HETA 87-238-1814
JULY 1987
KOUNTRY KREATIONS
TOWANDA, PENNSYLVANIA

NIOSH INVESTIGATORS:
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I. SUMMARY

In April, 1987, the National Institute for Occupational Safety and Health (NIOSH) received a request for technical assistance from the Pennsylvania Department of Health to evaluate employee health complaints associated with handling imported grape vine wreaths. Imported from Taiwan, the wreaths are decorated with dried flowers, ribbons, and other materials by employees of Kountry Kreations, Towanda, Pennsylvania, to produce various craft items.

An initial site visit was conducted on April 17, 1987 at Kountry Kreations. Colorimetric detector tubes were used to measure carbon dioxide (CO_2) both within and outside the building. The elevated levels of CO_2 in the building (1,300 parts per million (ppm), over 4 times the outside levels) suggest that inadequate amounts of fresh, outside air were being introduced into the work areas.

Health complaints, described in informal interviews conducted with 6 employees during the initial NIOSH visit to the company, included: headache, sore throat, watering eyes, extreme tiredness, blurry vision, sore neck, nausea, upset stomach, chills, loss of concentration, rapid heartbeat, rash (on upper arms), and leg twitches. Only headache was mentioned by more than 3 workers in these interviews.

Bulk samples of the vine wreaths were analyzed for organic compounds by gas chromatography/mass spectrometry (GC/MS). Both dynamic headspace and surface extraction analyses were performed. The wreaths contained various aliphatic hydrocarbons, alkyl substituted benzenes, naphthalenes, and styrene. No aromatic chloro-pesticides were identified, however.

Detector tubes were used to measure methyl bromide in unopened packages of the vine wreaths collected as bulk samples. Methyl bromide was not detectable in two packages checked on April 20, 1987.

Based on these results, it has been determined that a potential health hazard from inadequate ventilation existed for employees at Kountry Kreations, although no overexposures to specific contaminants were measured. Recommendations to reduce exposures by improving ventilation are included in Section VIII of this report.

KEYWORDS: SIC 3980, methyl bromide, carbon dioxide, ventilation, phthalic anhydride.

II. INTRODUCTION

On April 14, 1987, the National Institute for Occupational Safety and Health (NIOSH) received a technical assistance request from the Pennsylvania Department of Health to investigate employee health problems associated with handling vine wreaths imported from Taiwan. These 6-inch diameter grape vine wreaths are used by Kountry Kreations, Towanda, Pennsylvania, to produce a variety of decorative craft items for the wholesale market.

An initial site visit was conducted on April 17, 1987. Two unopened packages of the imported wreaths were collected as bulk samples and 7 employees were informally interviewed. Additionally, an air sample was collected in the first floor work area, detector tubes were used to measure carbon dioxide (CO_2), and temperature and relative humidity levels were checked throughout the building. Information was also gathered on other craft materials used by the employees and the heating and local exhaust ventilation systems.

III. BACKGROUND

Kountry Kreations, Towanda, Pennsylvania, is a small craft manufacturing firm employing eleven full and part-time workers. Specializing in decorative items for the wholesale market, such as wreaths, baskets, and stenciled and painted wooden figures, the company is located in a two-story (approximately 1,400 square feet per floor) frame building which houses a display room, two main work areas, and several storage rooms. There is also a basement storage area assessible from the outside.

The heating system consists of a natural gas fired space heater suspended from the ceiling in the first floor work area. Manufactured by the Onieda Heater Company, the unit had a normal output of 40,000 BTUs. The heater was operating intermittently on April 17 because of the mild outdoor temperatures. The building is not centrally air-conditioned. Except for natural infiltration (openings around doors and windows and cracks in the building's structure), there was no formal system for introducing fresh, outside air. A small (twelve-inch diameter) exhaust fan had been installed in a first floor window to provide ventilation to the work area.

Various craft activities are performed including stenciling (by brush or aerosol spray cans); brush or roller painting of wood figures, baskets, and wreaths; and arranging dried flowers. The employees use floral spray paints (aerosol spray cans, assortment of lead-free colors), hot glues (either from glue pots or hot glue guns), and acrylic and latex paints (using brushes or rollers). Other materials used at Kountry Kreations include isopropyl alcohol, 1,1,1 trichloroethane, and acetone (used in cleaners, paint removers, paint thinners, etc.).

The flowers, ribbons, and wood figures are attached, by hand, to an assortment of vine wreaths and wicker baskets. Except for a spray paint booth, which was installed in 1987, all craft activities are performed without the benefit of local exhaust ventilation (LEV). Completed crafts are stored on the second floor until shipped.

