

C O P Y

OCCUPATIONAL HEALTH LABORATORIES

211 Milby St.

Houston 3, Texas

Phone Capitol 7-5708

October 19, 1955

Mr. Manfred Bowditch
Lead Industries Assn.
420 Lexington Avenue
New York 17, N.Y.

Dear Sir:

We are equiped and have been running urinary leads (Dithizone) and Coproporphyrin III tests for some of the local lead industries including Lead Products Co., Houston Lead Co., Houston Battery Sales, Tex-Ford Battery Co. and Silverloy Battery Co.

If you should run across someone in this area interested in obtaining this type of examination, we would appreciate being referred to them.

Enclosed note OCCUPATIONAL HEALTH BULLETIN NO. 3, which we are distributing to the local lead plants.

Sincerely,

/s/ William U. Giessel, M.D.

William U. Giessel, M.D.
Medical Director
Occupational Health Laboratories

VE 03696

OCCUPATIONAL HEALTH BULLETIN NO. 3

TO : Health & Safety Department
FROM : Occupational Health Laboratories
SUBJECT: Practical Approach To The Industrial Lead Problem

CAUSE

- I. Inorganic Lead Poisoning is caused by the inhalation of lead dust or fume which enters the blood stream from the lungs.
- II. Practically all workers in lead plants inhale lead and will become ill if enough lead is inhaled over a long enough period of time.
- III. The difference between lead absorption (the amount of lead in the system) and lead poisoning (onset of signs and symptoms, such as constipation, abdominal cramps, headaches, nausea and vomiting, anemia, weakness, etc.) is one of degree only.

PLANT EVALUATION

- I. The most practical way to evaluate the in-plant problem is to analyze each worker who has been sampling the plant atmosphere over a certain period of time, and who is excreting in his urine amounts of lead which are definitely related to the amount of lead inhaled.
- II. Analyze the plant atmosphere directly for lead and strive to keep the plant atmospheric lead concentration below the maximum allowable concentration (0.15 milligrams/ cu. meter of air.). This is the amount of lead in the air that a normal worker can inhale during an eight-hour shift over a life time without suffering detectable damage. The maximum allowable concentration indicates the worst condition which should be tolerated by the workers.
- III. The coproporphyrin urinary test will detect incipient lead damage before the worker develops symptoms. It is an inexpensive, rapid screening test to determine which workers should then be followed by a urinary lead examination.

PREVENTION

- I. Install adequate exhaust ventilation at those positions where the workers show abnormally high lead values in urine or where the maximum allowable concentration in the air is constantly exceeded.
- II. Treat those workers with high urinary lead values (but without evidence of poisoning) with E.D.T.A. (Brand of Calcium Disodium Salt of Ethylene-diamine Tetra-acetic Acid - RIKER). This is a "wonder drug", which will combine with the lead in the system and neutralize it and cause it to be excreted harmlessly in the urine.
- III. Give all workers an iron-vitamin preparation (Heptuna Plus - Pfizer) in order to prevent nutritional anemia which would predispose the harmful effects of lead on the blood count.

