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 HE 79-26-614

DETROIT FREE PRESS
DETROIT, MICHIGAN

September 1979

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) at the Detroit Free Press, Detroit, Michigan on March 30-31, 1979. At the time of this evaluation, breathing zone and general area samples were collected for oil mist, inorganic lead and total particulates (paper dust). Forty three press and reelroom employees completed medical questionnaires and 18 received blood lead determinations.

On the basis of environmental and medical sampling in the workplace on March 30-31, 1979, it has been determined that a health hazard did not exist at the time of the survey. All environmental results were at or below the most recent recommended exposure limits. All 18 blood samples for lead were in the normal range (40 ug/100 g). Evidence of a potential noise hazard was found and additional audiometric testing and controls are recommended. These and other recommendations designed to aid in providing a safe and healthful working environment are also included in Section V of this Determination Report.

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 the NIOSH Publications Office at the Cincinnati address.

Copies have been sent to:

a) Detroit Free Press - Detroit, Michigan
b) Authorized Representative of Employees - International Printing & Graphic Communication Union and Newpaper Printing & Graphic Communication, Local #13
c) U.S. Department of Labor - Region V
d) NIOSH - Region V

For the purpose of informing the approximately 80 "affected employees" the employer shall promptly "post" for a period of 30 calendar days the Determination Report in a prominent place(s) where exposed employees work.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(60), 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.

The National Institute for Occupational Safety and Health received such a request from an authorized representative of employees from Local #13, International Printing & Graphic Communication Union and Newpaper Printing & Graphic Communication, regarding workers exposure to paper dust, oil mist and inorganic lead in the press and reelroom of the Detroit Free Press, Detroit, Michigan.

IV. HEALTH HAZARD EVALUATION

A. Plant Process

The Detroit Free Press is engaged in the printing of daily newspapers. The Detroit Press operates several presses which are arranged as "press lines" containing up to four presses of various sizes and configurations. The operating speed of each press is measured in papers per hour and the size of the paper is determined by the number of printing units used in each press.

The large newsprint rolls are loaded onto the press in the reelroom which is located directly below the pressroom. The paper or "web" is fed into the press via a system of guide rollers which thread the "web" through a series of printing units. The paper is printed using a standard letter press technique.

Many different ink colors are used in the printing units for special color advertising. These colors are applied separately by running the "web" through a special series of printing units called a "colordeck." Black printing ink is piped directly from bulk storage tanks to permanent installed ink fountain which are located in each printing unit. Colored inks are supplied to portable fountain by hand carried buckets. After printing, the "web" feeds into the folder machine for final assembly into newspapers.

B. Evaluation Progress and Design

An initial survey was conducted on January 17, 1979. This survey included obtaining background information and conducting a walk-through survey in the areas where the alleged hazards were present. No aerometric sampling was performed during the initial survey.

An Interim Report was distributed on February 8, 1979, reporting the findings to date and the future action to be taken.

A follow-up medical and environmental survey was conducted on March 30-31, 1979, in order to more fully evaluate employee exposure to substances mentioned in the earlier portion of this report.

C. Evaluation Methods

1. Environmental

Personal air samples were used to evaluate employee exposures. The personal samples were obtained by attaching a battery powered vacuum pump to the worker's belt with the sampling media (e.g., filter in a closed face cassette) in a holder attached to the shirt lapel of a worker to obtain a representative sample of air in the breathing zone of the worker. Samples were obtained for a sufficient period of time so that for all practical purposes they may be considered as eight-hour time weighted averages.

a. Total Particulate

Personal breathing zone samples were collected by using MSA*, Model G battery-operated vacuum pumps with tared 0.8u pore diameter copolymer polyvinyl chloride acrylonitrile filters at flow rates of 1.5 liters per minute. The sample weights were taken from a Perkin-Elmer Blance AD-2 to an accuracy of 0.01 mg.

