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KAISER ALUMINUM, TRENTWOOD WORKS  
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## SUMMARY

In May 1990, the National Institute for Occupational Safety and Health (NIOSH) received an employer request to conduct a health hazard evaluation (HHE) at Kaiser Aluminum, Trentwood Works, located in Spokane, Washington. The request expressed concern about exposures to the metalworking coolants used to cool and lubricate hot aluminum ingots as they are reduced in thickness in the Hot Line Department. The requestor stated that a large number of employees in the Hot Line Department are exposed to the coolant mist and complain of skin, eye and throat irritation, and that isolated respiratory problems have been documented.

In August 1990, a NIOSH industrial hygienist made an initial site visit to the Trentwood facility to conduct a walk-through survey of the plant. During March 12-27, 1991, a medical and industrial hygiene survey was conducted. The medical portion of the survey was designed to identify Hot Line employees exhibiting acute airway responses and chronic respiratory effects by means of a questionnaire, cross-shift spirometry, and serial peak flow monitoring. The dermatological effects of coolant exposure were also examined. The industrial hygiene portion of the survey consisted of collecting personal breathing zone and area air samples to characterize the make-up of the aerosols generated in the Hot Line Department and determine potential worker exposures.

This investigation identified 11 participants that had acute, work-related respiratory effects as defined by the results of the questionnaire, cross-shift spirometry, or serial peak flow measurements. Six participants reported at least one work-related acute respiratory symptom, one participant had a cross-shift decrease in FEV<sub>1</sub> of greater than 10%, and four exhibited a  $\geq 20\%$  change in peak flow temporally associated with work. No specific Hot Line jobs or work areas appeared to be associated with these effects.

Seventy percent of participating production workers, and 54% of maintenance workers reported experiencing eye irritation (red, itchy, or watery eyes) on more than two occasions in the 12 months preceding the evaluation. The prevalence of skin irritation (a report of rash, dermatitis, hives, or eczema) among maintenance workers was 44%, and 19% among production workers for the same time period. A similar pattern emerged when work-related criteria were applied: the prevalence of eye irritation was period, the number of colonies were counted and the predominant organisms were identified on the basis of colony and microscopic morphology.

Viable organisms were identified only in the bulk liquid samples, as indicated in Table 9. Both Gram-positive and Gram-negative bacteria were identified in the bulk liquids. They were predominantly Gram-positive, and the number of organisms appeared to be very low.

Since no viable organisms were found in the air samples (impingers), we felt there was a possibility that the biocide in the coolant had also been collected in the impinger and had killed any organisms that may have been collected. Therefore, the impinger samples were further analyzed microscopically using the Collection of Airborne Microorganisms on Nucleospore Filters, Estimation and Analysis (CAMNEA) method to determine if there were any nonviable bacteria present.~29~ Results of the microscopic analysis were negative. No organisms (viable or nonviable) were found in any of the impinger samples.

## **Medical**

### **Questionnaire**

Of the approximately 150 Hot Line Department employees, 78 (52%) completed the questionnaire. Male workers comprised 88% (69/78) of the participants. Participants ranged from 26 to 61 years of age, with a median age of 42 years. The prevalence of current cigarette smoking was 26% (20/78), and current smokers had a median of 37 pack-years (a pack-year is equivalent to smoking an average of one pack per day for a year). Twenty-nine percent (23/78) of participants reported that they were former smokers and had a median of 15 pack-years. Forty-five percent (35/78) of the participants had never smoked.

The median employment tenure at Kaiser Aluminum, Trentwood Works was 13 years with a range of less than 6 months to 38 years. The job classification of participants was nearly evenly divided between maintenance (53%) and production (47%), similar to the distribution in the Hot Line Department as a whole. Participants were asked to indicate their usual work area in the Hot Line Department. Thirteen percent (10/78) of the participants reported working only on the 80" mill, 15% (12/78) reported the 112/132" or reversing mill as their usual work area, and 14% (11 /78) reported working mainly in the area of the soaking pits or scalper room. The remainder, 58% (45/78), did not indicate a specific area, but reported working along the entire hot line.