PRELIMINARY CONTROL TECHNOLOGY ASSESSMENT OF ADVANCE PLATING COMPANY

Ft. Worth, Texas

SURVEY DATE:
April 9, 1981

REPORT WRITTEN BY:
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Engineering Control Technology Branch
Division of Physical Sciences and Engineering
National Institute for Occupational Safety and Health
Cincinnati, Ohio

PLACE VISITED:	Advance Plating Company Ft. Worth, Texas
DATE OF VISIT:	April 9, 1981
PERSONS CONDUCTING SURVEY:	John Sheehy Stephanie Spottswood
EMPLOYEE REPRESENTATIVES CONTACTED:	Ron Van Hofvegen
PURPOSE OF SURVEY:	To investigate Advance Plating's methods of contaminant control, and to determine the plant's suitability for an in-depth control technology survey.

ABSTRACT

A walk-through control technology survey was conducted at Advance Plating Company in Ft. Worth, Texas on April 9, 1981. This company is engaged in decorative chrome plating of automobile and truck parts and welded-wire products. A preliminary assessment of control technology revealed very little in the way of engineering controls, control monitoring, work practices, or personal protective equipment. A determination was made of the feasibility of performing a detailed survey at this plant.

INTRODUCTION

The Engineering Control Technology Branch of the Division of Physical Sciences and Engineering, NIOSH, is conducting a research study to assess and document the control methods used to limit employee exposures in electroplating and cleaning operations. Exposures to plating tank constituents have been documented as a cause of a variety of health problems. One such substance of concern is chromium, which represents the focus of the study. Chromium exposure can cause irritation of the skin, mucous membranes, and respiratory tract, resulting in skin ulceration and nasal septum perforation.

This preliminary survey was initiated to become familiar with unique or effective methods of controlling emissions from plating operations with a special emphasis on chrome plating, in an effort to identify a well-controlled operation for in-depth study.

PLANT DESCRIPTION

Advance Plating Company is a job shop operation principally engaged in decorative chrome plating. The company also operates a polishing and buffing operation within the same facility. the building age was estimated to be 20 years; however, the plating and cleaning equipment was installed in 1975.

The production area consists of a large spacious room with one plating line located in the center. The room dimensions are 150 feet by 50 feet with a 22 foot high ceiling over the plating line. The plating line includes two nickel tanks, one chromium tank, two pretreatment tanks, and several rinse tanks.

PROCESS DESCRIPTION

The principal operation at this plant is decorative chrome plating. Decorative chrome plating differs from hard chrome plating in that a thinner coating of chromium is applied, generally over coatings of nickel and sometimes copper. These metals have good corrosion resistance and ductility.

The plant is largely engaged in the plating of trailer hitches, automobile and truck bumpers, and various decorative products. The pieces to be plated usually arrive in large cardboard boxes. They are manually attached to a plating rack with a suitable hook or wire, and mechanically carried by an overhead hand-operated hoist from tank to tank.

The pretreatment tanks consist of an alkaline cleaning tank and an acid dip tank. The alkaline soak solution containings an electro-cleaner and is heated to approximately 180^{o}F. The acid dip tank follows the alkaline cleaner, and serves to remove any traces of oxide film from the alkaline cleaner. The acid dip tank contains 15 percent hydrochloric acid and water and is maintained at room temperature. Two plain water rinse tanks follow the acid dip, after which the pieces are ready for nickel plating.

There are two nickel plating tanks, with constituents of a typical Watts bath solution: 10 ounces per gallon nickel metal, 40 ounces per gallon nickel sulfate, and 8 to 10 ounces per gallon nickel chloride. Electrical current is

supplied by two 2,000 amp rectifiers, with a range of 1,500 to 2,000 amps used, depending on the amount of surface area being plated. These tanks are operated at approximately 135 to 140°F. The nickel plating step is followed by a rinse in two plain water rinse tanks.

The chrome plating tank contains a concentration of 32 ounces/gallon chromium in water. Electrical current is supplied by a 3,000 amp rectifier; 1,500 to 2,000 amps are actually applied in the process. The plating bath is maintained at 115°F. The desired chrome thickness 0.0005 inch. When the pieces have acquired this thickness, they are removed from the plating tank and dipped in a cold water rinse, followed by a hot water rinse. After the parts are dry, they are removed from the rack, inspected, and returned to boxes for pick-up or shipping.

ENGINEERING CONTROLS

General dilution ventilation is used with doors open for all but two months of the year. A 5 foot diameter window exhaust fan was in operation -- primarily to exhaust debris from the nearby buffing and polishing operation. Four other fans (2 roof, 2 wall) are used primarily for air cooling.

A mist suppressant made by Udyllite ("Zero-Mist" K-40Z) is used to control chromic acid mists.

OTHER CONTROLS

The polisher is issued safety glasses and a paper dust mask. No other personal protective equipment is used.

WORKFORCE DESCRIPTION

Advance Plating employs 5 persons, of which one is a polisher only. There is one shift: 7:00 a.m. to 3:00 p.m. There is no union representative in this company. No shower facilities are provided. An optional lunch room, away from the plating operation is available.

SAMPLING PROGRAM

No regular air sampling has been conducted at the plant. Local health officials have found the establishment to be free of hazard.

MISCELLANEOUS

The survey was conducted on a warm (approximately 75°F), humid, and windy day.

EVALUATIONS AND RECOMMENDATIONS

Advance Plating employs limited use of engineering controls. The general dilution ventilation, in conjunction with the mist suppressant, may have been effective in controlling mist evolution. However, such methods would not be applicable year-round in Northern climates. Unless there is some future

interest in evaluation of mist suppressants, this plant is not recommended for an in-depth control technology survey.