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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION REPORT
HE 79-147-702

DURALECTRA, INC.
NATICK, MASSACHUSETTS

June 1980

I. SUMMARY

The National Institute for Occupational Safety and Health (NIOSH) conducted an environmental survey at Duralectra, Inc., Natick, Massachusetts on December 18-19, 1979. Environmental measurements were made to determine employee exposures to: methyl ethyl ketone, trichloroethylene, toluene, nitric acid, sulfuric acid and phosphoric acid. Employees were interviewed regarding work histories and general physical condition.

Levels of methyl ethyl ketone ranged from less than detectable to 134 mg/M^3. Trichloroethylene ranged from 1 mg/M^3 to 38 mg/M^3. Toluene ranged less than detectable to 8 mg/M^3. Nitric acid ranged from 0.2 mg/M^3 to 0.15 mg/M^3. Sulfuric acid ranged from 0.04 mg/M^3 to 0.19 mg/M^3. Phosphoric acid ranged from less than detectable to 0.04 mg/M^3 for personal and general area samples. All samples were below the most recent environmental criteria.

Health questionnaires were completed by a NIOSH physician's assistant with 22 shop employees. Thirty percent of the workers, mostly cigarette smokers, detailed symptoms of headache, eyes, nose and throat irritation.

Based on the environmental sampling results, employees interviews, and available toxicological information, NIOSH concludes that a potential health hazard existed at the time of this study on December 18-19, 1979. Recommendations on improved housekeeping and personal hygiene are presented in the report.

Workers were interviewed by the NIOSH physicians assistant using a questionnaire designed to evaluate the occurrence of the health symptoms mentioned in the original request as well as the known health effects of exposure to the various chemical substances these people are exposed to. Basic demographic information was gathered on all study participantes.

V. EVALUATION CRITERIA

A. Environmental

To assess the potential toxicity of air contaminants in a place 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) 1979; and (3) Occupational Health Standards as Promulgated by The U.S. Department of Labor (29 CFR Part 1910.1000), in the following tabulation of criteria, these values are presented.

Exposure Limits Presented in mg/M^3*

Substance	NIOSH	ACGIH TLV	OSHA Standard
Methyl Ethyl Ketone	-	590	590
Trichloroethylene	134	535	535
Toluene	375	375	375
Nitric Acid	5.0	5.0	5.0
Sulfuric Acid	1.0	1.0	1.0
Phosphoric Acid	-	1.0	1.0

TLV's or occupational health standards for substances are usually established at levels designed to protect workers occupationally exposed for 8-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 standards do not represent absolute protection of all workers. Setting legal standards and enforcement is a responsibility of the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA).

B. Health Effects

1. Methyl Ethyl Ketone (MEK)

MEK is a widely used solvent that is an irritant to the eyes, mucus membranes, and skin. At high concentrations it causes narcosis (sudden sleep) in animals. MEK can be detected by its odor at 25 ppm; the odor is similar to acetone but non-irritating. This odor threshold should prevent inadvertant exposure to toxic levels. The TLV was established to prevent injurious effects and minimize complaints about odor and irritation.

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* Milligrams of substance per cubic meter of air.

6. Coal Tar Pitch Based Dyes (CTPBD)

The primary source of exposure to dyes at Duraectra is through skin contact. Coal tar pitch is a confirmed human carcinogen. When the dyes are heated inhalation becomes the key source of exposure. Skin exposed to CTPBD has the appearance of exaggerated sunburn on areas exposed to sun or ultraviolet light - usually the face or hands. Redness and swelling subside after removal from exposure. Intimate contact with (CTPBD with out adequate personal hygiene causes acne and hair follicle inflammation. Skin cancers have been observed in exposed workers. A high incidence of lung cancers has been reported in workers engaged in the roofing trade, where coal tar pitch is used. Signs and symptoms of CTPBD exposure include light-sensitive dermatitis and irritation of the eyes.

VI. EVALUATION RESULTS AND DISCUSSION

Results of environmental samples collected for methyl ethyl ketone, trichloroethylene and toluene are given in Table I. Maximum levels of methyl ethyl ketone were 17% of the criteria, trichloroethylene, 28% and toluene 2%.

