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. 79-25-607

A.H. VELA CO.
406 West 31st Street
NEW YORK CITY, NEW YORK 10021
JULY 1979

I. TOXICITY DETERMINATION

A Health Hazard Evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) on December 28, 1978 and January 10, 1979 at the printing department of A.H. Vela Co. West 31st Street, New York City, New York 10001, to determine employee exposure to solvents. Methodology used in the evaluation included 1) inspection of the workplace, 2) environmental sampling, 3) laboratory determination, 4) literature review, 5) personal interview, 6) review of personnel questionnaire, 7) review of personal medical records of the requestor.

Results of the Health Hazard Evaluation indicate that workers are not exposed to excessive concentrations of solvent vapors.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this 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, 22161. Information regarding its availability from NTIS can be obtained from NIOSH's Publication Office at the Cincinnati address. Copies of this report have been sent to:

a) A.H. Vela Company, New York, New York
b) The requestor of the Health Hazard Evaluation
c) U.S. Department of Labor, OSHA, Region II
d) NIOSH, Region II

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 an employer or authorized

represenative of employees, to determine whether any substance in the place of employment might have potentially toxic effects as it is used or may be found.

NIOSH received such a request from an employee of A.H. Vela company who had been diagnosed by his physician as having peripheral neuropathy. The request asked NIOSH to determine if the employee is exposed to chemicals which could cause or contribute to his condition.

IV. EVALUATION

A. PLANT PROCESS

This facility prints high quality color calendars, reports, announcements, etc. The press room is 66 feet wide, 100 feet long and 15 feet high. Most of the room is devoted to storage of paper. The press area, on the south wall of the room contains five presses - a 1-color Miehle, two 2-color Miehles, a 2-color Heidelberg Kord and a 4-color Champion. Each press has the capability of printing 4,000 to 5,000 copies per hour. The room is humidified - to aid in static control and paper flow. The press area has no mechanical ventilation and, because of winter weather conditions, all windows were closed at the time of the Health Hazard Evaluation.

B. EVALUATION DESIGN AND MEDICAL REVIEW

The purpose of the Health Hazard Evaluation was to determine if the requestor's exposure to solvent vapors at his place of his employment might cause or contribute to his physical condition.

The requestor, a 55 year old male, has been a pressman in the establishment for 28 years. He has been experiencing pain in his ankles and feet with parethesias intermittently for approximately 1½ years. Physical examination by his physician was reported as essentially negative. Electromyographic studies of the muscles of the lower limb (right side), anterior tibialis, peroneus longus, extensor digitorum brevis and gastrocnemius showed slightly decreased interference patterns for the first four muscles and a normal pattern for the gastroncnemius muscle.

Motor or Sensory conduction velocities of the peroneal and posterior tibialis nerves were found to be normal. The sensory conduction velocity in the sural nerve was normal but the amplitude of the evoked potential was 15-20% of normal. Sensory testing of the left median nerve showed borderline conduction velocity from digit to wrist and normal conduction velocity from wrist to elbow. Though not specific for neuropathic effect of toxic etiology, the findings are consistent with it. (1)

In addition to the requestor, there are seven other employees involved in the printing operation in which the solvents are used. The duration of exposure of these seven employees range from 6 to 25 years, with an average of 14.1 years. A questionnaire to elicit

information on neurological symptoms was completed by each of the seven employees. Review of the completed questionnaires did not disclose any significant medical findings pertinent to neurological symptoms associated with this exposure. Chemical agents mentioned in regard to the neuropathic effects in question are methyl ethyl ketone, methyl butyl ketone, and n-hexane. While any number of solvents may be used during a period of time, the only solvents in general, day-to-day use are "Prisco Auto Wash" and butyl acetate. The butyl acetate is used during daily clean-up operations and spot cleaning. Printers Service, Inc., the manufacturer of "Prisco Auto Wash" was contacted and supplied the information that this product contained no methyl ethyl ketone, or methyl butyl ketone, but did contain (n-hexane). Based on the presence of one known neuro toxic agent (n-hexane) and the concern of employees because of the odor and the more intimate, if less prolonged, use of the cleaning solvent butyl acetate, the workers' exposure to these two chemicals was determined.

