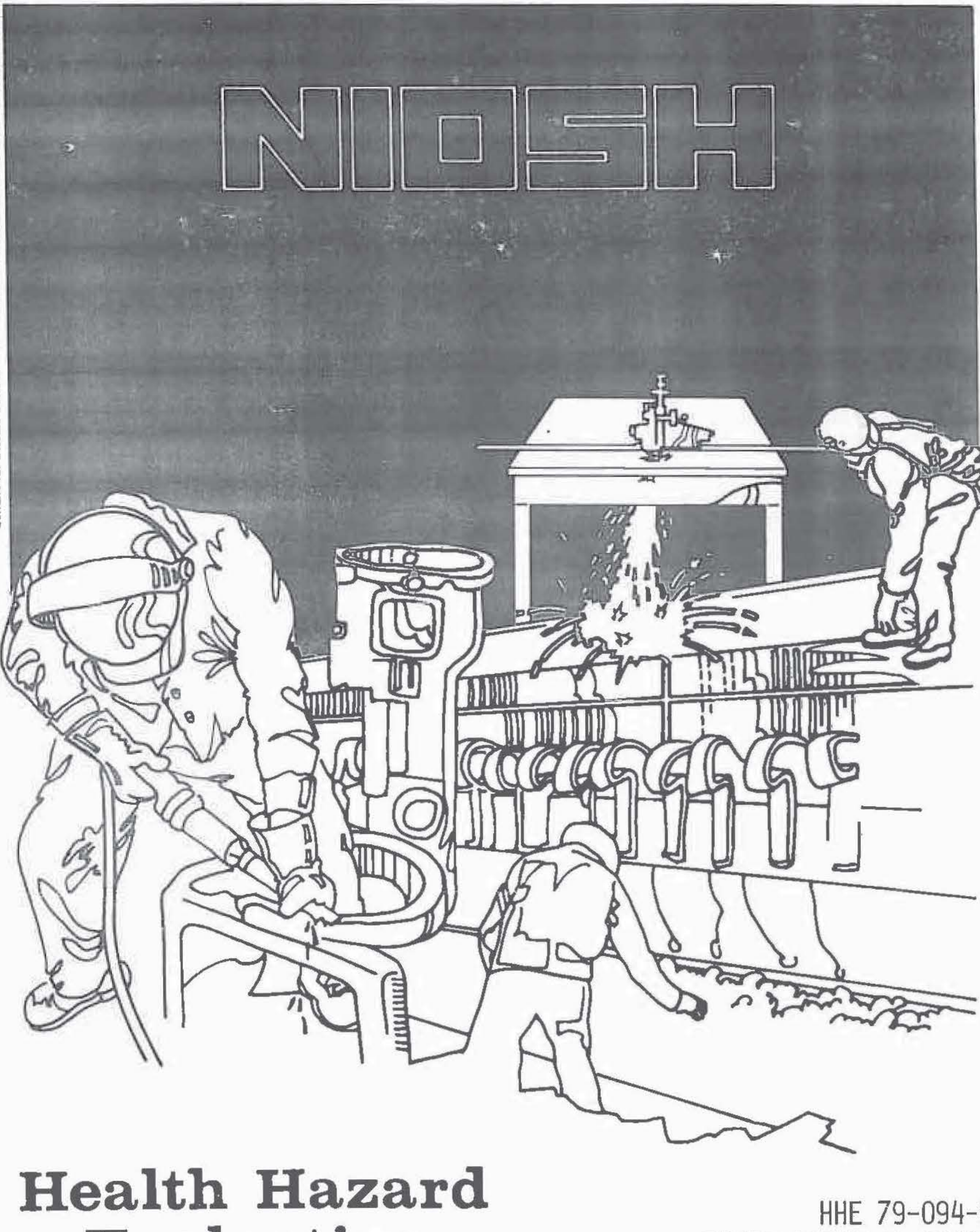
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health



