Queen City Valves, Incorporated
Cincinnati, Ohio

This is the plant where [redacted] is employed. Specimens for lead determination have been received from him recently. He was treated for Pb in Tox. at Christ. JDH

BUREAU OF INDUSTRIAL HEALTH
CINCINNATI HEALTH DEPARTMENT

REPORT OF INDUSTRIAL HEALTH INSPECTION

Plant: Queen City Valves, Inc.
1203 Findlay Street
Cincinnati, Ohio

Dates Inspected:
December 8 and 15, 1953

Contacts: Mr. William T. McLaughlin
Mr. Bud Joseph

Date Reported:
January 5, 1954

Origin of Inspection: Request of physician, Dr. Albert Ryan, Christ Hospital, for appraisal of work environment of patient [redacted], under treatment for lead poisoning.

1. Nature of Inspection: The work area in which the ill man had been employed as a grinder of brass castings was inspected and samples of room air collected for determination of lead content. A sample of dust from a chipping bench was collected for determination of free silica content. The melting, pouring and molding areas were also inspected and air samples collected for determination of lead content.

2. Results of Inspection: A situation markedly hazardous to health from the aspect of exposure to excessive concentrations of lead dust was encountered in the casting cleaning room. Significant contamination of room air in this area by free silica was obvious. Conditions in melting and pouring areas were generally good with respect to lead contamination of the atmosphere. Molding and sand conditioning was being carried out under at least potentially hazardous conditions with respect to contamination of the air by free silica.

3. Action Taken or Recommended: Repair of existing dust collecting apparatus; installation of additional local exhaust ventilation, principally on the grinding wheels; improved housekeeping; determination of the level of lead absorption of each man in inspected areas; X-ray of chest of each man; dust counts of air at certain sites.

4. Cost of Inspection: Approximately $80.00 to Kettering Laboratory for services of industrial hygiene engineer and analytical work.

Plant: Queen City Valves, Inc.
1203 Findlay Street
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Inspection made by: James P. Hughes, M. D.
Bureau of Industrial Health
Cincinnati Health Department

J. Cholak, Ch. E.
Kettering Laboratory
College of Medicine

Dates of Inspection: December 8 and 15, 1953

Description of the Plant

The plant is a small brass foundry occupying the second and third (top) floors of an old brick building. On the top floor there is carried out sand-conditioning, molding, and shakeout. Castings, chiefly small plumbing fixtures, are chuted to the cleaning room on the second floor where chipping, abrasive-wheel cut off, grinding and washing are done. Also on this floor is a machine shop and office. Total employment is approximately 50 persons.

The cleaning room is of particular interest because this is the work site of the ill employee. Four men are employed here. One receives castings from shakeout and chips off residual sand with a pneumatic tool. Another operates the carborundum cut off wheel, separating individual fixtures from the grouping in which they are cast. Two men operate a stationary double grinder, grinding burrs and surface sand off finished castings with emery wheels. A tumbler type washing machine is operated intermittently. The room measures approximately 25 x 15 feet. There are windows on two sides. There is no local exhaust ventilation effective.

A bag-type dust collector designed for exhaust of the cut-off wheel is inoperative and disconnected from the machine. Large heaps of dust are accumulated at the chipping, cut off and grinding stations. There is said to be no regular schedule for removal of this debris from the room. The room air is visibly contaminated by suspended dust particles. No personal protective respiratory devices are worn by any of the men.

Preparation of molds on the third floor is carried out by four or five men. One reconditions sand piled on the floor in the middle of the room, adding new sand and water to used sand, sifting it through an open mechanically agitated screen pan, and delivering it by wheel barrow to the molding machines at one end of the room. There is no local exhaust ventilation at the sand reconditioning station. Three or four men operate the molding machines, depending upon the rate of foundry production. Molding machine hoppers are loaded with sand by hand shovels. Parting compound is sprinkled over molds by hand. Behind each molding machine there is a window fitted with an exhaust fan of approximately 24 inch diameter. The face of each fan was partially covered with burlap cloth on the day of this inspection, and this covering is said to be maintained during the winter months.