C. SURVEY METHODS AND ANALYSIS

Samples were collected and analyzed in accordance with NIOSH method S90, which calls for absorption on activated charcoal, desorption with carbon disulfide and analysis by a standardized gas chromatographic method. Samples of air-borne contaminants were collected in the breathing zones of the five press operations, on January 10, 1979, during normal printing operations in the morning (approximately three hours) and in the afternoon (approximately two hours.) Samples were collected in the breathing zones of the men performing clean-up operations (either the press operator or his helper) for approximately 10-15 minutes at the end of the shift while clean-up operations were being performed. All operations could be considered normal and representative of usual operating conditions except for the operation of #4 press in the morning, when some difficulty was experienced in the printing operation. See table I for an outline of sampling locations and results.

D. SURVEY RESULTS

Results of analysis of the samples indicate that exposure levels to both n-hexane and butyl acetate were far less than permissible exposure levels established by the Occupational Safety and Health Administration (OSHA) and the levels recommended for occupational exposure by the National Institute for Occupational Safety and Health (NIOSH) as listed in Table II.

V. CONCLUSIONS

In view of the low level exposure to n-hexane in this work operation and no significant exposure to any other neurotoxin, and the lack of any significant related findings in the other exposed workers, a relationship between the present exposure and the neurological manifestations in the requestor cannot be established. Although the findings of the electromyographic and conduction velocity studies can be compatible with toxic etiology, the levels of n-hexane found in the present environmental study are considerably below the NIOSH proposed TWA of 350 mg/m^3 (100 ppm). "This standard has been proposed by NIOSH on the basis of, "Professional Judgment" that such a limit offers a sufficient margin of safety to protect against the development of chronic nerve disorders in workers exposed to n-hexane". (3)

VI. RECOMMENDATIONS

No recommendations are considered necessary.

VII. REFERENCES

1. Xintaras, Charles, DSc, NIOSH; Personal Communications.

2. U.S. Dept. of Labor, Occupational Safety and Health Standards, 29CFR, Part 1910 Subpart Z, 1910.1000 (a) (2), Table Z-1.

3. NIOSH Criteria for a Recommended Standard....Occupational Exposure to Alkanes. U.S. Dept of HEW,PHS,CDC, March, 1977.

4. NIOSH/OSHA Draft Technical Standard for Butyl Acetate (1-23-75).

VIII. AUTHORSHIP - ACKNOWLEDGEMENTS

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Table I

CONCENTRATION OF SOLVENT VAPORS
PRESSMEN'S BREATHING ZONES

Health Hazard Evaluation Determination
Report No. 79-25

A. H. Vela Co.
406 West 31st Street
New York, NY 10021

January 10, 1979

Sample Location & Time	Sample Volume (liters)	Hexane (mg/M^3)	Butyl Acetate (mg/M^3)
Normal Operation			
Press #5 (9:45 to 12:30)	29.7	6.1	2.0
" 3	27.9	3.6	3.9
" 4	31.5	4.7	2.2
" 1	30.9	2.8	3.2
" 2	31.0	2.8	3.2
Normal Operation (1:15 to 3:00)			
" 5	26.9	1.9	2.2
" 3	23.7	1.7	9.7
" 4	27.5	1.5	2.9
" 1	23.8	1.3	6.3
" 2	24.8	2.4	6.8
Cleaning Presses (3:45 to 4:30)			
" 5	5.1	2.0	2.0
" 4	4.6	2.1	6.6
" 1	4.0	20.	28.
" 1	3.8	69.	8.0
" 2	5.6	1.8	120.

Table II

Environmental Criteria/Health Effects

Health Hazard Evaluation Determination
Report No. 79-25

A. H. Vela Co.

406 West 31st Street
New York, NY 10021

Compound	OSHA Standard (2) mg/M^3	NIOSH Criteria mg/M^3	Possible Physiologic Responses
n-hexane	1,800	350	skin and nervous system effects [3]
butyl acetate	710	710	Headache, drowsiness anesthesia [4]