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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-47-172

PEABODY GALION CORPORATION
(UNISTEEL BODY DIVISION)
LIMA, OHIO
JANUARY 1975

I. TOXICITY DETERMINATION

It has been determined that employees are exposed to potentially toxic concentrations of lead in association with spray painting operations conducted at the Peabody Galion Corporation (Unisteel Body Division) plant in Lima, Ohio. Measured concentrations of lead ranged from 0.02 to 3.0 mg/M^3. Concentrations of xylene(xylol) and chromium measured in spray painting operations are not expected to produce adverse health effects. This determination is based upon measurement of air contaminant concentrations, employee interviews, information regarding the toxicity of substances in use, and on evaluation of work practices.

It has also been determined that employee exposures to emissions from welding were within accepted limits during the days of this evaluation (April 3-4, 1974). However, on questioning, employees consistently reported that they had repeatedly suffered irritative symptoms from exposure to welding emissions during periods of severely cold weather. In several cases, chronic respiratory ailments were routinely aggravated by exposure to welding emissions. These complaints together with the absence of plant ventilation strongly suggest that concentrations of welding emissions may reach potentially toxic levels during adverse weather conditions. These determinations are based on breathing zone measurements of air contamination made within welders' helmets, analysis of materials in use, analysis of work schedules and practices, information regarding the toxicity of substances in use, and on information from employee interviews.

Recommendations to reduce and prevent hazards have been made in the body of the determination report.

II. DISTRIBUTION AND AVAILABILITY OF THE DETERMINATION REPORT

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

a) Peabody Galion Corporation (Unisteel Body Division) - Lima, Ohio

b) Authorized Representative of Employees

c) U.S. Department of Labor - Region V, Chicago, Illinois

d) NIOSH - Region V, Chicago, Illinois

For the purposes of informing the approximately 150 "affected employees", the employer will promptly "post" the Determination Report in prominent places near where affected 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. (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 to emissions from welding operations at the Peabody Galion Corporation (Unisteel Body Division) plant in Lima, Ohio. The request was precipitated by recurrent symptoms of eye and throat irritation among several employees at the plant.

IV. HEALTH HAZARD EVALUATION

A. Description of Process - Conditions of Use

The Peabody Galion Corporation (Unisteel Body Division) plant in Lima, Ohio is engaged in the manufacture of refuse handling equipment (dumpsters, commercial refuse packing units) and truck equipment (van bodies, dump beds). The refuse handling equipment is fabricated from mild steel, flat stock using standard shearing, cutting, pressing and welding techniques. Continuous electrode or wire welding is most prevalent with some stick welding also present. Beds for dump trucks are fabricated in a similar fashion. Van bodies are made with steel or wood floors and aluminum or laminated wood and plastic walls, doors, and ceilings. Van body floors are assembled using wire and stick welding techniques. The ceilings, walls, and doors of the van bodies are of cold rivet and adhesive construction. A small amount of argon-arc welding is conducted in the fabrication of van body doors. Following construction, refuse handling equipment, truck beds, and various sections of van bodies are spray painted with enamel in large, dry-filter type spray booths.

B. Evaluation Progress

1. Initial Plant Visit

This plant was initially visited on August 23, 1973 by NIOSH investigators Messrs. Robert Vandervort and Ronald Steinhorn, and Dr. John Cromer. A preliminary conference was held with representatives of labor and management to obtain background information regarding processes, materials, attitudes, and occupational health problems within the plant.

Following the preliminary conference, a walk-through survey of the manufacturing area was made. Two potential hazards to health were readily identified; emissions from welding and solvent vapors from spray painting. There was an almost complete lack of mechanical ventilation in all welding areas. Spray painting was being conducted in poorly maintained, dry filter spray booths which were weakly exhausted and employees were observed not to be wearing appropriate protective equipment. In addition to these health hazards a variety of safety hazards were identified to include improper storage of flammable liquids, improper guarding of equipment, electrical shock hazards from poor grounding of equipment, improper protective equipment for steam cleaning, etc.

Exposures to the physical agents noise, ultraviolet radiation, and infrared radiation were also poorly controlled. Employees were observed not to be wearing hearing protection devices in previously recognized high noise level areas. No shielding (curtains/partitions) was provided to control exposures to ultraviolet and infrared radiation associated with welding and flame cutting operations.

A review of the plant's health care capabilities revealed that the plant employed no nurse or physician, but rather utilized the first-aid training of certain line foremen available during the day and evening shifts. The company provided neither pre-employment or annual physical exams nor did it provide special hazard or termination exams for employees. The plant had a first-aid station with basic supplies located in its north end, but there were no showers or eye wash basins anywhere within the plant.

