U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

# HEALTH HAZARD EVALUATION DETERMINATION REPORT 73-177-147
EPC OF ARKANSAS
FAYETTEVILLE, ARKANSAS

OCTOBER 1974

## I. TOXICITY DETERMINATION

Based on the results of environmental evaluations conducted on January 31 and February 1, 1974, and medical evaluations conducted on May 2, 1974, by the National Institute for Occupational Safety and Health (NIOSH), it has been determined that toxic exposures to sulfuric acid mist and trichloroethylene vapor did not exist at the EPC of Arkansas. Environmental samples for sulfuric acid and trichloroethylene were well below the 1973 American Conference of Governmental Industrial Hygienists threshold limit values (TLV) and the Occupational Safety and Health Administration's standards in the bright dip and degreasing operations. However, since six of ten workers interviewed described symptoms of irritation, possibly due to acid fumes or a combination of irritants, it is suggested that the ventilation should be adjusted to eliminate these exposures.

## II. DISTRIBUTION AND AVAILABILITY

Copies of this hazard evaluation determination are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

(a) EPC of Arkansas
(b) Authorized Representative of Employees
(c) U.S. Department of Labor - Region VI
(d) NIOSH - Region VI
(e) NIOSH - Region VIII

For the purpose of informing approximately 72 exposed employees, this report shall be posted in a prominent place readily accessible to workers for a period of at least 30 days.

## III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by 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 National Institute for Occupational Safety and Health received such a request from the Allied Industrial Workers Local #448, Fort Smith, Arkansas, to evaluate the potential hazards associated with exposure to acids in the bright dip area and from the chlorinated hydrocarbon solvents in the vapor degreasers.

## IV. HEALTH HAZARD EVALUATION

### A. Plant Process

The EPC of Arkansas makes custom-fitted copper pipe fixtures for the plumbing and air conditioning industries. The copper pipe is cut into various lengths and then coated with soap (Ivory Snow has generally been used). The soap serves as a lubricant during the bending and shaping process. After the pipe is shaped, it is usually passed through a vapor degreaser. It is then given a brilliant surface by dipping it in a series of basic and acidic solutions composed of sodium hydroxide and sulfuric acid, with several water rinses in between. This procedure is known as bright dip. The parts are then dried and packed for shipment.

### B. Evaluation Design

Prior to the time of the initial survey, it was known that sulfuric acid and trichloroethylene were used in the areas of concern in this hazard evaluation. Sulfuric acid samples were taken by impinger method, using water as a collecting medium and also on polyvinyl chloride (PVC) filters. Trichloroethylene samples were taken, using organic vapor sampling tubes. Ideally, samples should have been collected for sodium hydroxide and soap dust; however, due to the conclusiveness of the medical findings, it was deemed unnecessary to return and do additional sampling for these compounds.

### C. Evaluation Methods

Sulfuric acid samples were analyzed titrametrically, and the trichloroethylene samples were analyzed by gas chromatography in the NIOSH Salt Lake City laboratory.

### D. Evaluation Criteria

The occupational health standards relevant to the substances of this evaluation, as promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974), are as follows:

| | 8-hour time weighted average | |
|---|---|---|
| Substance | $mg/M^3$ | ppm |
| Sulfuric Acid | 1 | |
| Trichloroethylene | | 100 |

$mg/M^3$ - milligrams of contaminant per cubic meter of air
ppm - parts of vapor or gas per million parts of contaminated air by volume

Occupational health standards are established at levels designed to protect individuals occupationally exposed to individual toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Environmental Evaluation Results and Discussion

This evaluation was done on January 31 and February 1, 1974. Samples were taken for trichloroethylene and sulfuric acid. Trichloroethylene samples ranged from 2 to 60 ppm, and sulfuric acid samples ranged from 0.05 to 0.15 $mg/M^3$. The results of these samples substantiated opinions of the Industrial Hygienist and physicians that no apparent health hazard existed at the time of these evaluations.

F. Medical Results and Discussion

During the walk-through survey of the bright dip area, an unpleasant odor, probably sulfuric acid, was present. Five workers, all male between the ages of 19 and 42, were interviewed. These workers had a working experience from two months to two years. Three of these workers reported occasional nose, throat, and eye irritation. On physical examination no abnormalities of eyes, nose, or throat were observed.

In the area where soap dust was used, five workers were interviewed, all male, whose ages ranged from 28 to 40 years and whose work experience ranged from 3 months to 11 years. One worker complained that inhaling soap dust produced a black discharge from his nose; however, this could not be observed in the physical examination. One other worker complained of sneezing and running nose on occasion and reported that wearing a disposable surgical-type mask was effective in preventing this nasal irritation. Another of these workers had several allergies, including one to soap dust, and wears a surgical-type mask during his work shift and reports that this is very effective in preventing any symptoms.

During the walk-through survey of this area, it was noted that the noise level was high, approximately 95 dBA; and "efforts" were being made to lower this noise level. Ear protectors have been required in the soap dust area but not in the bright dip area for only the past three months. During the interviews, it was noted that the most common type of ear protector was Swedish wool, which was frequently used improperly.

Recommendations:

1. The use of safety glasses and rubber gloves appears to be effective in preventing many accidental splashes of acids or bases and should be continued.

2. Audiometric testing should be initiated as a pre-employment as well as a periodic part of the medical program in this plant.

3. When ear protection is used, it would be advisable to use devices that have been approved by NIOSH.

## V. AUTHORSHIP AND ACKNOWLEDGMENT

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TABLE I
Breathing Zone Concentrations of Trichloroethylene

EPC OF ARKANSAS

Fayetteville, Arkansas

January 31, 1974

| Job | Sample Vol/Liters | Sample Number | Trichloroethylene ppm |
|---|---|---|---|
| Degreaser Operator 1 | 24.4 | 3 C | 3 |
| Degreaser Operator 2 | 24.4 | 4 C | 60 |
| Degreaser Operator 3 | 24.4 | 5 C | 37 |
| Degreaser Operator 1 | 59.5 | 7 C | 15 |
| Degreaser Operator 3 | 42.5 | 8 C | 28 |
| Degreaser Operator 1 | 42.5 | 6 C | 10 |
| Degreaser Operator 3 | 270.0 | 10 C | 2 |
| Degreaser Operator 2 | 37.0 | 11 C | 21 |
| Degreaser Operator 1 | 60.0 | 9 C | 4 |
| | Federal Standard | | 100 |
| | 1973 ACGIH TLVs | | 100 |

C - organic vapor sampling tube

TABLE II
Breathing Zone Concentrations of Sulfuric Acid

EPC OF ARKANSAS

Fayetteville, Arkansas

February 1, 1974

| Job | Sample Vol/Liters | Sample Number | Sulfuric Acid ($H_2SO_4$) $mg/M^3$ |
|---|---|---|---|
| Automatic Dip Line Operator | 276 | 1 * | 0.15 |
| Hand Cleaning Operator | 270 | 2 * | 0.17 |
| Hand Cleaning Operator | 378 | 81 ** | < 0.05 |
| Hand Dip Operator | 470 | 82 ** | < 0.05 |
| Automatic Dip Line Operator | 405 | 80 ** | < 0.05 |
| | Federal Standard | | 1.0 |
| | 1973 ACGIH TLVs | | 1.0 |

* Impinger samples

** PVC filter samples