Aerosol spray painting is currently performed in a spray cabinet located on the second floor of the company. Prior to this arrangement, spray painting would be performed outdoors (weather permitting), or inside on the floor without LEV. Painting is usually limited to small items (baskets, flower arrangements, etc.) using eleven to twelve ounce aerosol spray cans. None of the floral spray paints checked during this investigation used pigments which contained lead. The carrier solvents indicated on the aerosol cans were toluene, xylene, or acetone.

Hot gluing is done either with hand-held hot glue guns or glue pots. For the glue pots, residential-type electric woks and hot oil frying pots are used to melt the glue crystals. The glue, no. 4166 skillet pellet glue crystals supplied by the Rhyne Company, Gastonia, North Carolina, contains ethylene vinyl acetate resin. No ventilation is provided for these gluing operations.

On Friday, March 20, l987, approximately 4,000, 6-inch diameter dried grape vine wreaths were received by Kountry Kreations. Packaged twelve to a plastic sleeve (twelve sleeves to a cardboard box), the wreaths were unloaded from a delivery van and placed in a basement storage room at Kountry Kreations. According to employees interviewed on April 17, this type of wreath had been used before but this shipment exhibited an exceptionally strong, fuel oil-type odor.

The supplier of these wreaths, Certified International Corporation, Brooklyn, New York, provided the following information regarding the shipment received by Kountry Kreations:

1. On January 24, 1987, prior to shipping, the wreaths were treated in Taiwan with methyl bromide. Three pounds of methyl bromide was used in a space of 1,000 cubic feet (approximately 12,000 ppm) at a temperature of 70°F. The wreaths were exposed for 24 hours.

2. The wreaths were dry heated at 135°F for 2 hours to kill the grape vines, any remaining insects, and to help remove residual methyl bromide.

3. A lacquer, consisting of phthalic anhydride, soya bean (soybean) oil, and xylene, was applied as a preservative to the wreaths.

4. The wreaths remained in their metal shipping containers, in a New York City warehouse, until shipment to Kountry Kreations.

Employee health complaints began on March 20 and continued the following week. Symptoms described during informal interviews conducted on April 17 with 6 employees included: headache, sore throat, watering eyes, extreme tiredness, blurry vision, sore neck, nausea, upset stomach, chills, loss of concentration, rapid heartbeat, rash (on upper arms), and leg twitches. Only headache was mentioned by more than 3 employees in these interviews. The driver of the delivery van also experienced headache, nausea, and an upset stomach. For most employees the symptoms gradually subsided after leaving work. Two employees were examined at a local hospital but were not admitted. These same 2 employees indicated they had been told by their private physicians they had experienced an allergic reaction.

The wreaths were removed from Kountry Kreations, by the owner, the following week (week of March 22, 1987). Another shipment of wreaths were received April 3, 1987. This second shipment, according to employees interviewed, lacked the pronounced odor that the first shipment exhibited.

IV. EVALUATION DESIGN

During the initial site visit colorimetric detector tubes were used to measure carbon dioxide (CO_2) levels both within and outside the company. In addition, temperature and relative humidity levels were monitored at various locations in the building.

Two unopened packages of the imported vine wreaths (total of 24 wreaths) were collected on April 17, l987 and returned to NIOSH for analysis. Colorimetric detector tubes for methyl bromide were inserted into the two unopened bags on April 20 to check for any residual of this chemical.

Bulk samples of the wreaths were submitted to the laboratory for analysis of organic compounds by gas chromatography/mass spectrometry (GC/MS). To collect surface materials, two portions of a wreath were cut up and extracted with either carbon disulfide or methylene chloride in an ultrasonic bath.

To identify substances released by the wreaths into the air, a dynamic headspace analysis was performed by placing an activated charcoal tube and an ORBO-42 sorbent tube inside a plastic bag with the wreaths for approximately 150

minutes at a flowrate of 500 cubic centimeters per minute. The charcoal tube was then desorbed with carbon disulfide; the ORBO-42 tube with with isooctane.

Extracts from these three samples were screened by gas chromatography (flame ionization detector). Since the same components were detected in all samples, only the bulk-methylene chloride extract and the ORBO-42 tube were further analyzed by GC/MS to identify specific organic compounds.

V. EVALUATION CRITERIA

Environmental Criteria

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects if their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy).

In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the evaluation criterion. These combined effects are often not considered in the evaluation criteria. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: (1) NIOSH Criteria Documents and recommendations, (2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLV's), and (3) the U.S. Department of Labor (OSHA) occupational health standards. Often, the NIOSH recommendations and ACGIH TLV's are lower than the corresponding OSHA standards. Both NIOSH recommendations and ACGIH TLV's usually are based on more recent information than are the OSHA standards. The OSHA standards also may be required to take into account the feasibility of controlling exposures in various industries where the agents are used; the NIOSH-recommended standards, by contrast, are based primarily on concerns relating to the prevention of occupational disease. In evaluating the exposure levels and the recommendations for reducing these levels found in this report, it should be noted that industry is legally required to meet those levels specified by an OSHA standard.