Health Hazard Evaluation Report

HHE 79-094-923
EXXON CHEMICAL COMPANY
POTTSVILLE, PENNSYLVANIA

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from 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 Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

HHE 79-094-923
JULY 1981
EXXON CHEMICAL COMPANY
POTTSVILLE, PENNSYLVANIA

NIOSH INVESTIGATORS:
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I. SUMMARY

In May 1979, the National Institute for Occupational Safety and Health (NIOSH) received a request from Local 8-719 of the Oil, Chemical and Atomic Workers International Union for a health hazard evaluation at the Exxon Chemical Plant, Pottsville, Pennsylvania. The union was concerned about employee exposure to lead chromate, carboxpolypropylene, propylene and polypropylene.

Environmental and bulk samples for ozone, lead chromate, acetic acid, C_4-C_6 hydrocarbons and 2,6 di-t-butyl p-cresol (BHT) were collected in June 1979 and February 1980. Biological samples (urine and blood) were taken in March 1979. All samples were well within the recommended environmental and biomedical criteria used in this report.

Resin bulk samples contained less than 0.01% by weight of lead and chromium. Air samples for acetic acid were less than the detection limit (20 mg/sample); butane, pentane, and n-hexane were not detected; ozone was less than the detection limit (3 mg/sample) and total dust ranged from 0.18 to 0.52 mg/m^3.

Blood lead values were below 40 ug Pb/100 ml (micrograms of lead per 100 milliters of blood) and urine chromium values were less than 350 ng Cr/ml (nanograms of chromium per milliter of urine (ppb)).

Based on environmental, biological and medical studies conducted at this time, NIOSH has determined that no occupational health hazard exists at this work site at the time of our survey. However, several recommendations regarding ventilation, medical surveillance and personal hygiene have been made toward improving the safety and health program.

KEYWORDS: SIC 3079 (Miscellaneous Plastic Products), Lead Chromate, Lead, Chromium, C_4-C_6 Hydrocarbons, 2,6 di-t-butyl p-cresol (BHT), Ozone, Acetic Acid.

II. INTRODUCTION

On May 25, 1979, NIOSH received a request from the Oil, Chemical and Atomic Workers International Union to investigate employee exposure to lead chromate, propylene, polypropylene, and carboxpolypropylene at the Exxon Chemical Plant in Pottsville, Pennsylvania.

On June 12 and 13, 1979, NIOSH Regional Industrial Hygienist, Walter J. Chrostek, initiated the NIOSH health hazard evaluation at Exxon's Pottsville Plant. Mr. Chrostek conducted an opening conference with representatives of labor and management, toured the plant operations, conducted forty non-directed medical questionnaires and collected two bulk samples of the material commonly used at the plant and results of air and noise monitoring conducted by Exxon.

An equitable arrangement was agreed to by the company, union, and NIOSH, and on December 5, 1979, NIOSH Regional Industrial Hygienist, Frank A. Lewis, conducted a follow-up investigation. In March 1980, Physician's Assistant, Michael Donahue, conducted biological sampling for lead and chromium.

Two interim reports dated August 1979 and January 1980 were issued.

III. BACKGROUND

Plant Process/Conditions of Use

The Plant - The plant was constructed in 1959. The principal products are polyethylene and polypropylene film products such as garbage bags, sandwich bags and plastic packaging materials. Lead chromates have been used as coloring agents here for ten years. Titanium compounds are also used as coloring agents.

Work Areas

Bulk Area - Resin pellets are brought by fork lift or air blown into large hoppers in the Bulk Area. The pellets are transferred from these hoppers to production areas. Dust may be a problem when the pellets are being pumped into the hoppers.

