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HEALTH HAZARD EVALUATION REPORT 71-19-8
HAZARD EVALUATION SERVICES BRANCH
DIVISION OF TECHNICAL SERVICES

Establishment: NL Industries, Incorporated
Atlanta, Georgia

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Region VI, Dallas, Texas

June 1972

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

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NL INDUSTRIES, INC.
ATLANTA, GEORGIA

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SUMMARY DETERMINATION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following receipt of a written request from an employee or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health received such a request from an authorized representative of employees regarding exposure to lead dust and noise at the NL Industries, Incorporated, plant in Atlanta, Georgia.

Lead dust air concentration levels measured on two (2) successive days March 22-23, 1972 indicated that numerous personal and general area samples throughout the plant exceeded the established lead dust standard of 0.2 milligrams per cubic meter of air (Federal Register, Part II, §1910.93, Table G-2) promulgated by the U.S. Department of Labor. Twenty-one out of twenty-six personal samples collected exceeded the standard; concentration levels ranged from 0.025 to 2.936 mg/M^3. All eight general area samples collected exceeded the standard, ranging from 0.244 to 2.656 mg/M^3.

Recommendations in the area of concern have been made to management to obviate the observed hazards to the 125 affected employees.

Copies of this Summary Determination as well as the Full Report of the evaluation are available upon request from the Hazard Evaluation Services Branch, NIOSH, 550 Main Street, Cincinnati, Ohio 45202. Copies of both have been sent to:

a) NL Industries, Incorporated, Atlanta, Georgia
b) Authorized representative of employees
c) U.S. Department of Labor - Region IV

For purposes of informing "affected employees," the employer will promptly either (1) post the Summary Determination in a prominent place near the affected employee's workplace for a period of 30 days or (2) provide a copy of the determination to each affected employee.

I. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following receipt of a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health received such a request from an authorized representative of the United Steelworkers of America, Local Union No. 4352, at NL Industries, Incorporated, 430 Bishop Street, Atlanta, Georgia.

NL Industries, Incorporated, in operation as its present location since 1914, currently employs 160 persons at its Atlanta plant. Of this number, 125 are normally employed in work areas as opposed to offices or outside areas. The plant's primary service is the production of specification lead and lead oxide for the battery industry. Three (3) work shifts are currently in effect at the plant.

II. BACKGROUND HAZARD INFORMATION

A. Standard

The occupational health standard as promulgated by the U.S. Department of Labor (Federal Register, Part II, §1910.93, Table G-2) applicable to the substance of this evaluation is as follows:

Substance	Standard
Lead and its inorganic compounds	0.2 mg/M^3*

*Eight-hour time-weighted average concentration in milligrams of particulate per cubic meter of air.

B. Toxic Effects

Most cases of industrial lead poisoning occur through inhalation. Lead poisoning may be acute or chronic. The symptoms of acute lead poisoning are experienced by a burning sensation in the mouth, stomach pain, nausea, vomiting, and constipation and diarrhea. However, most cases of lead poisoning in industry are of a chronic nature. Chronic lead poisoning is slow and vague in its beginnings and the signs and the symptoms are not well defined. No one symptom indicates the occurrence of lead poisoning. At first, one may experience a general ill-feeling, fatigure, exhaustion, irritability, loss of weight and appetite, or vague abdominal discomfort. These symptoms may be followed by more severe stomach pain, constipation and sleep disturbance, Occasionally workers may notice a blue discoloration of their gums. In advanced stages of chronic lead poisoning, several body functions and organs such as the liver and kidney may be affected. Since the signs and symptoms of lead poisoning are usually vague and not well defined, if workers exposed to lead show any evidence of disturbance of the digestive system, muscle pain, stiffness in joints, general weakness or weight loss, they should seek the attention of a physician for his evaluation.

III. HEALTH HAZARD EVALUATION

A. Initial Visit - Observational Survey

An initial hazard evaluation survey of NL Industries, Incorporated, 430 Bishop Street, Atlanta, Georgia, was performed on December 16, 1971, by NIOSH representatives Mr. Kenneth J. Kronoveter and Mr. Harry L. Markel, Jr. The function of the National Institute for Occupational Safety and Health, its relation to Section 20(a)(6) of the Occupational Safety and Health Act of 1970, and the purpose of the visit was explained to , Plant Superintendent. Both and , Secretary, United Steelworkers of America, Local Union No. 4352, accompanied NIOSH representatives on the survey. The NSN questionnaire, Part I, was also completed with the assistance of [redacted].

The purpose of this preliminary survey was to assist in determining (a) existing potential health hazards, and (b) appropriate sampling equipment necessary to properly evaluate concentrations of, and exposures to, lead dust and/or lead fumes.