A time-weighted average (TWA) exposure refers to the average airborne concentration of a substance during a normal 8- to 10-hour workday. Some substances have recommended short-term exposure limits or ceiling values which are intended to supplement the TWA where there are recognized toxic effects from high short-term exposures.

Carbon Dioxide

Carbon dioxide is a normal constituent of exhaled breath, and, if monitored, can be used as a screening technique to evaluate whether adequate quantities of fresh outdoor air are being introduced into a building or work area. The outdoor, ambient concentration of CO_2 is usually 250 to 350 ppm. Typically the CO_2 level is higher inside than outside (even in buildings with few complaints about indoor air quality). However, if indoor CO_2 concentrations are more than 1000 ppm (3 to 4 times the outside level), there is probably a problem of inadequate ventilation and complaints such as headache, fatique and eye and throat irritation are frequently found to be prevalent. Although the CO_2 itself is not responsible for these complaints, a high level of CO_2 does indicate that other contaminants in the building may also be increased and could be responsible for employee health problems.

The OSHA Permissible Exposure Limit (PEL) and the ACGIH TLV for CO_2 is 9,000 ppm for an 8-hour TWA.[1,2] The NIOSH Recommended Exposure Level (REL) is 10,000 ppm for a 10-hour TWA.[3]

Methyl Bromide

Methyl bromide is a clear, colorless gas used as a fumigant in pest control. In the past it has been used as a refrigerant and fire-extinguishing agent; however, this use was discontinued because of a high incidence of injury and deaths.[4] The chemical is a neurotoxin and can cause convulsions; at very high concentrations methyl bromide can cause pulmonary edema and, over prolonged exposures, peripheral neuropathy. Estimates of concentrations which have caused human fatalities range from 8,000 ppm for a few hours to over 60,000 ppm for a brief exposure.[5] Early symptoms include headache, visual disturbances, nausea, vomiting and malaise.[4] In some cases there is eye irritation, vertigo, and intention tremor of the hands.[5] Locally, methyl bromide is an extreme skin irritant and may produce severe burns.

Since methyl bromide gas is colorless and has no taste or odor at low concentrations, the compound is considered to have poor warning properties. Only at levels well above 5 ppm can the sweetish odor of methyl bromide be detected.[4]

The OSHA PEL for methyl bromide is 15 ppm for an 8-hour TWA.[1] The ACGIH TLV for this substance is 5 ppm, a level selected to prevent neurotoxic effects and pulmonary edema.[2] The ACGIH also recommends that appropriate skin protection be utilized so that the threshold limit is not exceeded. NIOSH recommends in Current Intelligence Bulletin No. 43, September 27, 1984, that methyl bromide be considered a potential occupational carcinogen and that exposures be reduced to the lowest feasible level.

Phthalic Anhydride

Phthalic anhydride, a white crystalline solid, is an irritant and sensitizer of the skin and respiratory tract and an irritant to the eyes. Studies have shown air concentrations of 30 milligrams per cubic meter (mg/m^3) to cause conjunctivitis and 25 mg/m^3 to irritate mucous membranes.[5] Phthalic anhydride, while causing a direct but delayed irritation of the skin, is more severely irritating after contact with water (phthalic anhydride and water combine to form the more irritating compound, phthalic acid).[5]

The OSHA PEL for phthalic anhydride is 12 mg/m^3 for an 8-hour exposure.[1] The ACGIH TLV-TWA is 6 mg/m^3, a level selected to prevent irritation.[2] There is no NIOSH REL for this compound.

Temperature and Relative Humidity

The majority of references addressing temperature and humidity levels as they pertain to human health frequently appear in the context of assessing conditions in hot environments. Development of a "comfort" chart by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE) presents a comfort zone considered to be both comfortable and healthful. This zone lies between a temperature of 73°and 77°F (23° and 25°C) and 20 to 60 percent relative humidity.[6] Recommended design conditions are an effective temperature and dry bulb temperature of 76°F (24.5°C), a relative humidity of 40 percent, and an air circulation rate of less that 45 feet per minute. Effective Temperature is an index of relative comfort determined by successive comparisons of individuals to different combinations of temperature, humidity, and air movement. Relative humidity levels below 30 percent are associated with increased discomfort and drying of the mucous membranes.[7]

Local Exhaust Ventilation

Effective control of a contaminant-producing process, such as spray painting or hot gluing, is achieved by first eliminating or minimizing all air motion about the process and then capturing the contaminated air by causing it to flow into the exhaust hood. Flow toward the suction opening must be sufficiently high to maintain the necessary capture velocity and to overcome opposing air currents. Countering this air motion usually necessitates positioning the capture hood as close to the point of contaminant generation as the operation permits. In addition, the hood should be shaped to control the area of contamination and designed to enclose the operation as much as possible. Figure 1 shows three major hood types: enclosures; receiving hoods; and capturing hoods.