*Mention of commercial names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

The weight of the sample is determined by subtracting the tare pre-sample weight from the total post sample weight.

b. Inorganic Lead

The sampling method for inorganic lead consisted of using MSA Model G battery-operated vacuum pumps at a flow rate of 1.5 liters per minute (LPM); 37-millimeter (MM) three-piece cassette filter holders; and 37 mm 0.8u mixed-cellulose-ester membrane filters supported by cellulose back-up pads.

The filter samples were wet ashed in distilled nitric acid and brought to a volume of 25.0 milliliters with deionized water. An aliquot of the sample was analyzed by an atomic absorption spectrophotometer.

c. Oil Mist

Oil mist samples were collected on 37 millimeter diameter mixed cellulose ester membrane filters using battery powered gravimetric pumps operating at a flow rate of 1.5 lpm. Samples were analyzed by infrared spectro-photometry.

2. Medical

A total of 43 press and reelroom employees participated in this study. Each person was queried via a standard questionnaire. The questionnaire included an occupational history, a current employment history, a medical history, and a smoking history. Symptoms that the individual thought may be job related were also sought. Many workers voiced displeasure with the Detroit Free Press's hearing conservation program. The audiometric testing done to date was felt to be inadequate.

In addition to the questionnaire, 18 employees were sampled for blood lead determinations.

D. Evaluation Criteria

1. Environmental

To assess the potential toxicity of air contaminants, in the workplace of employment, three primary sources of criteria are generally consulted: (1) NIOSH Criteria for Recommended Standards for Occupational Exposure to Substances (Criteria Documents); (2) Recommended and proposed Threshold Limit Values (TLV's) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH) 1978; and (3) Occupational Health Standards as promulgated by the U.S. Department of Labor (29 CFR part 1910.1000).

These Criteria are tabulated as follows:

Substance	NIOSH	ACGIH	OSHA
Lead	0.10 *mg/M^3	0.15 mg/M^3	
OSHA Standard Effective February 1, 1979			0.05 mg/M^3 **
Total Particulate	-	10.0 mg/M^3	15.0 mg/M^3
Oil Mist	-	5.0 mg/M^3	5.0 mg/M^3

* Milligrams of substance per cubic meter of air (mg/M^3)

** The 8-hour TWA PEL for inorganic lead was reduced from 0.20 mg/M^3 to 0.05 mg/M^3 (29 CFR 1910.1025). Pending current litigation of the 0.05 mg/M^3 lead standard. Employer must achieve the 0.20 mg/M^3 level through engineering and administrative controls, and must protect workers at the 0.05 mg/M^3 PEL through any combination of controls.

TLV's or occupational health standards for substance are usually established at levels designed to protect workers occupationally exposed for an eight-hours per day, 40-hours per week basis over a working lifetime. Because of a wide variation in individual susceptibility, some workers may experience ill effects at or below the designated levels. Thus, an evaluation of the workplace can not be based entirely upon comparisons made against such TLV's or standards, as various TLV's and standard do not represent absolute protection of all workers. Setting of legal standards and enforcement is a responsibility of the U.S. Department of Labor, Occupational Safety and Health Administration (NIOSH).

2. Toxic Effects

a. Inorganic Lead

Although capable of causing acute toxicity when absorbed in large amounts, lead is usually associated with chronic toxicity due to much smaller exposures repeated over a period of time. Lead and its inorganic compounds can be absorbed by inhalation of vapors, fumes, or dust. Oral intake can also lead to poisoning but absorption is not as complete. The three systems most commonly affected by lead are: the nervous system, the bone marrow (red blood cell producer), and the kidneys. Classic symptoms of lead toxicity are abdominal pain, constipation, anemia lead lines on the gums, and wrist drop. The muscles that raise the ankles may also be weakened.

Studies of laboratory animals, and human exposure data clearly show lead to be both mutagenic and teratogenic (substance capable of causing abnormalities in the fetus).

