine, Ohio

REPORT WRITTEN BY:
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REPORT DATE:
March 1984

REPORT NO.:
144-13

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: Lakewood Chemical Company
110 N. Market Street
East Palestine, Ohio 44413

SIC CODE: 2819 - Industrial Inorganic Chemicals,
not elsewhere classified

SURVEY DATE: April 19, 1983

SURVEY CONDUCTED BY: William A. Heitbrink

EMPLOYER REPRESENTATIVES CONTACTED: Douglas Columbus
General Manager at Operations
Phone: (216) 426-4154

EMPLOYEE REPRESENTATIVES CONTACTED: No Employee Representatives

ANALYTICAL WORK PERFORMED BY: None

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 bag opening, dumping, and disposal. Significant dust exposures can occur during these operations. Although dust can be controlled during bag opening, bag disposal is thought to elevate the workers' dust exposure. As a result, all three of these activities need to be studied. Ultimately, this study will result in a 10-15 page report describing dust control methods for bag opening, dumping, and disposal. Such a report should provide valuable information for those who are responsible for controlling a worker's dust exposure.

II. PLANT AND PROCESS DESCRIPTION

Plant Description:

Lakewood Chemical Company and Insul Company are two separate companies with the same owner. The General Manager of both companies is Mr. Douglas Columbus.

The plant was constructed in 1962. Approximately 15 people are presently employed at this location. The manual bag dump station, which is the subject of this study, had been installed in the plant for seven years.

Process Description:

The manual dump station is part of a process to mix and package dry solids for the steel industry. Three workers dump about 20 bags of lime, soda ash, and flourospar at the manual dump station. The procedure is as follows:

1. The worker lifts one bag from a pallet and carries it to the dump station.
2. He breaks the bag on the dump station's stationary knife.
3. He breaks lumped material on the station's grates.
4. He carries the empty bags to a waste disposal bay.

The manual bag dump station was manufactured by Whirl-Air-Flow Incorporated and is called "Manual Bag Emptier."

Potential Hazards:

Potential dermal and respirable exposures occur during these operations. Dermal exposure occurs because the bags are coated with dust.

Bag opening, dumping, and disposal involves numerous exposures to airborne dust:

1. Bag breaking creates a large puff of dust which is observed to contaminate the workers' breathing zone.
2. Handling the empty bags creates a dust exposure. The bags inevitably contain packets of highly contaminated air. This contaminated air is spilled into the workers' breathing zone by transporting the bags to the disposal bin.
3. Compressing the bags in the disposal bin also creates dust exposures.

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 ensure 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.

Engineering Controls:

The Whirl-Air-Flow Manual Bag Emptier provides local exhaust ventilation in an attempt to control dust generated by bag opening and dumping. The exhaust ventilation was provided by exhausting air from the hopper below the gate. The exhaust air flows up a duct in back of the dump station. The cleaned air is exhausted back into the workplace.

Physically, the Whirl-Air-Flow Manual Bag Emptier consists of a hood set on top of a hopper. The hood is open on three sides and provides very little enclosure. The hood essentially serves as a place to set the bag house.

Based on our observations, this bag emptier appeared to provide marginal control. It did not contain the dust generated by bag dumping. The consequence of this was increased worker exposure.

Work Practices:

The plant appears to be relatively clean. The workers took reasonable care in handling empty bags. They set the bags in the trash receptacles; the bags were not thrown.

Personal Protection:

The worker used cloth gloves and 3M, Model 8710, disposal respirators.

Other Observations:

During the seven-year period the bag opener had been in use, the filters for the manual bag emptier needed to be replaced five times.

Conclusions:

The manual bag dump station appeared to be an ineffective engineering control. Based upon smoke tube measurements, the air velocity through the hopper's grate was considerably less than the design velocity of 200 feet per minute. Whether this was due to a design or maintenance problem was unclear.