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

# HEALTH HAZARD EVALUATION DETERMINATION REPORT NO. 73-187-151

# AMAX ALUMINUM MILL PRODUCTS COMPANY RIVERSIDE, CALIF. 92501

#### **OCTOBER 1974**

#### I. TOXICITY DETERMINATION

It has been determined that "dross dust" and fumes from the aluminum melting furnaces are not toxic as observed in the furnace area during normal operating conditions. This determination is based upon the analysis of bulk dross dust samples, observation of work practices, and medical interviews of employees. During the day of the medical evaluation (May 24. 1974) no significant symptoms of toxicity to dross dust or other substances escaping into the atmosphere from the melting furnaces were reported by employees. Operating conditions on this day were described as normal by personnel at the plant.

Recommendations are included in this determination to address several potential health hazards not related to those items requested specifically in this Health Hazard Evaluation.

#### . 11. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report 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:

- Amax Aluminum Mill Products Co., Riverside, California a)
- b) Authorized Representative of Employees
- c) U.S. Department of Labor Region IX
- d) NIOSH Region IX

For purposes of informing the approximately 20 "affected employees." the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed employees work for a period of 30 calendar 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 Page 2 - Health Hazard Evaluation Determination Report 73-187

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 (NIOSH) received such a request from an authorized representative of employees regarding exposure to "dross dust" and fumes from aluminum melting furnaces at the Amax Aluminum Mill Products Company, Riverside, California.

# IV. HEALTH HAZARD EVALUATION

Amax Aluminum is primarily involved in the reclamation of aluminum from scrap aluminum parts. The scrap is dumped into melting furnaces and is recast into ingots which can either be sold or processed further. A byproduct of the melting process is "dross" which is skimmed off of the molten aluminum surface and cooled. This dross is not discarded but is combined with potash salt (potassium chloride) and then it is reduced in a dross furnace. Therefore, dross dust is aluminum oxide and potassium chloride. The aluminum oxide remaining in the dross is reduced to aluminum and is also reclaimed. At Amax, approximately 20 employees work in the melting and dross furnace areas.

B. Worksite Evaluation

On January 10, 1974, NIOSH investigator Melvin T. Okawa conducted the initial worksite evaluation of the melting furnace and dross furnace areas of the plant. The concerns of the employees were the dross dust from the dross furnace and the "fumes" generated by the melting furnaces.

Each melting furnace has a built-in stack which is designed to vent fumes out the roof of the plant. Above each furnace, a roof fan which is rated at 60,000 cubic feet per minute serves as another means to exhaust fumes out of the plant. Make-up air is provided only through open doors and a continuous 8 inch opening in the wall that runs most of the length of the work area. Seven melting furnaces (approximately 10' X 25') are found in a line extending the length (300 feet) of the work area. The width of the work area is about 50 feet.

When the furnaces are charged with scrap aluminum, the initial incomplete combustion of the residues such as solvents or paint left on the scrap can cause smoke to discharge out the open door of the furnace instead of the stack. This situation does not occur on every charge but depends upon the type of scrap. It takes up to 5 minutes for the roof fan to clear the excess smoke. It was stated that smoke can accumulate in the furnace area for more than several minutes causing workers to experience discomfort, but this condition was not observed during this or the subsequent visit to the plant.

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During adverse climatic conditions such as a thermal inversion, it may take longer for the roof fans to clear the working area of generated smoke than the normal several minutes. It was also learned from employees that the 8 inch opening along the wall had previously been several feet wide and served as a source of fresh air whenever smoke did accumulate in the work area. Now that the height of the opening was reduced to 8 inches, air movement was less than before. However, under the conditions observed, it is the judgment of this investigator that smoke from the melting furnaces did not present a health hazard.

At the worksite, a single dross furnace operates on a continual basis. Several times a day, bulk dross is combined with potash salt and dumped into the furnace. Each time the dross is dumped, dust becomes airborne for several minutes. Otherwise, the area is clear. Only one full-time employee was assigned to this area during a shift.

C. Evaluation Methods

1. Dross Dust and Fume

The dross dust presented only a nuisance problem unless it contained some toxic component which had not been previously identified. Dross is aluminum oxide and potassium chloride. It was decided to have the dross dust analyzed for free silica, soluble, and insoluble fluoride contents. From this data, the necessity for further environmental sampling for these compounds would be established.

2. Employee Interviews

Employees were asked non-directed questions regarding work related and non-work related health problems.

D. Evaluation Results

1. Dross Dust

An analysis of the dross dust showed that it had a free silica content of 1.0%. Nuisance dust to be classified as such must contain 1.0% or less free silica. As the free silica content of the dust increases, the total dust level in the atmosphere that a worker can be exposed to decreases. For dust with a free silica content of 1.0%, the Federal Standard for total dust allowed in the work atmosphere is 10 mg/M<sup>3</sup> (milligrams per cubic meter of air). The insoluble and soluble fluoride content in the dross dust was respectively 0.0% and 0.004%. These levels are not significant. During the initial and follow-up visits to the plant, no significant airborne dust was observed in the dross furnace area, and no environmental measurements were taken. Page 4 - Health Hazard Evaluation Determination Report 73-187

#### 2. Employee Interviews

The employees interviewed expressed symptoms which were nonspecific and hard to draw conclusions from, and it was decided to have a physician conduct a follow-up medical visit to the plant.

#### E. Medical Evaluation

On May 24, 1974, a medical evaluation was conducted by NIOSH physician Arnold Bodner, M.D., who was also accompanied by NIOSH investigator Melvin T. Okawa. Seven furnace operators were interviewed and were given a nondirected questionnaire including a smoking, work, and general medical history. No directed questions were asked except to probe further any positive responses from the workers.

# Results

All the workers were male, ages between 22-48 (average = 34) years. Their work experience ranged from 1-10 (average = 6.4) years. Four workers smoked cigarettes. None of the workers had any serious or chronic medical problems, but several were concerned about excessive heat exposure when working near the melting furnaces during the summer months. Additionally, employees were concerned about a lack of a hearing conservation program and the absence of a separate eating facility away from the worksite. Also, unrelated to this Health Hazard Evaluation request, it was learned that furnace operators mixed daily dry asbestos fibers with water to make a mortar for plugging small leaks in the melting furnaces. Management was unaware that this process was occurring. However, the plant is under an 0.S.H.A. abatement period for an asbestos problem in another area of the building and it would be simple to extend its required environmental and medical monitoring program to this small operation During the day of the evaluation, no employees exhibited symptoms which could be attributed to exposure to dross dust or fumes.

#### 2. Conclusions

It is the judgment of the NIOSH investigators that at the present time, there is no health hazard from exposure to dross dust and to smoke and fumes produced by the melting furnaces at the Amax Aluminum plant.

# V. RECOMMENDATIONS

The following recommendations concerning items unrelated to this Health Hazard Evaluation request are made for the purposes of completeness:

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- 1. Heat stress studies should be conducted in the furnace area during the summer months.
- 2. A noise study should be conducted in the furnace area and a hearing conservation program instituted if necessary.
- 3. The asbestos environmental and medical monitoring program should be extended to include the furnace area.

# VI. AUTHORSHIP AND ACKNOWLEDGEMENTS

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