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 equipped 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

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.

OCCUPATIONS WHICH OFFER LEAD EXPOSURE

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

TABLE 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."

— James A. Sterner, M. D.
Medical Director
Eastman Kodak Company.

[redacted]

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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, $2PbCO_3\ Pb(OH)_2$: white lead, used in paints.

Lead sulfate, $PbSO_4$: a paint pigment.

Lead Titanate, $PbTiO_3$: a paint pigment.

Lead acetate, $Pb(C_2H_3O_2)_2$: The most common water-soluble compound of lead

Lead arsenate, $Pb_3(AsO_4)_2$: 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, $Pb(BO_2)_2$: employed in certain plastics.

Lead sulfide, PbS: occurs naturally as galena.

Lead tetraethyl, $Pb(C_2H_5)_4$: 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
page 49

[redacted]

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