U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 79-73-601

ROCKY MOUNTAIN BANK NOTE COMPANY
WHEAT RIDGE, COLORADO

JULY 1979

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) at the Rocky Mountain Bank Note Company, Wheat Ridge, Colorado, on May 8, 1979. (A previous health hazard evaluation was conducted at this plant in 1976. Reference 1) At the time of this evaluation, breathing zone and general room air samples were taken on workers for lead (Pb).

All air samples were far below the NIOSH and OSHA exposure criteria of 0.1 and 0.05 mg/M^3 respectively. Sample results range from below the laboratory detection limits to 0.02 mg/M^3.

There are approximately 20 workers employed in the linotype and lead melt area. All workers were interviewed. Based on these interviews and environmental levels, a health hazard did not exist at the time of this survey.

II. DISTRIBUTION AND AVAILABILITY

Copies of this determination report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Rocky Mountain Bank Note Company
2. U.S. Department of Labor/OSHA - Region VIII
3. NIOSH - Region VIII

For the purpose of informing approximately 20 affected employees a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

III. 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 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.

NIOSH received such a request from plant management to evaluate potential exposures to lead in the linotype operators' and lead melter's work area.

IV. HEALTH HAZARD EVALUATION

A. Process Evaluated

Rocky Mountain Bank Note Company is a printing firm which employs close to 500 workers; of this number, approximately 300 are production workers and 8 are maintenance personnel. There are eleven linotype operators in the linotype room and one furnace man (lead melter) in a small room adjacent to the linotype room. The linotype machines are in an open room. Each machine is equipped with a small melting pot held at 650 degrees F.

The furnace room (lead melt room) is purposely located adjacent to the linotype. Lead scraps collected from individual linotype machines, along with new bars of lead, are melted in one locally exhausted pot. Lead is melted and then poured in the shape of a small ingot which is convenient for use by each linotype machine.

This is a new facility and has very adequate general ventilation.

The major products of this facility are checks, drafts, and other banking soft ware.

B. Evaluation Design

There were approximately 20 workers. Most of these workers were interviewed and monitored for possible lead exposures. Biological samples were not obtained since review of the

previous Health Hazard Evaluation showed that workers practiced good hygiene and had very low blood lead levels.

C. Evaluation Methods

All breathing zone and general room samples were taken on AA filters using vacuum pumps operated at 1.5 liters per minute. These samples were analyzed according to NIOSH method #173 using atomic absorption technique.

D. Criteria for Assessing Workroom Concentrations of Air Contaminants

Three sources of criteria are generally used to assess workroom concentrations of air contaminants: (1) NIOSH criteria for recommended standards; (2) recommended Threshold Limit Values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1977; and (3) Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910.1000), January 1978.

	Permissible Exposures 8-Hour Time-Weighted Exposure Basis (mg/M^3)		
Substance	NIOSH Criteria for Recommended Standard	TLV	Current OSHA Standard
Lead.....	0.1	0.15	0.05

mg/M^3 = milligrams of substance per cubic meter of air

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Toxicology

Lead — Prolonged absorption of lead or its inorganic compounds from inhalation of vapor, fume or dust, as well as from oral ingestion, can result in severe gastro-intestinal disturbances and anemia. With more serious intoxication, neuromuscular dysfunction may occur, and with severe exposure may result in encephalopathy. Presenting symptoms are often weakness, weight loss, lassitude, insomnia, and hypertension. Usually associated with this, there is a disturbance of the gastro-intestinal

tract, which includes constipation, anorexia, and abdominal pain described as colicky. The physical findings although occurring late usually consist of facial pallor, malnutrition, abdominal tenderness, and pallor of the eye grounds. The anemia associated with lead poisoning is of the hypochromic, microcytic type with basophilic stippling of the red cells being present. A lead line may appear on gingival tissues, and in severe cases of poisoning paralysis of the extensor muscles of the wrist, and less often of the ankles, can occur. Encephalopathy while common in children is unusual in adults. (Reference 1)

Lead is teratogenic in mammalian animals, so it is advised that exposure of women in the child bearing age to lead should be carefully monitored. Health information related to lead suggests that blood lead levels in individual workers should be kept at values less than 60 micrograms per 100 ml. of whole blood. It also should be noted that persons with anemia existing or sickle cell trait may be at increased risk from exposure to lead. At this present time NIOSH recommends the levels of 0 to 40 micrograms per 100 ml. of whole blood to be in the normal range. The levels of 40 to 60 micrograms per 100 ml. of whole blood in the increased absorption range and levels above 60 micrograms per 100 ml. of whole blood to be considered undesirable. (Reference 2)

F. Environmental Results and Discussion

Results of 12 air samples clearly illustrate that workers were not overexposed to airborne lead since the highest concentrations observed was 0.02 mg/M^3. Fifty percent (50%) of the samples were below laboratory limits of detection (0.004 mg/sample). Since the environmental results were extremely low and workers were practicing excellent hygiene, biological monitoring was not considered necessary. To review environmental data, refer to Table 1.

G. Conclusions

Results of environmental data, employee interviews, and the physical conditions of the work place illustrate that there was no health hazard during the time of this survey.

V. RECOMMENDATIONS

1. Workers should continue their good hygiene practice of washing hands before eating.

2. No eating, drinking, or smoking should occur at the work station.

3. The lid on the lead melting pot should remain closed when it is not being charged.

VI. REFERENCES

1. Rivera, R. and Schutte, R., Health Hazard Evaluation Determination Report No. 76-75-340, NIOSH, Cincinnati, Ohio, November 1976.

2. NIOSH Standard Completions Project; Appendix C - Medical Surveillance Guidelines.

VII. AUTHORSHIP AND ACKNOWLEDGMENTS

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TABLE 1

Breathing Zone and General Room Air Concentrations of Lead (Pb)

Rocky Mountain Bank Note Company
Wheat Ridge, Colorado

May 8, 1979

Sample Number	Location	Job Classification	Time of Sampling	mg/M^3 Pb
J	Lead Melt	Lead Melter	7:04 AM - 1:43 PM	0.008
101	Linotype	Monitor	7:06 AM - 1:47 PM	0.02
102	Linotype	Operator	8:38 AM - 1:50 PM	0.02
103	Linotype	Monitor	7:03 AM - 1:45 PM	0.01
108	Linotype	Monitor	7:00 AM - 1:45 PM	*
110	Linotype	Pan Set Operator	7:09 AM - 1:50 PM	*
111	Linotype	Machinist	6:58 AM - 1:47 PM	0.007
114	Linotype Area	Area	7:14 AM - 1:50 PM	*
115	Linotype	Machinist	7:12 AM - 1:47 PM	0.01
116	Linotype	Operator	7:40 AM - 2:05 PM	*
117	Linotype	Operator	7:42 AM - 2:05 PM	*
118	Linotype	General Area	8:38 AM - 1:50 PM	*

EVALUATION CRITERIA	0.05
LABORATORY LIMIT OF DETECTION mg/sample	0.004

* = below laboratory limit of detection