The melting room is separated from the rest of the work area by a partial partition of concrete block. There are three melting furnaces in the room. Two of these were in operation at the time of this visit. Over the largest and most used furnace, a Reda forced-air type, is erected a canopy hood and stack. In the central portion of the melting room roof there is an open bay

into which considerable smoke and fume is observed to rise. In addition, windows on two sides of the room are fitted with exhaust fans. Two men are regularly employed in tending the furnaces and pouring metal into molds. A ladle filled from a furnace is suspended from an overhead track along which it is propelled by the melter and his helper into the main floor area where molds are filled. Both men stand in or near smoke and fume arising from the ladle, although a hand-cover is placed over the ladle in the furnace room. A melt is poured about three times each hour. The melter also occasionally operates a small pot in which scrap lead is melted, and pours ingots for use in the brass furnaces. The lead content of the brass is said to average 5 per cent. It is stated by the foreman that "brass chills" sometimes occurs in the men, but is not common, being reported only about a half dozen times each winter.

Collection of Samples and Results

In the cleaning room samples of air varied in lead concentration from 0.15 milligrams of lead per cubic meter of air at a central location between the cut off wheel and the grinding wheels, to 4.4 milligrams per cubic meter at the breathing zone of the cut off wheel operator, with a concentration of 3.9 milligrams per cubic meter at the breathing zone of a grinder working on the grinding wheel on the left side of the grinding stand (Table I). A sample of dust collected from the chipper's table contained 90 per cent free crystalline silica and 0.17 per cent lead.

On the melting floor a sample of air collected over the period of a single furnace tapping and casting operation contained 2.0 milligrams of lead per cubic meter of air.

The generally accepted maximum concentration of lead which may be permitted in workrooms for repeated eight hour exposures is 0.15 milligrams per cubic meter of air.

The generally accepted maximum allowable concentration of dust containing over 50 per cent free silica in workrooms where persons are regularly exposed is 5 million particles per cubic foot of air. It has been demonstrated repeatedly that this concentration is exceeded in atmospheres which are visibly dusty, as is the case in this plant.

Interpretation

In the cleaning room all of the men are exposed at their work stations to concentrations of lead in excess of maximum permissible levels. The cut off wheel operator and the grinders are working under particularly hazardous conditions of exposure to lead dust. The magnitude of this exposure can best be measured by a determination of the concentration of lead in their blood and urine. In addition, there is a source of significant contamination of the room atmosphere by silica.

On the melting and molding floor, the sand conditioner and the molders appear to be exposed to dangerous amounts of silica dust. The melter and his helper are exposed to high concentrations of lead fume during pouring and casting, but these operations are

intermittent, and the cumulative exposure of the two men to lead may not be excessive.

The extent of lead absorption in these men also should be determined by analysis of blood and urine.

Under the conditions observed, cases of both lead poisoning and of silicosis may occur in the men exposed to the respective contaminants over long periods of time.

Recommendations

1. The dust collector on the cut off wheel should be put in working order, reconnected to the machine, and should receive regular maintenance attention. The bag should be removed and cleaned as often as once daily, depending upon the rate of accumulation of dust in it.

2. Dust collectors should be installed on the grinding wheels.

3. Chipping of castings should be carried out in a simple hood fitted with an exhaust fan.

4. Accumulated chippings, grindings and debris should be removed from the tables and floor of the cleaning room. Floor, work surfaces and rafters should be gone over with a vacuum cleaner now and at regular intervals, since accumulated dust is being stirred up continuously and contributes significantly to contamination of the room atmosphere.

5. Dust counts and determination of silica content should be made in the sand reconditioning and the molding areas now, and in the cleaning room after improvements in dust collection and general housekeeping have been made.

6. A sample of urine for determination of lead concentration should be collected from each of the men employed in the cleaning room and from each working on the top floor. Re-examinations may be desirable as indicated by the results of the initial tests. This and the previous recommendation can be carried out by the Bureau of Industrial Health as an adjunct to the present study.

7. Each of these two groups of men should have an X-ray of chest for the purpose of identifying reaction of the lungs, if any, to inhaled dust. The Bureau will assist in arranging for these X-rays to be made at the Twelfth Street Health Center of the Cincinnati Health Department at a cost of $1.00 per examination. Re-examinations should be made annually. It is suggested that these be done by the mobile X-ray unit of the Anti-Tuberculosis League at a cost of $1.50 per film, since this unit will visit the plant. These examinations may be made by a private practitioner if preferred.

From the Bureau of Industrial Health, Cincinnati Health Department

James P. Hughes

James P. Hughes, M. D.