Seven personal and one general area samples were collected in the anodize area for nitric acid, sulfuric acid and phosphoric acid are given in Table II. Maximum levels of nitric acid were 3% of the criteria, sulfuric acid 19% and phosphoric acid 4%.

All environmental samples were thus well below both the NIOSH criteria and OSHA health standards.

Of those workers interviewed 16 (73%) were male and 6 (27%) were female. Smokers and non-smokers were equally divided with 11 workers in both groups. The mean years worked was 7.61 years with a range of two months to 15 years. Eight (36%) of the 22 individuals interviewed reported eye, nose, and throat irritation while on the job. Six of these eight people were current smokers. Headaches attributed to the work environment were reported by three individuals (13.6%), all were current smokers. While smoking must be considered as contributing to these health effects, smoking itself can not be held singularly culpable. Skin irritation, numbness of the limbs or digits, nausea, and difficult breathing were each reported by fewer than 3 people.

Based on the environmental sampling results, employees interviews, and available toxicological information, NIOSH concludes that a potential health hazard existed at the time of this study on December 18-19, 1979.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

Evaluation Conducted and Report Prepared by:

Raymond Ruhe
Industrial Hygienist
Industrial Hygiene Section
Hazard Evaluations and Technical Assistance Branch
Cincinnati, Ohio

Michael Donohue
Physician's Assistant-Certified
Medical Section
Hazard Evaluations and Technical Assistance Branch
Cincinnati, Ohio

Originating Office:

Hazard Evaluations and Technical Assistance Branch
Division of Surveillance, Hazard Evaluations and Field Studies
Cincinnati, Ohio

Environmental Evaluation:

Richard Stephenson
Industrial Hygienist
Industrial Hygiene Section
Hazard Evaluations and Technical Assistance Branch
Cincinnati, Ohio

Analytical Laboratory Services:

Measurement Support Branch
Cincinnati, Ohio

Report Typed by:

Jackie Woodruff
Clerk/Typist
Industrial Hygiene Section
Hazard Evaluations and Technical Assistance Branch
Cincinnati, Ohio

TABLE I

Results of Breathing Zone and Area Samples
for Methyl Ethyl Ketone, Trichloroethylene and Toluene
Duralectra, Incorporated
Natick, Massachusetts

December 18-19, 1979

Job and/or Location	Sampling Period	Sample Volume (Liters)	Methyl Ethyl Ketone *mg/M^3	Trichloro-ethylene mg/M^3	Toluene mg/M^3
Masker	0658-1503	100	33	6	8
Inspection & Packing	0659-1501	97	55	5	1
Racker	0701-1500	88	11	2	1
Inspection & Packing	0708-1500	90	31	1	1
Packer	0714-1510	90	4	36	LD**
Masker	0717-1507	93	29	6	6
Masker	0723-1500	68	47	4	6
Racker	0727-1459	80	3	1	LD
Racker	0731-1501	86	23	29	LD
Masker	0732-1507	56	22	7	6
Inspection & Packing	0745-1500	79	40	2	LD
Area (Room 7)	0755-1642	82	LD	4	LD
Area (New Degreaser)	0753-1640	90	3	8	2
Inspection & Packing	0646-1500	95	91	8	LD
Racker	0652-1500	134	5	3	LD
Masker	0658-1500	70	16	7	1
Racker	0700-1500	85	14	4	1
Racker	0701-1500	91	25	3	LD
Asst. Chemist	0703-1500	76	6	2	LD
Masker	0706-1500	97	24	38	1
Racker	0720-1500	83	23	6	LD
Masker	0722-1500	80	22	4	1
Inspection & Packing	0726-1500	76	103	4	LD
Masker	0734-1500	89	42	9	1
Inspection & Packing	0738-1500	81	67	3	LD
Environmental Criteria			590	134	375
Limit of Detection (mg/sample)			0.015	0.015	0.015

* mg/M^3 - Milligrams of substance per cubic meter of air
** LD - Less than Detectable Limits