Blown Film Area - As described, the products of this area are polyethylene film. In this area there are 13 machines, including the three machines in the Overhead Lines. Ethylene copolymer resins, primarily ethylene vinyl acetate, and color concentrates are air weighed and fed into a mixing machine. The pellets are then fed into a grinder, ground and heated to 300°F. The melted polymer is then extruded through a die six inches in diameter. As it leaves the die, it assumes the shape of a balloon. It is air cooled; gradually collapsed on a series of rollers; passed to wider rollers and cut. The tailings are reprocessed through the grinder and the extruder.

On the third level, the film passes over a series of rubber covered rolls. These "treater bars" deliver a charge of electricity to stabilize the color concentrate. The film then goes to the bagging department.

Dust, ozone, acetic acid and BHT by-products (possibly including cresol) may be released in the vicinity of the dies. Cleaning and/or maintenance are necessary if the color is changed or the "bubble is lost."

There are two operators for three machines. Approximately one hour per shift is spent in enclosed area of machines.

Overhead Lines - Three machines in this area (a mezzanine overlooking the Blown Film Department) are used to make polyethylene film for garbage bags. This film is cut and packaged in the Bag Department. It is here that lead chromate color concentrates were used. The machines are not enclosed as they are in Blown Film; and the winding rolls are overhead. The process and exposures are identical to those in the Blown Film Department otherwise.

Cast Department - The product is polypropylene film. There are four machines, and one operator per machine (per shift). Two contain slot dies. The film is cooled on a chilled roll rather than with refrigerated air. Two (#650 and #651) were recently acquired and involve the use of new technology: the die is circular, the extruded film is water cooled in a pit, the water is blown off, and the film balloon collapsed and sent upstairs for winding. The film must sit for three days to "cure." It is then sent to the slitting department, cut to size and shipped to customers.

The Reprocessing Area is in the Cast Department. Waste film is ground and extruded into plastic pellets which are then reused. Hearing protection is required here.

Bag Department - Kitchen, sandwich, and garbage bags are cut and packaged here. Polyethylene film is sealed, serated, slit and packaged. The film from the overhead lines is cut on the FMC machine to produce garbage bags. Kitchen bags are cut from polyethylene film; the temperature of the sealing bar is 346°F.

Sandwich bags are cut and processed in a separate area. The machines (#196 and #308) are partially enclosed. The temperature of the sealing bar is 750°F, so that the heat and fumes generated are higher than those in the area of kitchen bag production.

Maintenance Department - A bath is used to clean parts in sodium hydroxide (NaOH). The NaOH is burned off at a temperature of 500°F. Local exhaust removes caustic fumes from the maintenance area, but the intake fans for the Blown Film Department are 50 feet from the exhaust vent. There are no scrubbers in the ventilation system for the department.

Workers wear face shields and aprons. There are eye washers and safety showers in the area.

IV. EVALUATION DESIGN AND METHODS

A. Design

In June 1979, and February and March 1980, NIOSH conducted ventilation, environmental and medical studies of the following areas and their exposures. It should be noted that lead chromate use was discontinued at the plant shortly after the second walk-thru survey as a way of preventing any potential health problem with the substance. It was not used during the air sampling survey or since, however, the NIOSH team still wanted to evaluate any residual environmental or medical problems due to its former use.

ENVIRONMENTAL

1. Bag Department: Three operators were tested for C_4-C_8 hydrocarbons, (BHT), 2,6 di-t-butyl cresol, and total dust.
2. Blown Film Department: Two operators were tested for C_4-C_8 hydrocarbons, 2,6 di-t-butyl cresol (BHT), total dust, ozone and acetic acid.
3. Cast Department: One operator was tested for total dust.
4. Reprocessing Department: Two operators were tested for total dust.
5. Bulk Area: One operator was tested for total dust.
6. Bulk samples of the following materials were taken and analyzed for:
    A. Bulk plastic materials: Rexene 214 and LD 304-59 for identification of off-gases.
    B. Bulk residue materials from the grinders for lead and chromium content.