This mutagenic effect has no predilection for either *gamete. Both men and women can be adversely affected in the exposed lead worker population. Lead can cross the placental barrier and affect the fetus, thus it is an established tetragen.

Blood lead levels up to 40 ug/100 ml are found in persons without specific exposures to lead, although most unexposed persons will have lower levels than this. When fully implemented the OSHA regulations will require removal from exposure if, a workers average blood lead is over 50 ug/100 g or any blood lead is over 60 ug/100 g.

b. Total Particulate (Paper Dust)

This is a term that is applied to the total dust in the air. It is very non-specific, however, at levels that exceed 10 mg/M^3, work conditions are very dusty and uncomfortable and can lead to coughing, sneezing, and respiratory irritation.

c. Oil Mist

For the most part oil mists present a very low order of toxicity. Inhalation of mineral oil mist in high concentrations may cause pulmonary effects although this has rarely been reported. Certain additives or thermal decomposition products may cause mild eye or upper respiratory irritation but these effects have not been fully evaluated experimentally.

d. Noise

The terms noise and sound are often used interchangeably, but generally, sound is descriptive of useful communication or pleasant sounds, such as music, while noise is used to describe discord or unwanted sound. Chronic exposure to excessive noise causes a sensorineural hearing loss that is almot always irreversible. Since the ear does not have an overload switch, it has no option but to receive all the sound that strikes the eardrum. In industry, excessive noise constitutes a major health hazard. Such exposure can cause both auditory and extra-auditory effects. Extra-auditory effects of noise include: high blood pressure, nervousness, joint pains, nausea, and headache. Hazardous noise levels can mask speech, be a source of annoyance, and degrade a worker's job performance.

The pure tone audiometer is the fundamental tool used in industry to evaluate a person's hearing sensitivity. It produces tones which vary in frequency usually from 250 Hz to 8,000 Hz at octave or halfoctave intervals. The audiogram serves to record the results of the hearing tests. In conductive hearing losses, the low frequencies show most of the threshold evaluation, whereas the high frequencies are most often involved with the sensorineural losses. When a marked hearing loss is encountered, bone conduction audiometry and more sophisticated hearing tests are often helpful in diagnosing the site and cause of the hearing loss.

* Gamete (reproductive element, one of the two cells, male and female, that join to produce the human fetus).

E. Evaluation Results and Discussion

1. Environmental

Results from the personal breathing zone and area samples are shown in Tables I-III. All samples were within the most recent evaluation criteria for total particulate, lead, and oil mist. The sampling was conducted during normal operating conditions that existed on Saturday and Sunday when the maximum copies are printed.

2. Medical

Blood lead levels are important in monitoring lead exposure and in helping to made the diagnosis of lead intoxication. Values of blood lead up to 40 ug/100 ml. whole blood are considered "normal," and values over 100 ug/100 ml. are considered dangerous. Until recently, lead levels up to 80 ug/100 ml. were considered acceptable by most authorities. This is no longer true.

Eighteen employees of the Detroit Free Press were sampled for blood lead determination. Results of analysis of these samples found six samples within the 30-40 ug/100 ml range. Table 4 details this information.

A total of 43 pressroom employees were interviewed during the course of this health hazard evaluation. Twenty-eight workers (65%) complained of perceived hearing loss. Five workers (12%) complained of dermatitis. Six workers reported high blood pressure.

The most striking feature of the Detroit Free Press pressroom was noise. With the presses fully operational, the noise generated prohibited normal verbal communication on the pressroom floor. In the course of conducting medical interviews (off the pressroom floor) 11 individuals (25% of those interviewed) could not readily hear questions when asked in a normal conversational tone. An oft heard comment was that at home, the workers received complaints from family members regarding the high volumes at which they set their televisions/radios.

A review of the OSHA inspection records of the Detroit Free Press showed noise measurements recorded throughout the pressroom were consistently found to range from 100 DBA to 105 DBA. No engineering attempts at either baffling or absorbing this noise were in evidence at the time of this NIOSH evaluation. Protective hearing devices were in use on the pressroom floor.

