

REPORT ON
ATMOSPHERIC POLLUTION AT THE PLANT OF
THE SCHAIBLE COMPANY, MARIEMONT, OHIO

This report describes the results of an investigation undertaken to determine the cause of a series of illnesses which occurred at the Schaible Company, Mariemont, Ohio. The plant manufactures fuse parts. The processes employed are principally of a machining nature but involve some cleaning of the parts as well as light assembling and packaging. Approximately twenty screw-cutting machines, the majority of which used a soap and water lubricating fluid, were employed in the machining operations. A special cutting-oil was used by a few of the machines. The cleaning processes consisted of a chromic acid dip and some cold metal cleaning with trichloroethylene. All operations were identical with those carried out in another plant owned by the Schaible Company where no illness of a similar nature had ever occurred.

It was learned that operations at the plant, recently purchased from the Emery Canale Company had started on July 22, which was a very hot and humid day. The plant, a modern one built during the war, was of the "blackout" type and employed forced ventilation with water cooling. On the first day of operation, the cooling section was not in operation so that the temperatures in the plant were equal to or in excess of the outside temperature, which reached a maximum of approximately 95° F.

Illness occurred first at the booster assembly line where 60 or 70 women worked in three shifts. Other female employees working in the Kingsbury machine area were affected later. Thirteen women were made ill during the first daylight shift on Tuesday and

nine or ten more became ill during the night shift on Wednesday night. Men working in the same areas or at the cleaning processes were not affected. Illnesses were characterized by headache, dizziness, nausea (some vomiting), and irritation of the eyes and throat. Some fainting was also reported.

Inspections and tests of the atmosphere were made on the afternoon of July 24 and the morning of July 25. Several of the women who were affected were interviewed and examined on July 24. The tests and inspections resulted in the following findings.

1. The temperatures in the building on the days of July 24 and 25 were quite comfortable since the cooling system had been turned on and since a general cool spell had set in. Temperatures did not exceed 80° F. in the building.

2. Measurements of air velocities revealed that the air movement was adequate in all sections of the building except near the center of the booster line where velocities barely reached 15-20 f.p.m. A velocity measurement at one of the air inlets serving this area revealed that this inlet was supplying approximately 400 c.f.m. Similar air inlets were spaced about 10 feet apart. The grill of the inlet at which measurements were made was quite dirty and apparently needed to be cleaned. After the grills in the area had been cleaned, the air velocity in the booster assembly section increased to 30 f.p.m., which is considered acceptable.

3. Tests for carbon monoxide in the assembly area and in the Kingsbury machine area showed that this material was absent from the atmosphere. Hydrogen sulfide was also absent.

Tests for acid gases and mists such as phosgene, hydrochloric

acid and sulfuric acid were negative.

Tests were also made for aldehydes (acrolein and formaldehyde) which could cause eye irritations. These tests also proved negative.

4. Compressed air supplied at the assembly table contained a small quantity of oil which was dispersed as mist into the atmosphere of the area.

5. The cleaning processes did not appear to be factors in the illnesses. Some illnesses occurred when the chromic acid dip was not in operation, while the quantity of trichloroethylene used in the plant was too small to produce an atmospheric contamination which would be harmful to man.

Conclusions and Recommendations

1. The atmosphere of the plant contained no toxic substances capable of causing the reported illnesses.
2. Air velocities in the booster line area on July 24 indicated need for improvement, but the velocities were satisfactory after the grills in the air inlets had been cleaned.
3. The eye irritation which was the principal clinical finding in the affected women was consistent with what might be expected from the fine oil mist introduced into the air from the compressed air lines, as well as from the oil mist and fine dust particles dispersed into the atmosphere due to the operation of the screw-cutting machines. Dispersal of oil mist from the compressed air lines can be reduced by installing filters in the air lines. Oil mist and fine dust originating at the screw cutting machines may be eliminated by the installation of properly engineered dust and oil mist collecting equipment. Management has stated that the latter installations are contracted for.

4. On the basis of these observations and the medical facts established by interviewing and examining a number of the affected workers, this episode is considered to have been caused by a combination of environmental factors in the plant plus a "chain reaction" of hysteria touched off by what appeared to the workers as a mysterious illness. The environmental factors were: (a) a fine oil mist in the air sufficient to cause some smarting and reddening of the eyes; (b) excessive heat on the first day of operation, July 22; and (c) sluggish air movement in the booster line area. The building design contributed to the psychological difficulty. It is our opinion that the women in the affected area of the building would feel much more secure if a window or two were put into the wall near them.

From the Kettering Laboratory in the Department of
Preventive Medicine and Industrial Health, College of Medicine
University of Cincinnati, Cincinnati, Ohio

Report by:

J. P. Hughes, M. D.
J. Cholak, Ch. E.

Approved:

Robert A. Kehoe R.A.S.
Robert A. Kehoe, M. D.
Director

Date: July 30, 1952