MEDICAL

A total of 80 workers (drawn from all four shifts) comprised the study group for the medical component of this health hazard evaluation. Each of these people completed a standard questionnaire designed to elicit an occupational history, demographic information, smoking history, a work-related illness history, and questions regarding other sources of lead exposure. Of these 80 workers, eight were female and 72 male. Thirty-three individuals were non-smokers, and 47 were current smokers. Machine operators, re-pro operators, and cast operators comprised the "exposed group." Slitters, packers and fork-lift operators comprised the "low-exposed" group. Laboratory tests for determination of blood lead levels and urinary chromium levels were performed on all study participants.

The analytical aspect of the data review compared and contrasted the lead chromate "exposed" workers with workers with minimal lead chromate exposure. The "exposed" group was selected from the body of workers who labored with "green materials." The "low-exposed" group was selected from those workers who had minimal contact with raw materials at Exxon.

B. Evaluation Methods

ENVIRONMENTAL (1)

Acetic Acid - was sampled for using silica gel tubes and personal sampling pumps at a rate of 200 cc/minute. These samples collected on silica gel tubes were desorbed with 0.1% H_2O_2, filtered, and then injected into a Dionex Model 10 ion chromatograph.

A series of working acetate standards covering the range from 0.4 to 40 ppm was prepared on silica gel tubes from a stock solution of sodium acetate. Identification and quantitation were performed by comparison of retention times (6.2 minutes) and peak heights of samples and blanks with those of standards. The average value of blanks has been subtracted from sample results. To check for breakthrough, the absorbent and back-up sections of each tube were analyzed separately. In all cases, the peak heights of the samples measured from chromatograms did not differ significantly from those of blanks.

Instrumental conditions employed were as follows: To separate acetate from formate, fluoride and other conductive species that elute in the void volume, 2.5 nM borate served as eluant and an additional separator column (3 x 250 mm anion column) was placed in series with a second 3 x 500 mm separator column; injection volume - 100 ul; conductivity detector setting - 3uMHO/cm^2 full-scale; and an eluant flow rate of 132 ml/hr.

The limit of detection is estimated to be 20 ug CH_3COOH/silica gel tube. Results are reported in the units ug acetic acid per silica gel tube.

Chromium and Lead - were sampled for using the bulk residue material obtained from areas around the grinders. These samples were analyzed for lead and chromium according to NIOSH P&CAM 173. Perchloric acid was used to aid in the ashing of the samples. The samples were diluted to a final volume of 25 ml and analyzed by atomic absorption spectroscopy.

Hydrocarbons - were sampled for using charcoal tubes and personal sampling pumps at a flow rate of 200 cc/minute.

The charcoal tubes were analyzed by gas chromatography equipped with a flame ionization detector. Various hydrocarbons were identified as presented in Table #1.

Ozone - was sampled for using an alkaline potassium iodide solution in a midget impinger attached to a personal sampling pump at a rate of 1.5 liters/minute.

The samples have been analyzed for ozone using NIOSH method S-8, using spectrophotometry.

Total Dust - the particulate weights of total dust were determined by weighing the samples plus the filters on a Perkin-Elmer AD-2 electrobalance and subtracting the previously determined tare weights of the filters. The tare and gross weighings were done in duplicate.

The instrumental precision of weighings done at one sitting is 0.01 mg. Because of variable factors such as overloading, hygroscopicity of sample, relative humidity, and the physical integrity of the filter itself, the actual precision can be considerably poorer and occasional slight net negative particulate weights are to be expected.

V. EVALUATION CRITERIA - TOXICOLOGY [3,9] (Refer to Table #1 for permissible exposure limits)

Acetic Acid

Local - Acetic acid vapor may produce irritation of the eyes, nose, throat, and lungs. Inhalation of concentrated vapors may cause serious damage to the lining membranes of the nose, throat, and lungs. Contact with concentrated acetic acid may cause severe damage to the skin and severe eye damage, which may result in loss of sight. Repeated or prolonged exposure to acetic acid may cause darkening, irritation of the skin, and erosion of the exposed front teeth.