Dilution Ventilation

Dilution ventilation, which is the process of diluting contaminated air with uncontaminated air in a general area, room or building for the purpose of health hazard or nuisance control, is especially applicable for controlling emissions from less toxic materials.

The use of dilution ventilation, however, has several limiting factors. First, the quantity of contaminant generated must not be too great, otherwise the air volume necessary for dilution will be impractical. Second, employees must be far enough away from contaminant evolution, or evolution of contaminants must be in sufficiently low concentrations, so that the workers will not have an exposure in excess of the permitted or recommended limit. Third, the toxicity of the contaminants must be low and their evolution reasonably uniform throughout the work area.

VI. RESULTS AND DISCUSSION

Using detector tube, the CO_2 concentration measured in the rear, first floor work area was 1,300 ppm, compared to an outside CO_2 level of 300 ppm. These levels suggest that inadequate amounts of fresh, outside air are being introduced into the company. In such a situation, any contaminants generated from the work activities (for example, spray painting, hot gluing, and the odor from the wreaths and baskets) will dissipate more slowly and higher indoor concentrations of these contaminants could develop.

Results from the colorimetric detector tubes for methyl bromide were negative (below the limit of detection for these indicator tubes) in sampling conducted on April 20, 1987. These samples were drawn from unopened packages of the vine wreaths to obtain the highest possible concentration.

Organic compounds identified from the grape vine wreaths included aliphatic hydrocarbons, alkyl substituted benzenes, naphthalenes, and styrene. Copies of the reconstructed chromatograms are shown as Figures 2 and 3. The predominant material present on the wreaths is a refined petroleum solvent resembling mineral spirits, a finding supporting the "fuel oil"

odor described by Kountry Kreations employees and the delivery van driver during interviews. A trace amount of phthalic anhydride was identified on one of the bulk samples. The GC/MS analyses revealed no chlorinated aromatic compounds (substances which would be found if aromatic chloro-pesticides were present).

The hot glue pots were not in operation during the site visit to Kountry Kreations as part of this investigation. The no. 4166 skillet pellet glue crystals used in these glue pots are composed of ethylene vinyl acetate (less that 1 percent unreacted vinyl acetate), a low toxicity elastomer used to improve the adhesion properties of hot melt and pressure-sensitive adhesives. According to the supplier, if the glue is heated to boiling (570°F), the possible decomposition products, acetic acid and carbon monoxide, may be slightly irritating.

The temperature and relative humidity levels on April 17, l987 were within the comfort range recommended by ASHRAE.

VII. CONCLUSIONS

Health effects from exposure to organic compounds at the presumably low levels which existed at Kountry Kreations in March 1987 are difficult to evaluate. Usually the exposures are numerous and complaint symptoms are common to many compounds. Typical symptoms of exposure to organic compounds are headache, irritation of the eyes and mucous membranes, irritation of the respiratory system, drowsiness, fatigue, and general malaise. Table I lists various pollutants and examples of potential sources.

In general, volatile organic compounds, such as the ones identified from the wreaths, or the solvents from the aerosol spray cans, are lipid soluble and easily absorbed through the lungs.[8] Their ability to readily cross the blood-brain barrier may induce central nervous system depression, a possible causal factor in drowsiness, fatigue, and general malaise. Some of the compounds, such as alcohols, aromatic hydrocarbons, and aldehydes can irritate mucous membranes. As mentioned earlier, a small percentage of the population may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy). In addition, many of these substances have low odor thresholds which can initiate further complaints. Usually concentrations are well below OSHA PEL's and NIOSH and ACGIH recommended levels. The range and severity of symptoms are variable and appear to depend greatly on the sensitivity of an individual at low concentrations.

Based on visual observations of the ventilation and heating systems, and supported by the elevated CO_2 levels measured in the work area on April 17, 1987, the NIOSH investigator concluded that insufficient introduction of fresh, outside air and inadequate containment of contaminant-producing processes were major contributors to the employee health complaints seen at Kountry Kreations. These conditions would be excerbated in the colder months when doors, windows, and other potential sources of outside air would be closed. Because of these situations, organic compounds from the craft materials, such as xylene and toluene from the aerosol spray paints and the aliphatic and aromatic hydrocarbons from the wreaths, could increase in concentration in the work areas. Although it is unlikely that any of these organic compounds would have developed concentrations exceeding OSHA permissible limits or NIOSH or ACGIH recommemded levels (the actual levels which existed at Kountry Kreations in March, 1987 cannot be determined), they were sufficiently high to create objectionable odors, cause mucous membrane irritation and, possibly, more severe health effects in hypersensitive employees.