Potential health hazards noted for various work areas are described in the following paragraphs.

1. Battery Decasing Area

This conveyor-type operation is contracted and involves the processing of approximately 80,000 - 90,000 batteries per month. Potential lead dust problems were observed at this location.

2. Lead Casing Separation Area

A conveyor transports battery cases to a crusher which separates lead from non-lead portions (density/centrifugal force/air pressure principle). Potential lead dust problems were observed at this location.

3. Oxide Plant

Purchased lead (primary metal) is fed to smaller melting pots at approximately 900°F, and following an air/steam oxidation and separation process which produces oxide of lead, then enters the two (2) BARTON pots at approximately 600°F. All employees in this area were wearing DUSTFOE 66 respirators, filter No. 457485. Potential lead dust problems were observed at this location.

4. Smelter Building

Skip fed furnaces (up to 1800°F) are exhausted through an incinerator, cyclone collector, cooling tower and into bag houses. Two (2) persons who occasionally work in the bag house area utilize air line respirators. Potential lead dust/fume problems were observed in this area.

5. IP-11 Kettle Area

Secondary metal operations are conducted in a 25,000 pound kettle which is hooded and ventilated through a dust collector. Metals added, in very small amounts, at this location, include antimony, white arsenic, cadmium, copper, tin and silver. Potential lead dust problems were observed at this location.

6. Ingot Lead Area

As a result of generally poor housekeeping, dust was felt to present a potential problem in this area.

7. Soft Lead/Mixed Metals Area

Pots in the mixed metals area have thermostats but are not vented. Potential lead dust problems were observed in both areas.

8. Mill Building

Sheet lead is made in this building, with 2-3 men being employed in the area of the roller mill, winders and pipe presses. Carbon tetrachloride is used for 1-2 minutes each week for purposes of cleaning dies used in the operation. Although the currently unvented "blue lead" kettle is used only 6-8 times each year, reported excessive smoke created by its use might warrant consideration of proper venting.

9. Noise

Potential excessive noise levels were observed in the oxide building, ingot lead area and mixed metals area. Levels are to be measured at a later date.

B. Environmental Survey

On March 22 and 23, 1972, a follow-up health hazard survey was conducted by NIOSH representatives Messrs. Harry L. Markel, Jr., and Raymond L. Ruhe to determine environmental exposures of lead within the plant in question. NL Industries, Incorporated corporate officials, , Accident Control Coordinator, and , Environmental Engineer, accompanied NIOSH representatives on various portions of the survey.

Twenty-six (26) personal and eight (8) general room/area air samples were collected during the two-day survey. Personal samples were of the breathing-zone type with an average sampling time of 5.7 hours. The employee's name, social security number and job title were recorded to further identify the samples.

General room air samples, collected over an average sampling period of 5.5 hours were located at specific pre-selected sites within the working environment. Sampling devices consisted of a Mine Safety Appliance (MSA) Model G battery-operated vacuum pump, operating at 1.7 liters per minute (lpm) with a 0.8 micron pore size, 37 millimeter cellulose membrane filter.

With regard to noise levels, it has been determined that "substances", as presently defined in Section 20(a)(6) of the Act, do not include physical agents. However, to satisfy our responsibility of evaluating a place of employment as a result of the receipt of a request for hazard evaluation, applicable noise levels were measured and reported. Instrumentation used included a General Radio Company Sound Level Meter, Type 1565-B.

Results:

All air samples were analyzed by the Division of Laboratories and Criteria Development, NIOSH, Cincinnati, Ohio. Filters were wet-ashed with distilled nitric acid and hydrolized with 1:1 distilled HCl prior to analysis. Samples were analyzed for lead using atomic absorption spectrophotometer procedure. The results are presented in Table I and are expressed as milligrams of lead per cubic meter of air (mg/M^3).

1. Battery Decasing Area

Four (4) personal air samples were collected in the battery decasing area, two (2) of which exceeded the established standard for lead.

2. Lead Casing Separation Area

Two (2) personal air samples were collected in the lead casing separation area, both of which exceeded the established standard for lead. In excess of 1 mg/M^3 of lead was measured in the breathing zone of the battery separator operator.

3. Oxide Plant

Six (6) personal air samples were collected in the oxide plant, five (5) of which exceeded the established standard for lead. Both of the general room samples similarly exceeded lead standards.

4. Smelter Building

All of the six (6) personal air samples collected in the smelter building indicated concentrations of lead from 4 to 14 times in excess of established standards.

5. and 6. IP-11 Kettle Area and Ingot Lead Area

No general room samples were collected in these areas due to a partial curtailment in plant operations.

7. Soft Lead/Mixed Metals Area

Six (6) personal samples were collected in the soft lead/mixed metals area, all of which exceeded established lead standards. Similarly, all of the six (6) general room samples collected were also excessive.