Systemic - Bronchopneumonia and pulmonary edema may develop following acute overexposure. Chronic exposure may result in pharyngitis and catarrhal bronchitis.

Chromium

Local - Chromium compounds may act as allergens which cause dermatitis to exposed skin. They may also produce pulmonary sensitization. Chromic acid has a direct corrosive effect on the skin and the mucous membranes of the upper respiratory tract; and although rare, the possibility of skin and pulmonary sensitization should be considered.

Systemic - Chromium compounds in the +3 state are of a low order of toxicity. In the +6 state, chromium compounds are irritants and corrosive, which can enter the body by ingestion, inhalation, and through the skin. Typical industrial hazards are: inhalation of the dust and fumes released during the manufacture of dichromate from chromite ore; inhalation of chromic acid mist during the electroplating and surface treatment of metals; and skin contact in various manufacturing processes.

Acute exposures to dust or mist may cause coughing and wheezing, headache, shortness of breath, pain on deep inspiration, fever, and loss of weight.

In electroplating operations, workers may experience a variety of symptoms including lacrimation, inflammation of the conjunctiva, nasal itch and soreness, epistaxis, ulceration and perforation of the nasal septum, congested nasal mucosa and turbinates, chronic asthmatic bronchitis, dermatitis and ulceration of the skin, inflammation of laryngeal mucosa, cutaneous discoloration, and dental erosion. Hepatic injury has been reported from exposure to chromic acid used in plating baths, but appears to be rare.

An increased incidence of bronchogenic carcinoma has been reported in workers exposed to chromate dust. Nearly all implications of carcinogenicity have arisen from studies of the worker population of the chromate-bichromate industry and from animal studies using the intermediates produced in that industry. Less soluble chromium (VI) compounds - lead chromate, zinc chromate roast materials, are all suspected carcinogens.

Hydrocarbons

Aliphatic hydrocarbons are saturated or unsaturated, branched or unbranched open carbon chains. Within this group there are three subgroups: alkanes (saturated hydrocarbons), alkenes (unsaturated hydrocarbons with one or more double bonds), and alkynes (unsaturated hydrocarbons with one or more triple bonds). Synonyms are paraffins, olefins, and acetylenes, respectively. Compounds of lower molecular weight containing fewer than four carbons are usually gases at room temperature, whereas larger molecules, containing from five to 16 carbons, are liquids, and those having more than 16 carbons are usually solids.

Aliphatic hydrocarbons are derived from petroleum by the cracking, distillation, and fractionation of crude oil. Most of these compounds are used industrially in mixtures, such as natural gas, petroleum naphtha, gasoline, kerosene, and mineral spirits. Aliphatic hydrocarbons are used principally as fuels, refrigerants, propellants, dry cleaning agents, lubricants, solvents, and chemical intermediates.

Aliphatic hydrocarbons are asphyxiants and central nervous system depressants. Lower members of the series, methane and ethane, are pharmacologically less active than higher members of the series, their main hazards resulting from the simple displacement of oxygen and from fire and from explosion. Higher members of the series cause narcosis. At least one member (hexane) has neurotoxic properties. Another common effect is irritation of the skin and mucous membranes of the upper respiratory tract. Repeated and prolonged skin contact may result in dermatitis, due to defatting of the skin. Due to its low viscosity, aspiration of liquid may result in diffuse chemical pneumonitis, pulmonary edema, and hemorrhage. Contamination of aliphatic hydrocarbons by benzene significantly increases the hazard. Therefore, it is important that benzene content, if suspected, be determined.

Ozone

Local - Ozone is irritating to the eyes and all mucous membranes. In human exposures, the respiratory signs and symptoms in order of increasing ozone concentrations are: dryness of upper respiratory passages; irritation of mucous membranes of nose and throat; choking, coughing, and severe fatigue; bronchial irritation, substernal soreness, and cough. Pulmonary edema may occur, sometimes several hours after exposure has ceased. In severe cases, the pulmonary edema may be fatal.

