

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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 74-113-192

DEL MONTE CORPORATION
OAKLAND, CALIFORNIA
MAY 1975

I. TOXICITY DETERMINATION

It has been determined that the exposure of Varnish Room employees to petroleum naphtha, xylene, toluene, methyl ethyl ketone, and styrene vapors was not toxic at the concentrations measured during the NIOSH evaluation conducted on November 7, 1974. This determination is based upon the generally low air concentrations of these solvents measured during the evaluation, upon the absence of workers reporting symptoms at the time of the evaluation, and upon the current scientific information concerning the effects of exposure to these substances.

Evaporation of solvents is increased at higher temperatures and re-evaluation of work area conditions by management may be necessary during the summer. General recommendations are included (see Recommendation Section) to keep employee exposure to these substances at a minimum.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

- a. Del Monte Corporation, Oakland, California.
- b. Authorized Representative of Employees.
- c. U.S. Department of Labor - Region IX.
- d. NIOSH - Region IX

For the purposes of informing the approximately 15 "affected employees" the employer shall promptly "post" the Determination Report in a prominent place(s) near where employees work 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.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposure of workers to solvent vapors at the Del Monte Corporation labeling plant in Oakland, California.

IV. HEALTH HAZARD EVALUATION

A. Introduction

The Del Monte Corporation labeling plant is involved in the printing of labels for all of the corporations' wholesale and retail products. In the "Varnish Rooms," sheets of printed labels have a gloss coating applied to the printed side as they are automatically passed through either of two varnishing machines. The gloss contains a mixture of solvents.

B. Plant Process - Conditions of Use

On November 7, 1974, NIOSH investigator, Melvin T. Okawa, conducted a conference with representatives from management and labor to explain the procedures of a health hazard evaluation. A preliminary walk-through survey of the Varnish Rooms was conducted.

Two similar "Varnish Rooms" are located next to each other and are connected by an open door. A varnish labeling machine is located in each room. An operator and his assistant run a machine at the feed end and about 100 feet down the conveyor, two "stackers" are responsible for stacking and cutting the varnished sheets of labels. The operation runs two full shifts and sometimes will continue for a third one.

The varnish is piped into an 80" trough on a machine while the roller dispenses the solution to each sheet of labels as it passes through the machine. Primary solvent exposure to employees is at the feed end of the varnish room where most of the evaporation takes place. The machines are provided with local exhaust hoods which run the length

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of the trough. Additionally, each room has an exhaust hood located near the floor and against the wall of the feed-in end of the room. Varnish Room #7 (Aquavar solution) is 117' x 24' x 15' and Varnish Room #6 (Glidden solution) is 128' x 24' x 15' in size. Employees may switch machines and solutions can be interchanged. Make-up air is provided only through open doors.

C. Evaluation Criteria

Two varnishes are used with the same thinner. Aquavar is mainly petroleum naphtha with some xylene. Glidden is mainly a polyester resin (styrenated alkyd) but contains some styrene, xylene, toluene, and methyl ethyl ketone. The Chevron thinner is mostly parafins with some xylene and toluene.

The adverse effects from excessive exposure to these substances are well known. Therefore, in order to make a determination for this hazard evaluation, air concentrations of solvents were measured and medical questionnaires were administered to employees in the work area.

The following is a list summarizing the adverse effects of excessive exposure to various solvents being used at the Del Monte plant:

Toluene

The major problem of toluene toxicity concerns its narcotic effects on workers. Such signs and symptoms as muscular weakness, confusion, impaired coordination, sensitivity to light, repeated headache, nausea and skin irritation are common effects of overexposure to toluene.

Methyl Ethyl Ketone (MEK)

MEK in levels above 200 ppm can cause eye and nose irritation as well as headaches, throat irritation and nausea. Additionally, cases of dermatitis among workers handling MEK are not uncommon.

Xylene

The signs and symptoms of excessive xylene exposure are similar to those of toluene. Additionally, skin irritation and the likelihood of dermatitis with xylene contact is much more severe than with toluene exposure.

Styrene

The common symptoms of excessive styrene exposure are eye and nasal irritation.

Petroleum Naphtha and Paraffin

Petroleum naphtha and paraffin hydrocarbons are derived from petroleum. Petroleum naphtha is a mixture of hydrocarbons and the effects vary with the content of the naphtha. Generally, the physiological response to petroleum naphtha can be called narcotic with such symptoms as dizziness and a sensation of giddiness being common.

The Occupational Health Standards promulgated by the U.S. Department of Labor (Federal Register, October 18, 1972, Title 29, Chapter XVII, Subpart G, Tables G-1, G-2) applicable to the individual substances considered in this evaluation are as follows:

<u>Substance</u>	<u>Standard - ppm*</u>
Petroleum Naphtha	500
Xylene	100
Toluene	200
Methyl Ethyl Ketone	200
Styrene	100

* ppm - Parts of vapor or gas per million parts of contaminated air by volume.

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

D. Evaluation Methods

1. Environmental Measurements

Breathing zone samples were collected via personal air sampling equipment. Two types of pumps were used. Sipin Personal Sampler pumps operated at 100 cc per minute and sample volumes ranged from 6.2 - 11.4 liters. MSA Personal Sampler Pumps operated at 1.0 liters per minute and sample volumes were 10-11 liters. The charcoal air sampling tubes were sealed and mailed to NIOSH facilities in Salt Lake City for analysis.

2. Medical Interviews

Non-directed medical questionnaires were administered to employees in the Varnish Room. The questionnaires were reviewed by the NIOSH Medical Services Branch to determine if workers were suffering from adverse affects as a result of exposure to potentially toxic substances in the work atmosphere.