Date of Report: January 5, 1954

TABLE I

LEAD CONCENTRATIONS, FREE CRYSTALLINE SILICA CONTENTS OF SETTLED DUST

Analysis Number	Location and Description	Time	Cubic Meters of Air Sampled	Lead Mgs/M³	Per Cent Free Crystalline Silica
53A-9281	At grinders (breathing level)	9:31 A.M.	1.28	3.9	-
53A-9282	At cut-off wheel (breathing level)	9:30 A.M.	1.00	4.4	-
53A-9283	On band saw table, central location in workroom. General room air (grinding operations in progress).	9:44 A.M.	1.44	0.15	-
53A-9284	Dust from chipping table	-	-	0.17%	90
53A-9285	In foundry, while following ladle from time of furnace tapping to completion of casting operation; a period of approximately 6 minutes	10:43 A.M.	0.13	2.0	-

Reported: 12-22-53

KE 0013697

Name: [redacted]

Material: Urine and Blood

History: Has worked as a brass grinder for 9 years. Patient states that there is large amount of dust in the area. Grinds brass thick enough to coat clothing. Composition, Copper 85%, Zinc 5%, Tin 5% and Lead 5%.

Submitted: 11-21-53 by Dr. A. Ryan, Christ Hospital, Cincinnati, Ohio

Required: Lead Analysis

URINE

Analysis Number - 53A-8805

Volume - 50 ml.

Specific Gravity - 1.021

Mg. Pb/Liter - 0.46

BLOOD

Analysis Number - 53A-8806

		Spectrographic	Dithizone
Grams	-	21.7	21.9
Mg. Pb/100 Grams	-	0.12	0.12

The concentration of lead in the blood and urine are indicative of lead absorption of considerable magnitude, and is consistent with the occurrence of symptoms of lead intoxication. Of considerable significance is the time interval that elapsed between termination of exposure to lead on the job, and the collection of these specimens. If more than a week or two had elapsed, it is probable that the high rate of urinary lead excretion may be expected to continue for some time.

Signed: James P. Hughes

James P. Hughes, M. D.

Results Phoned

Samples Collected: 11-20-53
Samples Received: 11-21-53
Samples Reported: 11-25-53

KE 0013698

Lucas Cty Valuation

Name: [redacted]

Material: Urine and Blood

Submitted: 12-30-53 by Dr. J. Hughes for Dr. A. Ryan, Christ Hospital

Required: Lead Analyses

URINE

Analysis Number	- 53A-9477
Volume	- 114 ml.
Specific Gravity	- 1.025
Mg. Pb/Liter	- 0.10
Coproporphyrin	- 1.00 Mg./Liter

BLOOD

		Spectrographic	Dithizone
Analysis Number	-	53A-9478	
Grams	-	18.4	20.8
Mg. Pb/100 Grams	-	0.17	0.19

The concentration of lead in the blood is at a higher level than it was found to be in late November of 1953, and the increased level is sufficient to indicate that some further exposure to abnormal quantities of lead has occurred.

This fact, despite the relatively low and essentially normal level of lead concentration in the urine, may well be associated with an increase in symptomatology, although this is by no means inevitable.

Signed: Robert A. Kehoe

Robert A. Kehoe, M. D.

Samples Collected: 12-29-53
Samples Received: 12-30-53
Samples Reported: 1-5-54

RE 0013699

Linen City Values, Inc

Name: [redacted]

Material: Urine and Blood

Submitted: 12-3-53 by Dr. J. P.Hughes

Required: Lead Analyses

URINE

Analysis Number	- 53A-9050
Volume	- 153 ml.
Specific Gravity	- 1.009
Mg. Pb/Liter	- 0.08
Coproporphyrin	- 0.275 Mg./Liter

BLOOD

Analysis Number	-	53A-9051	
		Dithizone	Dithizone
Grams	-	17.8	19.0
Mg. Pb/100 Grams	-	0.09	0.11

The concentration of lead in the blood is in the range indicative of recent hazardous absorption of lead. The concentration in the urine is disproportionately low, in keeping with the low specific gravity (dilute sample) of the urine. The results are compatible with the occurrence of symptoms of lead intoxication.

Signed: _____
Robert A. Kehoe, M. D.

Samples Collected: 12-1-53
Samples Received: 12-3-53
Samples Reported: 12-11-53

KE 0013700