Animal experiments demonstrate that ozone causes inflammation and congestion of respiratory tract and, in acute exposure, pulmonary edema, hemorrhage, and death.

Chronic exposure of laboratory animals resulted in chronic bronchitis, bronchilitis, emphysematous and fibrotic changes in pulmonary parenchyma.

Systemic - Symptoms and signs of subacute exposure include headache, malaise, shortness of breath, drowsiness, reduced ability to concentrate, slowing of heart and respiration rate, visual changes, and decreased desaturation of oxyhemoglobin in capillaries. Animal experiments with chronic exposure showed aging effects and acceleration of lung tumorigenesis in lung-tumor susceptible mice.

Animal experiments further demonstrated that tolerance to acute pulmonary effects of ozone is developed and that this provided cross tolerance to other edemagenic agents. Antagonism and synergism with other chemicals also occur.

Ozone also has radiomimetic characteristics, probably related to its free-radical structure. Experimentally produced chromosomal aberrations have been observed.

Lead

Inhalation of lead dust and fumes is the major route of lead exposure in industry. A secondary source of exposure may be from ingestion of lead dust contamination on food, cigarettes, or other objects. Once absorbed lead is excreted from the body very slowly. The absorbed lead can damage the kidneys, peripheral and central nervous systems, and the blood forming organs (bone marrow). These effects may be felt as weakness, tiredness, irritability, digestive disturbances, high blood pressure, kidney damage, mental deficiency, or slowed reaction times. Chronic lead exposure is associated with infertility and with fetal damage in pregnant women.

Blood lead levels below 40 ug/100 ml whole blood are considered to be normal levels which may result from daily environmental exposure. However, fetal damage in pregnant women may occur at blood lead levels as low as 30 ug/100 ml. Lead levels between 40-60 ug/100 ml in lead exposed workers indicate excessive absorption of lead and may result in some adverse health effects. Levels of 60 to 100 ug/100 ml represent unacceptable elevations which may cause serious adverse health effects. Levels over 100 ug/100 ml are considered dangerous and often require hospitalization and medical treatment.

The new OSHA standard for lead in air is 50 ug/M^3 on an eight hour time-weighted average for daily exposure. The standard also dictates that in four years workers with blood lead levels greater than 50 ug/100 ml must be immediately removed from further lead exposure and in some circumstances workers with lead levels less than 50 ug/100 ml must also be removed. At present medical removal of workers is necessary at blood lead levels of 60 ug/100 ml or greater. Removed workers have protection for wage benefits, and seniority for up to eighteen months until their blood levels adequately decline and they can return to lead exposure areas.

Total Dust

Prolonged exposure to dust may lead to industrial bronchitis. The heavier the dust exposure, the more likely is the development of industrial bronchitis. The characteristic features of this condition are cough and sputum in the absence of localized destructive disease of the lungs.

The symptoms of industrial bronchitis differ in no way from those seen in chronic bronchitis due to cigarette smoking. Both conditions are characterized by production of excess mucous. The mucous is secreted by the goblet cells and more particularly the mucous glands of the bronchial tree. Airway obstruction is seen less often in industrial bronchitis than it is in the naturally occurring form of chronic bronchitis due to cigarette smoking.

VI. RESULTS AND DISCUSSION

A. ENVIRONMENTAL (Refer to Table 2)

Bulk Sample Analyses of Rexene 214 and Exxon LD 304-59

The bulk samples of Rexene 214 and Exxon LD 304-59 were subjected to a temperature of 350°-400°F. Aliquots from the headspace were taken with gas tight syringes and injected into the GC/MS system for analyses. No large amount of any single component were found in either heated bulk headspace. Major peaks for both samples were low boiling alkanes and cycloalkanes and alkenes, mainly C_4-C_6 compounds. BHT (also known as 2,6 di-t-butyl p-cresol, an anti-oxidant) was detected in both samples. In addition, acetic acid was identified in the headspace sample from the Rexene 214 bulk. This last component (acetic acid) could be a major cause of complaints.