3. Conclusions

On the basis of environmental and medical sampling in the workplace on March 30-31, 1979, it has been determined that a health hazard did not exist at the time of the survey. All environmental results were below the most recent recommended exposure limits. All 18 blood samples for lead were in the normal range (40 ug/100 g). Evidence of a potential noise hazard was found and audiometric testing and controls are recommended.

V. RECOMMENDATIONS

1. A lead monitoring program should be initiated by the Detroit Free Press as required by the new OSHA standards. (29 CFR part 1910.1025)

2. Noise in the pressroom should be reduced. Baffling devices should be employed wherever feasible on the presses. Sound absorbing material should be installed so as to effectively insulate pressmen from the noise of their presses.

3. Audiometric testing of all pressman employees should be done. The management and union representatives should be in concert regarding this testing. This will prevent a repeat of the displeasure voiced by the workers concerning prior audiometric test procedures and results.

4. Pre-employment physical exams (including audiometric testing) and thorough history should be given all new employees. This data will institute a viable baseline for continued medical monitoring. Termination physical exams should be given all workers to insure completeness of all medical records. Medical records should be reviewed and initialed prior to their insertion into a worker's medical file.

5. Management is encouraged to continue developing detailed written Health and Safety Programs and instruct all employees of the hazards associated with the chemicals used in the facility and the proper usuage of personal protective equipment.

6. Good personal hygiene and work practice should be observed by all employees. Washing of hands before smoking, eating and drinking will help reduce possible contamination.

7. Better housekeeping is needed throughout the press and reelrooms.

8. All local exhaust ventilation systems should be serviced regularly to insure that they are operating at maximum efficiency.

VI. REFERENCES

1. NIOSH Criteria for a Recommended Standard...Occupational Exposure to Inorganic Lead, Revised Criteria, DHEW (NIOSH) Publication No. 78-158, Cincinnati, Ohio, 1978.

2. NIOSH Criteria for a Recommended Standard...Occupational Exposure to Noise, DHEW (NIOSH) Publication No. HSM 73-11001, Cincinnati, Ohio, 1973.

3. Industrial Noise Control Manual, DHEW (NIOSH) Publication No. 79-117, Cincinnati, Ohio, 1979.

4. Van Atta, F.: "Federal Regulation of Occupational Noise Exposure." Sound and Vibration, 27101 E. Oviatte, Bay Village, Ohio 44140. 6:28-31 (May, 1972).

5. U.S. Department of Health, Education, and Welfare, PHS, NIOSH: Occupational Diseases; A Guide To Their Recognition, U.S. Government Printing Office, June, 1977.

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Table

Results of Pressman's Breathing Zone Samples for Total Particulate
Detroit Free Press, Detroit, Michigan

March 30 & 31, 1979

Pressman Number	Date	Sampling Period	Sample Volume (liters)	Total Particulate mg/M^3
#13	3/30/79	1948-0355	666	0.5
#16	3/30/79	1949-0353	726	0.6
#13	3/30/79	1952-0355	431	1.5
#13	3/30/79	1953-0354	637	0.6
#14	3/30/79	1956-0358	723	0.8
#16	3/30/79	1959-0354	622	0.6
#14	3/30/79	2009-0400	618	0.5
#9	3/30/79	2010-0159	361	0.3
#19	3/30/79	2011-0358	450	0.8
#16	3/31/79	1837-0405	880	4.7
#16	3/31/79	1839-0402	844	1.2
#14	3/31/79	1846-0400	597	1.9
#8	3/31/79	1840-0356	834	1.0
#12	3/31/79	1849-0401	828	0.7
#10	3/31/79	1857-0448	886	0.4
#8	3/31/79	1902-0408	726	1.2
#16	3.31.79	2903-0424	768	1.3
Environmental Criteria				10.0