An adequate fresh outdoor air supply has been shown to be an effective method of correcting and preventing problems and minimizing complaints. Dilution ventilation, which is the process of diluting contaminated air with uncontaminated air in a general area, room or building for the purpose of health hazard or nuisance control, is especially applicable for controlling less toxic emissions. Even if specific contaminants are identified (such as acetone or toluene) dilution ventilation may be a practical way of reducing exposure.

VIII. RECOMMENDATIONS

1. It is recommended that provisions be made for the introduction of adequate amounts of fresh, outside air in the building during periods of occupancy.

2. After reviewing the materials used at Kountry Kreations, it is recommended that dilution ventilation, as described in Section VII, be used to control and reduce air contaminants. When practicable, LEV (such as the spray paint booth) may be utilized to contain exposures.

3. It is recommended that workers be informed (through training sessions, product information, and related methods) of the potential health hazards associated with the use of the craft materials. This training should include methods to control personal exposures and proper work practices.

4. It is recommended that all glue melting pots be operated in the temperature range specified by the adhesive's manufacturer (for no. 4166 skillet pellet glue crystals the range is 400° to 425°F).

5. It is recommended that the following dilution ventilation principles should be applied to the processes used by employees of Kountry Kreations.

    a. Locate the exhaust openings near the sources of contaminants, if possible, in order to obtain the benefit of LEV. Possible sources would include hot glue pots, spray and brush painting, stenciling, and the handling and decorating of baskets and wreaths.

    b. The exhaust outlet and air supply must be located so that all the air used in ventilation passes through the zone of contamination. For example, positioning the make-up air at one end of a work area, and the exhaust outlet at the opposite end, would allow fresh air to sweep through the room.

    c. A make-up air system should be used to replace the exhausted air. This will help assure the ventilation system is operating satisfactorily. During cold weather, the make-up air should be heated.

    d. The general air movements in the room should keep the source between the operator and the exhaust opening.

    e. Re-entrainment of the exhausted air should be avoided by discharging the exhaust high above the roof line or by assuring that no windows, outside air intakes, or other such openings are located near the exhaust discharge.

IX. REFERENCES

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2. American Conference of Governmental Industrial Hygienists. Threshold limit values and biological exposure indices for 1986-87. Cincinnati, Ohio: ACGIH, 1986.

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1. Kountry Kreations
2. Pennsylvania Department of Health
3. OSHA Region III

For the purpose of informing affected employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees for a period of 30 calendar days.

Table I

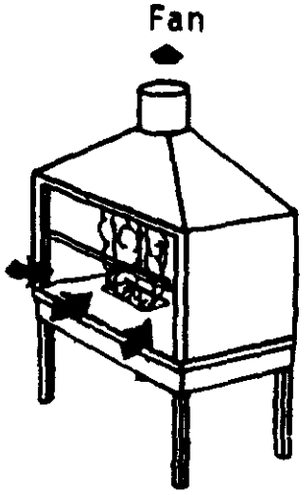
Examples of Organic Compound Types and
Potential Indoor Sources

Kountry Kreations
Towanda, Pennsylvania
HETA 87-238

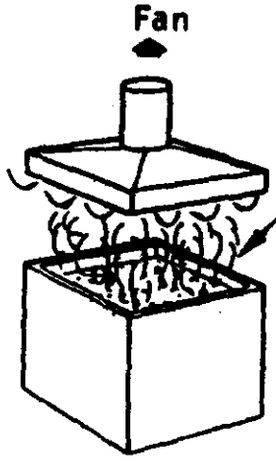
Pollutant Type	Example	Indoor Sources
Aliphatic hydrocarbons	Propane, butane hexane, limonene	Cooking and heating fuels, aerosol propellants, cleaning compounds, refrigerants, lubricants. flavoring agents, perfume base
Halogenated hydrocarbons	Methyl chloroform, methylene chloride, PCBs	Aerosol propellants, fumigants pesticides, refrigerants, and degreasing, dewaxing, and dry cleaning solvents
Aromatic hydrocarbons	Benzene, toluene, xylenes	Paints, varnishes, glues, enamels, lacquers, cleaners
Alcohols	Ethanol, methanol	Window cleaners, paints, thinners, cosmetics, adhesives, human breath
Ketones	Acetone	Lacquers, varnishes, polish removers, adhesives
Aldehydes	Formaldehyde, nonanal	Fungicides, germicides, disinfectants, artificial and permanent-press textiles, paper, particle boards, cosmetics, flavoring agents, etc.