Bulk Samples-Lead and Chromium Analysis of Resin Materials Escaping From Grinders:

Grinder #652 - Resin emanating from inside of grinder enclosure and onto floor showed less than 0.01% of lead and chromium in the bulk sample.

Grinder #652 - Discharged resin from extruder hopper showed less than 0.01% of lead and chromium in the bulk sample.

Unit P-433 - Residue from top of lamp (6 feet from cyclone and 4 feet from die) showed less than 0.01% of lead and chromium in the bulk sample.

The limit of detection for lead and chromium is 0.01%, therefore all of the above analyses were below the limit of detection.

Acetic Acid - All air samples taken in the Blown Film Department were less than 20 mg (below the limit of detection).

Hydrocarbons - Air samples taken in the Blown Film and Bag Departments showed a major peak was identified as fluorotrichloromethane; minor peaks included methylene chloride, butene, methyl butane, 1-propanol, 2-methyl butane, n-pentane, 1,1,1-trichloroethane, methyl cyclopentane, 3-methyl pentane, 2-methyl pentane and n-hexane, BHT (also known as 2,6 di-t-butyl p-cresol, an anti-oxidant), butane, pentane and hexane were not detected.

Ozone - Air samples taken in the Blown Film Department showed less than 3 mg per sample (below the detection limit).

Total Dust - Air samples taken in Bag Department, Casting Department, Reprocessing Department, and Bulk Handling ranged from 0.18 to 0.52 mg/m^3. The limit of detection is 0.01 mg.

All of the air samples were below their permissible exposure limits as listed in Table 1.

Because of the high voltages used on the blown film machinery, it was not possible to take ventilation measurements during visits, however, exhaust ventilation at the treater bars is designed poorly on Machines P 11 and P 13. The shape and location of the hood and duct work do not meet optimum design specifications as presented in the ACGIH Industrial Ventilation Manual.

B. Medical

Possible lead absorption was monitored by determining blood lead concentration in samples collected from eighty (80) workers. No excessive lead absorption was indicated because all blood lead values were below 40 ug Pb/100 ml of blood. These blood lead values ranged from 5 ug Pb/100 ml blood to 24 ug Pb/100 ml blood.

The urine chromium values represent a best effort from a "state of the art" situation. Originally the samples were sent to the Utah Biomedical Testing Laboratory (UBTL). UBTL was unable to determine chromium in these samples because of instrument failures and inadequate methodology. The samples arrived at Environmental Sciences Associates, Inc. (ESA) approximately one year after collection. Many were in poor condition. All samples had precipitant and some had microbial growth. These conditions presented a problem to the analyst when withdrawing a representative aliquot from each sample for chromium analysis. Another difficulty common in trace chromium analyses were encountered by ESA. Even the best commercial mineral acids used for ashing biological samples have trace quantities of chromium. Therefore, the samples were not ashed and raw urine was presented to the analytical instrument for chromium analyses.

The results for the exposed and low-exposed groups showed no significant difference.

	48 Exposed	32 Low-Exposed
Range	2.0-110 ppb	2.0-130 ppb
Median	15.5 ppb	19.5 ppb
Mean	24.9 ppb	28.7 ppb
S.D.	26.7 ppb	25.7 ppb

Finally, chromium appears to be an essential trace metal involved in carbohydrate and cholesterol metabolism. Only two oxidation states are biologically significant. They are the hexavalent and trivalent states. Most of the body burden chromium is in the trivalent state. Should an employee be exposed to the strictly hexavalent chromium, 90 percent will be excreted via the urine as trivalent chromium. Therefore, it is assumed that the analysis of urines for total chromium reflect the concentration of chromium in its prevalent biological form, the trivalent state.

The result of the urine chomium analysis in this report reveal no excessive chromium absorption based upon the following observations.