*mg/M^3 - Milligrams of substance per cubic meter of air

Total Particulate - Limit of Detection 0.01 mg/M^3

Table II

Results of Breathing Zone and Area Samples for Lead
Detroit Free Press, Detroit, Michigan

March 30 & 31, 1979

Job and/or Location	Date	Sampling Period	Sample Volume (liters)	Lead $*mg/M^3$
Pressman #9	3/30/79	1947-0410	754	D**
Pressman #9	3/30/79	1949-0346	631	LD
Pressman #16	3/30/79	2001-0352	706	LD
Pressman #16	3/30/79	2008-0358	705	LD
Pressman #9	3/30/79	2010-0409	718	LD
Sterotyper	3/30/79	2020-0042	226	0.04
Sterotyper	3/30/79	2023-0046	213	LD
Sterotyper	3/30/79	2032-0207	388	LD
Sterotyper	3/31/79	1650-0040	465	LD
Sterotyper	3/31/79	1702-0040	397	0.05
Pressman #10	3/31/79	1834-0356	750	LD
Pressman #10	3/31/79	1842-0356	766	LD
Pressman #10	3/31/79	1844-0410	694	LD
Pressman #12	3/31/79	1848-0402	831	LD
Pressman #10	3/31/79	1900-0410	825	LD
Pressman #10	3/31/79	1954-0352	717	LD
#3 Shaver (Sterotyper)	3/31/79	1953-0126	499	LD
Above lunch table (sterotyper)	3/31/79	1945-0126	511	LD
Reel Room	3/31/79	1955-0146	526	LD
Environmental Criteria				0.05

$*mg/m^3$ - Milligrams of substance per cubic meter of air
**LD - Less than detectable limits

Total Lead - Limit of Detection 5 ug/sample

Table

Results of Pressman's Breathing Zone Samples for Oil Mist
Detroit Free Press, Detroit, Michigan

March 30 & 31, 1979

Pressman Number	Date	Sampling Period	Sample Volume (liters)	Oil Mist *mg/M^3
#16	3/30/79	1945-0356	736	0.9
#13	3/30/79	1951-0319	672	0.5
#13	3/30/79	1951-0357	729	0.5
#14	3/30/79	2006-0405	631	0.3
#13	3/30/79	2007-0356	703	0.1
#9	3/30/79	2012-0343	435	0.3
#14	3/30/79	2014-0400	699	0.4
#14	3/30/79	2015-0400	604	0.5
#16	3/30/79	2017-0407	705	0.4
#14	3/30/79	2020-0405	628	0.7
#16	3/31/79	1830-0403	859	0.7
#16	3/31/79	1832-0358	849	0.9
#16	3/31/79	1838-0420	873	0.9
#13	3/31/79	1850-0410	840	0.9
#12	3/31/79	1855-0359	730	0.5
#14	3/31/79	1856-0404	822	0.9
#13	3/31/79	1856-0345	745	0.4
#8	3/31/79	1901-0300	667	0.8
#12	3/31/79	1904-0402	742	0.6
#10	3/31/79	1904-0355	796	1.7
#8	3/31/79	1907-0401	801	1.0
Environmental Criteria				5.0

*mg/M - Milligrams of substance per cubic meter of air

Oil Mist - Limit of Detection 0.05 mg/sample

Tab 1

Employee's Blood Lead Valves
Detroit Free Press

March, 1979

Sample Number	*ug Pb/100 ml. Whole Blood	Sample Number	ug Pb/100 ml. Whole Blood
001	22	010	36*
002	13	011	30*
003	20	012	19
004	10	013	20
005	30*	014	8
006	30*	015	17
007	39*	016	8
008	36*	017	8
009	26	018	10

All samples have blood lead valves below 40 ug Pb/100 ml. any value above 40 ug Pb/100 ml. is considered above normal.

*1.05 ug/100 ml≈1 ug/100 g