Table courtesy of: Indoor Air and Human Health, 1985, page 391.

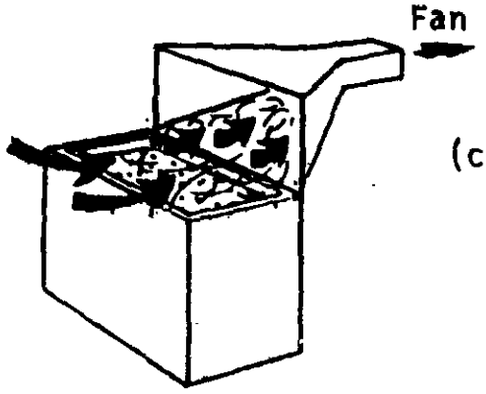
FIGURE 1
TYPES OF VENTILATIONS HOODS
KOUNTRY KREATIONS
TOWANDA, PENNSYLVANIA
HETA 87-238



(a) Enclosures - contain contaminants released inside the hood



(b) Receiving hoods - catch contaminants that rise or are thrown into them

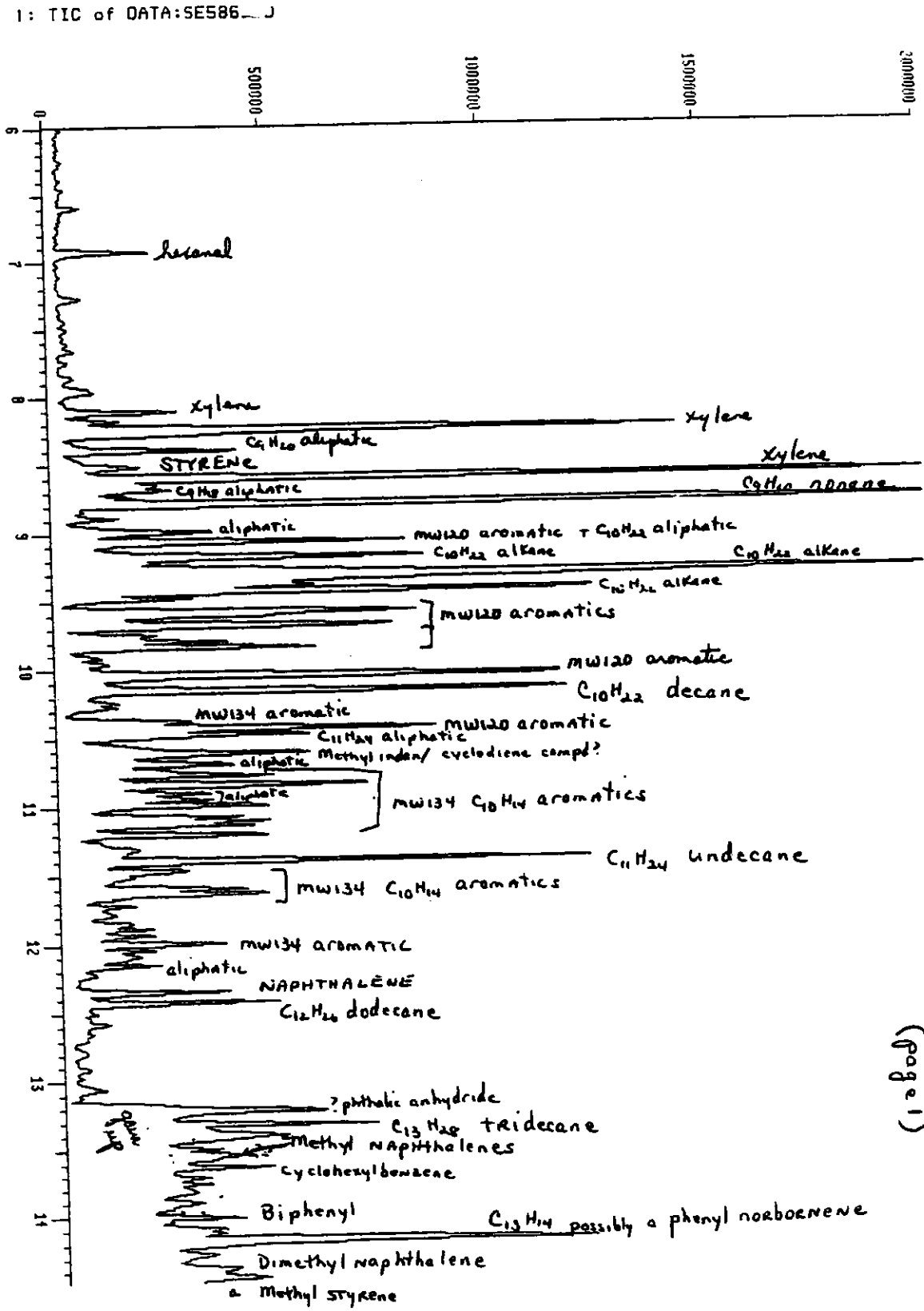


(c) Capturing hoods - reach out to draw in contaminants

The three major hood types: (a) enclosures; (b) receiving hoods; and (c) capturing hoods.