1. Low blood lead values collected from the same workers exposed to lead chromate.
2. The reported large range (undetectable to 350 ng Cr/ml (ppb) urine) difficulties encountered by many authors attempting urine chromium analyses.
3. The almost identical statistics observed for both exposed and low-exposed groups.

VII. RECOMMENDATIONS[10]

1. A medical surveillance program should be instituted in order to obtain baseline data and to monitor the health of the employees with regard to their exposure to chemical contaminants and noise at the plant.
2. Showers and change of clothing with proper locker facilities should be provided to those workers who come into contact with any toxic materials (materials handling operations, processing and reprocessing operations).
3. No smoking, eating, or drinking or storage of such items should be allowed where toxic materials are being used.
4. Ventilation used on the older "treaters" for the blown film machine should conform to the more desirable design used on the newer machines. The shape of a ventilation enclosure, its size, location and rate of air flow, are important design considerations. The hood should enclose the operation as much as possible and be located as close as possible to the source and shaped to control the area of contamination. Also branch ducts off a main duct should have as few bends with as severe angles as possible in order to minimize losses of velocity pressure.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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10. Industrial Ventilation - A Manual of Recommended Practice, 15th Edition, 1978, American Conference of Governmental Industrial Hygienists.

X. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

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 regardings its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Exxon Chemical Company, Plant Manager
2. Oil, Chemical and Atomic Workers Union, Local 8-719
3. OSHA, Region III
4. NIOSH, Region III

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

TABLE 1

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EXXON CHEMICAL COMPANY

Evaluation Criteria
Permissible Exposure Limits

Substance	NIOSH	OSHA	ACGIH
Acetic Acid	--	10 ppm-8HR TWA	10 ppm-8HR TWA 15 ppm-STEL
Chromium (VI)	1.0 ug/m^3-8HR TWA	10 mg/m^3 ceiling	50 mg/m^3-8HR TWA
Butane	--	--	600 ppm-8HR TWA 750 ppm-STEL
Pentane	120 ppm-8HR TWA	1000 ppm-8HR TWA	600 ppm-8HR TWA 750 ppm-STEL
n-Hexane	100 ppm-8HR TWA	500 ppm-8HR TWA	100 ppm-8HR TWA 125 ppm-STEL
Ozone	--	0.1 ppm-8HR TWA	0.1 ppm-8HR TWA 0.3 ppm-STEL
Lead	0.05 mg/m^3-8HR TWA	0.05 mg/m^3-8HR TWA	0.15 mg/m^3-8HR TWA
Total Dust	--	10 mg/m^3-8HR TWA	10 mg/m^3-8HR TWA

TWA = Time-Weighted Average

STEL = Short-Term Exposure Limit

TABLE 2

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EXXON CHEMICAL COMPANY

Personal Air Sampling Results

Substance	Location/Operation	Sampling Time (Minutes)	Concentration
Acetic Acid	Blown Film Dept. (PA 11)	418	N.D.*
	Blown Film Dept. (PA 9)	411	N.D.
Aliphatic Hydrocarbons	Blown Film Dept. (PA 9 and PA 11) Bag Dept. (B-2 and B-3)		
BHT			N.D.
Butane			N.D.
Pentane			N.D.
n-Hexane			N.D.
Ozone	Blown Film Dept. (PA 11)	418	N.D.
	Blown Film Dept. (PA 9)	411	N.D.
Total Dust	Bag Dept. (B-3)	460	0.52 mg/m^3
	Bag Dept. (B-2)	464	0.30 mg/m^3
	Sandwich Bags (308)	456	0.18 mg/m^3
	Casting Dept.	440	0.50 mg/m^3
	Reprocessing Dept.	439	0.27 mg/m^3
	Reprocessing Dept.	435	0.38 mg/m^3
	Bulk Handler	443	0.24 mg/m^3

*None Detected = Below the Reliable Limit of Detection

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