According to management representatives, no work-related deaths or serious injuries had occurred within the past several years of operation. Review of the OSHA 100 form from January 1973 through August 1973 showed no record of absence from work because of work-related illnesses. A number of minor injuries (cuts, abrasions, contusions, sprains, eye foreign bodies) were noted. Of particular importance was the frequency of eye foreign bodies in cleaners and painters as well as in welders.

A large sample of employees were individually interviewed in private with regard to occupationally related health problems. The interviewed population contained a large number of welders who were expected to be most symptomatic.

Fifty-three percent of the day shift welders (19 of 36) and fifty-eight percent of the evening shift welders (14 of 24) were interviewed. Additionally, four of six painters and four of eight cleaners were interviewed. A small number of press room operators, assemblers, forklift operators, and maintenance employees were also interviewed.

Most of the welders indicated that they were asymptomatic during the summer months. Those with symptoms indicated that they felt much better than during winter months. Employee descriptions of winter symptoms revealed the following: burning and watering eyes, fatigue, frequent colds, nausea, sore throat, and nasal discharge. The first three above stated symptoms were most prevalent and all symptoms, in general, were short lived in nature. Seventy-five percent of the welders (21 of 27) employed five months or longer had been symptomatic with at least one of the three major symptoms. In bays A through D, where the greatest concentration of welding was performed, ninety-five percent of the welders (19 or 20) had been similarly symptomatic. The symptoms reported by welders did not appear to express a chronic debilitating or systemic influence in exposed employees. All painters were asymptomatic except one who felt that he had been getting progressively short of breath.

From industrial hygiene observations and medical information collected during the initial visit it was concluded that a follow-up evaluation would be necessary. It was also concluded that the evaluation should be conducted during cool or cold weather when symptomatology was alleged to occur. These conclusions along with several recommendations to alleviate many of the observed safety and health hazards were presented in an exit conference attended by representatives of management and labor.

2. Follow-up Evaluation

On April 3 and 4, 1974 a follow-up evaluation of welding and spray painting operations at the Peabody Galion Corporation - Lima plant was conducted by Messrs. Robert Vandervort and Robert E. Rosensteel. Work room air sampling coupled with employee interviews conducted by Messrs. Vandervort and Rosensteel were used to evaluate employee exposures to emissions from welding and spray painting. The remainder of this report deals with the methodology used and results of this follow-up evaluation.

C. Evaluation Methods

1. Air Sampling in Spray Painting Operations

Employee exposures to paint solvent vapors and to paint particulate were evaluated by obtaining air samples from the breathing zones of painters by the use of personal air sampling equipment. Solvent vapors were collected in air sampling tubes containing activated charcoal. Most charcoal tube samples were collected using Sipin, battery powered, air pumps running at approximately 100 cc/min. In the laboratory, charcoal tube samples were desorbed with carbon disulfide and analyzed by gas chromatography. A bulk sample of paint solvent (Xylol) was analyzed by gas chromatography to determine possible contamination with benzene and toluene.

Airborne paint particulate was collected on pre-weighed PVC filters using MSA Model G, battery powered, air pumps running at approximately 1.5 liters/min. In the laboratory, the filters were reweighed and then analyzed for lead and chromium by atomic absorption spectrophotometry.

2. Air Sampling in Welding Operations

Employee exposures to emissions from welding were measured using direct reading, Draeger, gas detector tubes and specially modified welding helmets outfitted with air sampling equipment. Gas detector tube samples for carbon monoxide, oxides of nitrogen, and ozone were collected in the plumes of welding emissions, near welding operations, and in general work areas.

Particulate welding emissions were collected from the welder's breathing zone inside the welding helmet. Each monitored welder was asked to wear a welding helmet outfitted with a filter holder connected to a MSA Model G sampling pump. The filter holder contained a pre-weighed, 37mm PVC filter which was later reweighed and analyzed for iron and copper by atomic absorption spectrophotometry in the laboratory.

3. Employee Interviews

Employees performing spray painting were asked non-directed and subsequent directed questions regarding possible health effects from exposure to paint solvents and particulate.

Employees performing welding operations were asked directed questions regarding their employment history, smoking history, and history of major illnesses. They were then asked whether they were currently experiencing or ever had experienced the following symptoms in association with welding: shortness of breath, burning of the chest, whistling or wheezing in the chest, cough, fever or chills, weakness, watering or burning of the eyes, watering or burning of the nose or throat, nausea, headache, and dizziness. The frequency of elicited historical symptoms was recorded together with information describing the factors which precipitated the symptoms.