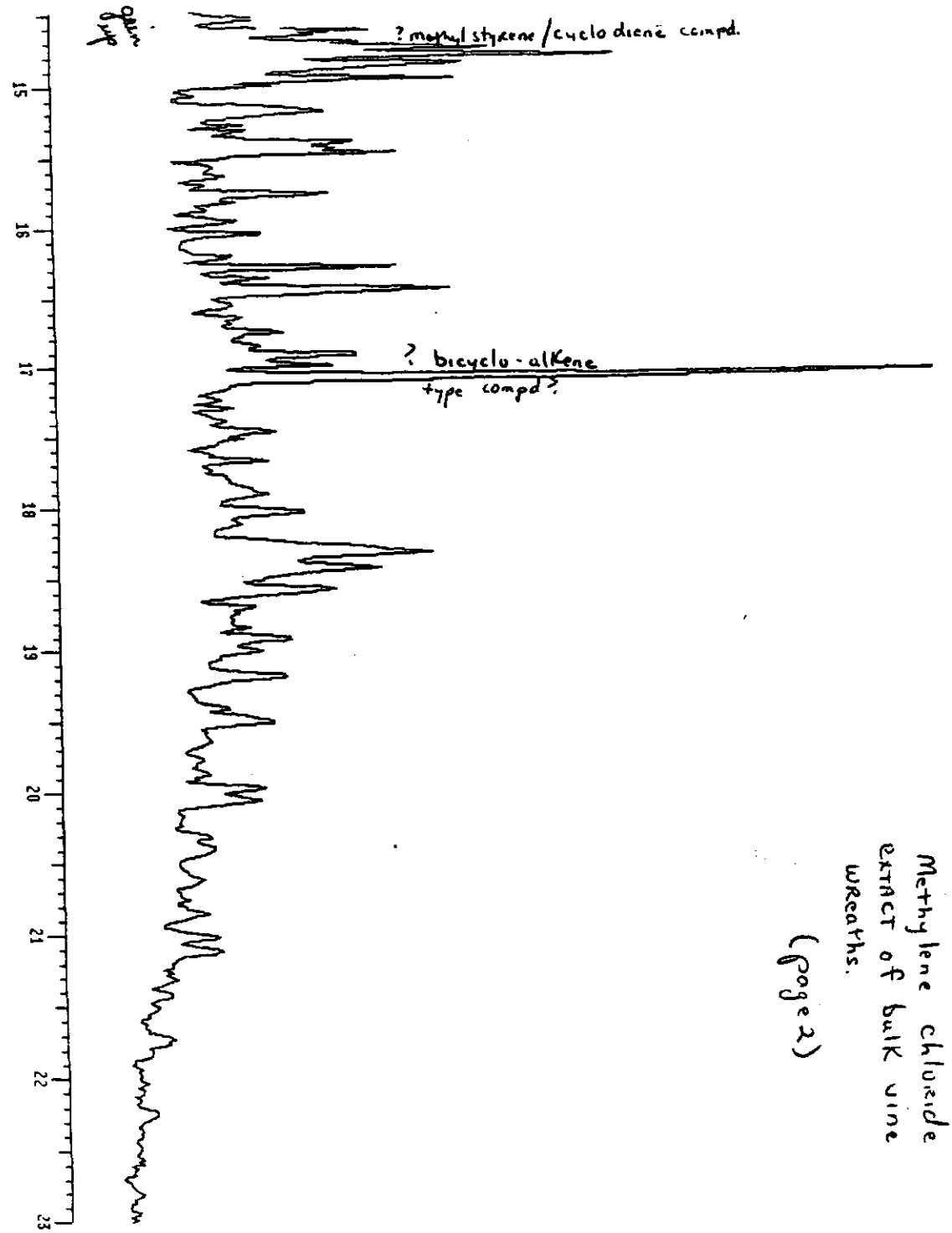
Diagrams courtesy of: Handbook of Ventilation for Contaminant Control, 1976 page 107.