E. Evaluation Results and Discussion

1. Environmental Measurements

A total of 8 breathing zone samples were collected on machine operators in varnish room #7 over 8 hours covering two shifts. Aquavar was the varnish but exposure to solvents contained in the Glidden varnish was possible from the adjacent varnish room. MEK levels were below the limits of detection (less than 0.5 ppm) for the method used, styrene levels ranged from 0.7 to 3.1 ppm, xylene from 5.7 to 24.4 ppm, toluene from 4.3 to 13.7 ppm and petroleum naphtha from 72.5 to 287.0 ppm. The Standard calls for the calculation of an equivalent exposure (E_m) when more than one solvent is involved. If E_m is less than unity (1 or 100.0%), the exposure combination is within acceptable limits. Table I contains individual solvent levels and an E_m value in terms of 100.0%. A total of 9 samples were collected in varnish room #6. MEK and styrene (less than 0.17 ppm) levels were below the limits of detection, xylene levels ranged from below limits of detection (less than 0.13 ppm) to 2.7 ppm, toluene from 0.4 to 8.2 ppm, and petroleum naphtha from 4.9 to 69.2 ppm. The E_m in varnish room #7 ranged from 22.3 to 91.7% with an average below 50%. In varnish room #6 the E_m ranged from 0.1 to 20.6%.

2. Medical Interviews

Non-directed questionnaires were administered to 13 employees over two shifts. Although most employees voiced the fact that they had experienced some eye irritation on occasion, they did not report any irritation during the day of the interview. The employees who were interviewed felt that eye irritation occurs mainly during the warmer summer months. NIOSH medical personnel who analyzed the responses on the interview forms did not feel that any of the other nonspecific symptoms correlated with the low environmental levels of solvents found during the investigation.

In conclusion, the environmental levels for solvents were below levels generally thought to be safe and no significant symptomatology was found during the day of the investigation. However, during summer months or if the solvent content of the varnish is reformulated, the overall conditions in the varnish rooms may change and may require further investigation.

V. RECOMMENDATIONS

Although environmental levels were generally low at the time of the evaluation, some general recommendations are made to keep employee exposure to solvents at a minimum.

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1. The ventilation system should be cleaned and serviced regularly to insure it is functioning at maximum efficiency.
2. The local exhaust ventilation over the varnish trough should be in place at all times.
3. During the summer, the general conditions in the varnish rooms should come under management review to make sure that workers' exposures to the solvents have not increased.

VI. REFERENCES

1. White, W.D., Taylor, D.B., Mauer, P.A. and R.E. Kupel, "A Convenient Optimized Method for the Analysis of Selected Solvent Vapors in the Industrial Atmosphere." Am. Ind. Hyg. Assoc. J., Vol. 31, Mar.-Apr. 1970.
2. Patty, F.A., Editor, Industrial Hygiene and Toxicology, Vol. II, Interscience Publishers, 1963.

VII. AUTHORSHIP

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T A B L E I

SOLVENT CONCENTRATIONS IN PARTS PER MILLION (PPM) IN BREATHING ZONE SAMPLES
COLLECTED IN THE LABEL PRINTING AREA AT DEL MONTE CORPORATION PLANT, OAKLAND, CALIFORNIA
NOVEMBER 7, 1974

Sample No. Aquavar Mixture	Sample Volume (Liters)	Sample Period	Petroleum Naphtha (PPM)	Toluene (PPM)	Xylene (PPM)	Styrene (PPM)	Total Mixture (PPM)	E _m Percent Allowable Concentration*
1	8.0	11:45-12:15PM	129.0	6.8	10.2	1.3	147.3	39.5
2	6.2	12:15-12:50	72.5	4.3	5.7	0.7	83.2	22.3
3	8.6	12:55- 1:40	78.1	4.6	5.9	0.7	89.3	24.5
4	10.9	1:45- 2:30	82.8	4.6	5.9	0.7	94.0	25.7
5	10.0	4:11- 4:21	172.0	7.6	13.3	1.6	194.5	53.1
6	11.0	4:24- 4:34	275.0	12.1	21.9	2.6	311.6	85.6
7	11.0	4:37- 4:48	205.0	9.7	17.7	2.0	234.4	65.5
8	10.0	4:54- 5:04	201.0	9.3	16.3	2.0	228.6	63.1
9	10.0	5:07- 5:17	287.0	13.7	24.4	3.1	328.2	91.7
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Gliddon Mixture								
1	9.5	11:50-12:25PM	20.3	2.9	1.1	0.0	24.3	6.6
2	11.4	12:30- 1:20	40.3	3.9	0.7	0.0	52.9	12.4
3	9.6	1:20- 2:10	22.6	2.8	1.4	0.0	26.8	6.0
4	9.8	2:10- 2:45	30.6	2.3	1.3	0.0	34.2	7.2
5	10.0	3:39- 3:49	52.0	5.3	2.0	0.0	59.3	15.0
6	11.0	4:39- 4:50	41.3	4.2	1.6	0.0	47.1	12.0
7	10.0	4:55- 5:05	69.2	8.2	2.7	0.0	80.1	20.6
8	10.0	5:35- 5:45	10.3	1.2	0.6	0.0	12.1	2.2
9	10.0	5:45- 5:55	4.9	0.4	0.0	0.0	5.3	0.1

* If the calculated allowable concentration of a mixture in the Federal Standard is reached, the percentage would be 100 percent.