D. Evaluation Criteria

The three primary sources of environmental evaluation criteria considered in this report are: (1) NIOSH Criteria Documents recommending occupational health standards, (2) American Conference of Governmental Industrial Hygienists threshold limit values with supporting documentation, and (3) Federal occupational health standards. For brevity, federal standards are used as reference points in the following presentation of evaluation criteria.

The occupational health standards promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974, Title 29, Chapter XVII, Subpart G, Tables G-1 and G-2) applicable to the substances of this evaluation are as follows:

Substance	8-hour Time-Weighted-Average Exposure Standard ppm[a]	mg/M[3b]
Carbon Monoxide[c] (CO)	50	
Chromium, metal and insoluble salts		1
Copper Fume[d]		1
Iron Oxide Fume[e]		10
Lead and its inorganic compounds[f]		0.2
Nitric Oxide (NO)	25	
Nitrogen Dioxide (NO_2)[g]	5	
Ozone	0.1	
Xylene	100	

[a]Parts of vapor or gas per million parts of contaminated air by volume.

[b]Approximate milligrams of particulate per cubic meter of air.

[c]NIOSH in its Criteria for a Recommended Standard - Occupational Exposure to Carbon Monoxide recommends that employee exposure to Carbon Monoxide be controlled to 35 ppm on an 8-hour time-weighted-average basis, and that employees should never be exposed to concentrations of Carbon Monoxide in excess of 200 ppm.

[d]The American Conference of Governmental Industrial Hygienists (ACGIH) in its Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes for 1974 propose that employee exposure to Copper Fume be controlled to 0.2 mg/M^3 on an 8-hour time-weighted-average basis.

[e]The ACGIH (same reference as in "d" above) proposes that employee exposure to Iron Oxide Fume be controlled to 5 mg/M^3 on an 8-hour time-weighted-average basis.

[f]The ACGIH (same reference as in "d" above) and NIOSH (Inorganic Lead Criteria Document) recommend that employee exposure to Lead (inorganic, fumes and dust) be controlled to 0.15 mg/M^3 on an 8-hour time-weighted-average basis.

[g]The ACGIH (same reference as in "d" above) recommends that employee exposure to nitrogen dioxide should never exceed the 5 ppm level.

The American Conference of Governmental Industrial Hygienists in its Threshold Limit Values for Chemical Substances and Physical Agents in the Workplace Environment with Intended Changes for 1974 has proposed that a new Threshold Limit Value (TLV) be established which would recommend that employee exposure to "Welding Fume" not exceed 5 mg/M^3 on an 8-hour time-weighted-average basis. This proposed TLV for Welding Fume refers to total airborne particulate in the employee's breathing zone.

Occupational health standards and threshold limit values for individual substances are established at levels designed to protect workers occupationally exposed on a 8-hour per day, 40-hour per week basis over a working lifetime.

E. Evaluation Results

1. Results of Air Sampling in Spray Painting Operations

Employee exposures to solvent vapors and to paint particulate were measured in each of the three paint booths. Painters reported that they sprayed paint for 3 to 5 hours per shift. Painters were wearing organic cartridge respirators with particulate prefilters. Sampling was conducted during the actual spraying of paint, however, some painters did not paint steadily during the period sampled. The results of this sampling are shown in Table I below:

TABLE I: Breathing Zone Concentrations of Air Contaminants Associated with Spray Painting

Booth No.	Sampling Period	Type of Paint	Xylene Conc. ppm	Total Part. Conc. mg/M^3	Lead Conc. mg/M^3	Chromium Conc. mg/M^3
3	1252 to 1350	Grey Primer	140	47	0.58	0.34
3	1345 to 1506	Green Enamel	55	36	2.8	0.40
3	1606 to 1831	Green Enamel	51	38	3.0	0.25
3	1631 to 1642	Green Enamel	68*	---	----	----
2	1205 to 1507	Grey Primer	6.9**	7.3	0.04	0.01
2	1600 to 1823	Grey Primer	5.3**	4.8	0.02	0.02
1	1212 to 1315	Green Enamel	22	26	2.3	0.24
1	1550 to 1841	Misc. Enamel	13	12	0.88	0.10

*Sample collected during continuous painting, no breaks in spraying.
**Little painting accomplished during sampling period.