8. Mill Building

Both of the personal samples collected in the mill building revealed concentrations of lead to be well below that permitted by applicable standards.

9. Noise

At the time of the survey, the following noise levels were measured. 90 dBA (oxide plant); 87 dBA (ingot lead area); 81 dBA (mixed metals area); and 80 dBA (smelter building). All levels were, therefore, found to be at, or below, the current standard of 90 dBA.

IV. RECOMMENDATIONS

1. Local exhaust ventilation should be improved at applicable locations. The importance of maintaining the concentration of airborne lead at a very low value stems from lead's high toxicity and its tendency, in small amounts, to accumulate in the human system.

Dusty operations may sometimes be isolated or enclosed, with or without a local exhaust system. An enclosed operation which generates large quantities of dust generally needs to be exhausted to prevent the dust from leaking into the surrounding atmosphere.

2. Housekeeping practices throughout the plant should be improved. Good housekeeping plays a key role in occupational health protection. Dust on overhead ledges and floors can readily be dispersed to the inplant atmosphere by traffic, vibration and random air currents.

Housekeeping is always important; where toxic materials are present, it is paramount. It is, therefore, impossible to have an effective health program unless maintenance housekeeping is good and the worker has been informed of the need for those measures.

3. In addition, and in order to prevent ingestion, food or drinks should not be taken into workrooms where lead compounds are handled.

4. The current "respirator required" policy for areas designated in Figure 1 should be maintained. Although personal protective equipment must never be considered an adequate substitute for good engineering or housekeeping, it can, if used intelligently and maintained properly, reduce irritation and/or hazardous conditions on certain operations until other control measures can be initiated or completed. The type of protective equipment varies according to the job process.

If used, respirators should be controlled through a program which provides for proper selection, fitting, testing and maintenance under the surveillance of competent personnel. In every instance of exposure to concentrations of harmful dusts, U.S. Bureau of Mines approved respirators should be used. (Note: Use of respirators may ultimately require issuance of variance by Department of Labor).

5. Those employees in high risk areas, for example, those employed where exposure to lead is constant or where air sampling indicates high lead content, should be involved in a medical monitoring program under the supervision of a physician. The program should include history and physical examinations of workers when necessary, and biologic testing for lead at periodic intervals.

TABLE I

PERSONAL SAMPLES

Operation/Location	March 22, 1972			March 23, 1972		
	Laboratory Number	Sampling Period (Minutes)	Concentration (mg/M^3)	Laboratory Number	Sampling Period (Minutes)	Concentration (mg/M^3)
Oxide Packer/Oxide Plant	59218	271	0.599	59235	243	0.605
Oxide Tech/Oxide Plant	59219	378	0.507	59236	750	0.488
Lead Man/Oxide Plant	59220	369	0.284	59237	743	0.101
Tapper/Smelter Bldg.	59221	360	0.944	59238	644	2.408
Refining Caster/Soft Lead Area	59222	349	1.000	59239	750	0.571
Refining Caster/Soft Lead Area	59223	344	1.101	59240	763	0.405
Refining Caster/Mixed Metals Area	59224	339	0.543	59241	775	0.294
Pipe Press Helper/Mill Bldg.	59225	286	0.025	59242	716	0.073
Laborer/Batt. Decasing	59226	313	0.062	59243	765	0.056
Batt. Chop. Oper/Batt. Decasing	59227	308	0.410	59244	758	0.401
Batt. Separ. Oper/Batt. Decasing	59228	302	1.092	59245	743	0.402
Aux. Worker/Smelter Bldg.	59229	268	2.936	59246	255	0.894
Charge Maker/Smelter Bldg.	59230	263	2.631	59247	262	2.355

TABLE I (Continued)

GENERAL ROOM SAMPLES

Date	Location	Laboratory Number	Sampling Period (Minutes)	Concentration (mg/M^3)
March 22, 1972	N. of 2 hoists Oxide Bldg.	59231	270	0.442
March 22, 1972	E. of Pot #5 Mixed Metals Area	59232	259	0.977
March 22, 1972	E. of & between Pots #1 & #2 Soft Lead Area	59233	262	2.656
March 22, 1972	Slug Casting Mixed Metal Area	59234	257	0.405
March 23, 1972	N. of 2 hoists Oxide Bldg.	59248	702	0.244
March 23, 1972	E. of & between Pots #1 & #2 Soft/Hard Metal Area	59249	606	1.345
March 23, 1972	E. of Pot #3 Soft/Hard Metal Area	59250	603	1.801
March 23, 1972	NE of Pot #5 Mixed Metals Area	59251	668	0.337

TABLE I (Continued)

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