FIGURE II
SPECTRUM DISPLAY-SURFACE EXTRACT SAMPLE
KOUNTRY KREATIONS
TOWANDA, PENNSYLVANIA
HETA 87-238



Seq 5862
Methylene chloride extract
of bulk vine wreaths.
(page 1)

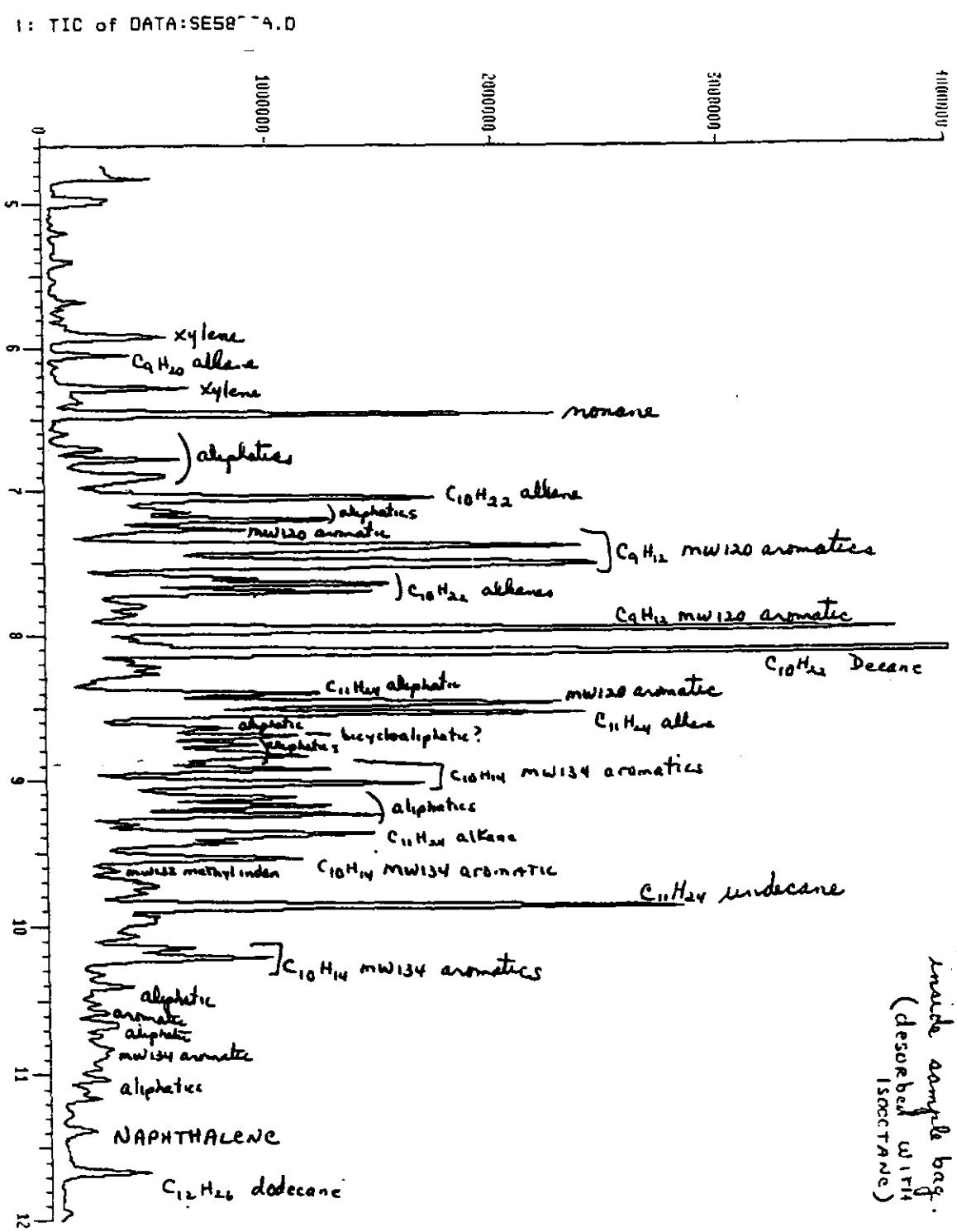
FIGURE 2-CONTINUED
SPECTRUM DISPLAY-SURFACE EXTRACT SAMPLE
KOUNTRY KREATIONS
TOWANDA PENNSYLVANIA
HETA 87-238



Seq 5862
Methylene chloride extract of bulk vine wreaths.
(page 2)

End of plot. Time = 6.00 to 23.00 minutes Chart speed = 2.61 cm/min

FIGURE III
SPECTRUM DISPLAY-DYNAMIC HEADSPACE SAMPLE
KOUNTRY KREATIONS
TOWANDA, PENNSYLVANIA
HETA 87-238



Jeq 5862
ORBO-42 tube collected
inside sample bag.
(desorbed with
isooctane)