VE 03697

OCCUPATIONS WHICH OFFER LEAD EXPOSURE

Acid finishers (glass)	Galvanizers	Reclaimers (rubber)
Actors	Garage workers	Red-lead workers
Airplane pilots - crop dusting	Gardeners	Refiners (metal)
Amber workers	Gasoline blenders	Riveters
Art-glass workers	Glass finishers	Roofers
Artificial-flower mak- ers	Glass mixers	Rubber workers
Artificial-pearl mak- ers	Glass polishers	Sagger makers
Babbitt metal workers	Glaze dippers (pottery)	Sandpaperers (enameling and painting auto bodies, etc.)
Babbitters	Glaze mixers (pottery)	Screen workers (lead and zinc smelting)
Battery (dry) makers	Glost-kiln workers	Sheet metal workers
Blacksmiths	Gold refiners	Shellackers
Blooders (tannery)	Grinders (metals)	Shellac makers
Bookbinders	Grinders (rubber)	Shot makers
Bottle-cap makers	Incandescent-lamp makers	Silk weighters
Brass founders	Ink makers	Slip makers (pottery)
Brass polishers	Insecticide makers	Slushers (porcelain enam- eling)
Braziers	Japan makers	Solderers
Brick burners	Japanners	Solder makers
Brickmakers	Jewelers	Sprayers (trees)
Bronzers	Junk-metal refiners	Stainers (shoes)
Browners (gun barrels)	Labelers (paint cans)	Stereotypers
Brush makers	Lacquerers	Storage-battery makers
Buffers (rubber)	Lacquer makers	Sulphuric-acid workers
Burners (enameling)	Lead burners	Table turners (enameling)
Cable makers	Lead-foil makers	Tannery workers
Cable splicers	Lead miners	Temperers
Canners	Lead-pipe makers	Tetraethyl lead makers
Cartridge makers	Lead-salts makers	Textile printers
Cement workers (ceramic)	Lead smelters	Tile makers
Chippers	Linoleum makers	Tin-foil makers
Cigar makers	Linotypers	Tinners
Colorers (white) of shoes	Linseed-oil boilers	Toy makers
Color makers	Litharge workers	Transfer workers (pottery)
Compositors	Lithographers	Type founders
Compounders (rubber)	Lithotransfer workers	Type melters
Concentrating-mill workers (lead and zinc)	Match factory workers	Varnishers
Copper refiners	Metallizers	Varnish makers
Crayon (colored) makers	Mirror silverers	Wall-paper printers
Cut-glass workers	Mixers (rubber)	Welders
Cutlery makers	Molders (foundry)	White-lead workers
Decorators (pottery)	Monotypers	Wood stainers
Dental workers	Musical instrument makers	Zinc miners
Diamond polishers	Nitric-acid workers	Zinc smelters
Dye makers	Nitroglycerin makers	
Dyers	Painters	
Electroplaters	Paint makers	
Electrotypers	Paint removers	
Embroidery workers	Paperhangers	
Emery-wheel makers	Paper makers	
Enamelers	Patent-leather makers	
Enamel makers	Petroleum refiners	
Engravers (steel)	Photograph retouchers	
Explosives workers	Pipe Fitters	
Farmers	Plumbers	
File cutters	Polishers	
	Pottery workers	
	Printers	
	Printer makers	

T A B L E II

from:

(Occupation Hazards &
Diagnostic Signs -
United States Dept. of Labor
Bulletin #41 - Revised, 1942
United States Dept. of Labor
Maurice J. Tobin, Secy.
Page - 49)

FOLLOW-UP

I. Periodic re-examination is necessary to detect those workers abnormally sensitive to lead (even when the M.A.C. is not being exceeded), to observe the results of treatment with E.D.T.A., and to detect early any possible break-down in ventilation procedure, and to detect previously unsuspected exposures.

II. It is vitally important to examine all new employees since many will come from other lead plants where they may have absorbed excessive amounts of lead and then have been released from employment.

STANDARDS FOR SAFEGUARDING THE HEALTH OF THE INDUSTRIAL LEAD WORKER

(a) Threshold limits for concentrations of injurious lead dust in the workroom air (M.A.C.)—0.15 milligrams/ cubic meter of air.

(b) The biological threshold limit of lead in urine:

NORMAL RANGE: 0.00 - 0.08 mgm. lead/liter of urine.

SIGNIFICANT RANGE: 0.08 - 0.15 mgm. lead/liter of urine.

DANGER RANGE: 0.17 mgm. (or greater)/liter of urine.

(c) Pretoxicosis screening test (Urinary coproporphyrin III test):
For the detection of subtle metabolic changes in the body before injury of serious proportions has developed.

(d) Prophylactic and antidotal agents are available.

"No substance is so toxic that it cannot be used . . . no substance is so nontoxic that it should be used without caution."

IMPORTANT LEAD COMPOUNDS

- Lead metal: found chiefly alloyed with antimony, tin, or copper.
- Litharge, PbO : used especially in storage battery manufacturing.
- Red lead, Pb_3O_4 : used in paints and storage batteries.
- Lead dioxide, PbO_2 : used in chemical industry.
- Lead carbonate, $2\text{PbCO}_3 \cdot \text{Pb(OH)}_2$: white lead, used in paints.
- Lead sulfate, PbSO_4 : a paint pigment.
- Lead Titanate, PbTiO_3 : a paint pigment.
- Lead acetate, $\text{Pb(C}_2\text{H}_3\text{O}_2)_2$: The most common water-soluble compound of lead
- Lead arsenate, $\text{Pb}_3(\text{AsO}_4)_2$: A common insecticide.
- Lead chloride, PbCl_2 : probably formed when fluxes are used with heated lead.
- Lead silicate, PbSiO_3 : present in glasses and vitreous enamels.
- Lead chromate, PbCrO_4 : used in yellow and green pigments.
- Lead borate, $\text{Pb(BO}_2)_2$: employed in certain plastics.
- Lead sulfide, PbS : occurs naturally as galena.
- Lead tetraethyl, $\text{Pb(C}_2\text{H}_5)_4$: used in gasoline.

TABLE I

from:

Chemistry of Industrial Toxicology
by Hervey B. Elkins

John Wiley & Sons, Inc., New York
Chapman & Hall, Limited, London, 1950
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