Examination of air sampling data reveals that during most painting operations xylene exposure was not excessive. As reflected by the sample collected in Booth No. 3 from 1252 to 1350, there were spray painting jobs which resulted in greater employee exposure to xylene for some portion of the workshift. These higher exposure periods were associated with painting large manufactured products which nearly filled the spray booth and required paint in relatively confined spaces.

Gas chromatographic analysis of the xylol (xylene) paint solvent found it to be essentially pure xylene with combined toluene and benzene contamination much less than 1% by weight.

Although exposure to chromium associated with paint particulate did not appear to be excessive, employee exposure to lead presented a distinct potential hazard to health. Even though employees did not paint continuously during the workshift, their averaged potential exposure to lead in Booth Nos. 1 & 3 was obviously much in excess of the federal occupational health standard for 8-hour time-weighted-average exposure (0.2 mg/M^3). As reflected by total airborne paint particulate concentrations, spray painting employees were exposed to excessive levels of paint overspray. Much of the total airborne particulate load was composed of relatively non-toxic pigments like titanium dioxide. As previously mentioned, excessive exposure to paint overspray resulted in excessive exposure to lead and, in addition, reduced visibility inside the booths during painting. These heavy particulate concentrations were encountered because, (1) the booths were exhausted from only one end, (2) because many objects to be painted nearly filled the booths, and (3) some objects required the painter to apply paint in confined spaces where the booth ventilation currents count not reach.

2. Results of Air Sampling in Welding Operations

Employee exposures to emissions from welding were evaluated on each of the two workshifts of April 4, 1974. Although outside weather conditions were not severely cold, employees elected to keep doors and windows closed during the first workshift to simulate cold weather operations. Second shift employees performed their work operations with doors and windows open to the extent normally found during mild weather.

Sampling of airborne contaminants to which welding employees were exposed was conducted in a manner to reflect maximal exposure during the laying of a welding bead. Time and resources did not permit the collection of sufficient samples to accurately determine 8-hour time-weighted-average exposures to individual welding contaminants. However, several important inferences can be drawn from the data collected.

Detector tube measurements made in the plume of welding emissions at several work stations showed that insignificant concentrations of ozone, nitric oxide + nitrogen dioxide, and nitrogen dioxide were generated by the type

of welding conducted in this facility. (Refer to Table II.) Although carbon dioxide was used extensively as a shielding gas, carbon monoxide was not found to be present in significant concentrations. (Refer to Table II.)

Inside the welding helmet, breathing zone concentrations of copper fume reflecting maximal exposure were all low and employee 8-hour time-weighted-average exposures were undoubtedly much below the federal occupational health standard of 1 mg/M^3 and below the proposed ACGIH threshold limit value of 0.2 mg/M^3. (Refer to Table II.) Samples were analyzed for copper fume because the welding wire used in wire welding (EZOS-3) was coated with copper.

Inside the welding helmet, breathing zone concentrations of iron oxide fume reflecting maximal exposure (Refer to Table II.) were moderate and suggest that if welders had continuously layed a bead for 8 full hours that their 8-hour time-weighted-average exposures to iron oxide fume would have been below the federal occupational health standard for iron oxide fume of 10 mg/M^3 but in the vicinity of the proposed ACGIH threshold limit value of 5 mg/M^3. Welders at Peabody Galion did not weld continuously throughout their workshifts with at least 50 percent of their workshift involved with set-up of materials to be welded. Thus, it is inferred that employee exposures to iron oxide fume were below 5 mg/M^3 on an 8-hour time-weighted-average basis.

Inside the welding helmet, breathing zone concentrations of total airborne welding fume (Total Airborne Particulate in Table II.) when adjusted for approximately 50 percent set-up time suggest that 8-hour time-weighted-average exposures to total welding fume were near the ACGIH proposed threshold limit value of 5 mg/M^3.

Samples Nos. 6 & 8 were taken without and with the use of a fume collection system in operation. Sample No. 8 reflects both lower total airborne particulate and iron oxide fume exposure with the collector in operation. The total particulate concentration of 0.6 mg/M^3 in Sample No. 8 is undoubtedly somewhat low and inaccurate due to insufficient sample for accurate gravimetric determination of total particulate. Sufficient sample was present for iron oxide determination, however.

3. Results of Employee Interviews

a. Spray Painting Employees

None of the six spray painters assigned to the three paint booths on April 3, 1974 reported that their health had been adversely affected by their work. One of the men did express concern for possible chronic adverse health effects from his work as a spray painter. Several of the men complained that their ability to see was significantly compromised when painting large bulky objects or inside confined spaces. They attributed this problem to infrequent changing of booth filters which results in poor

TABLE II: Welding Emissions Air Sampling (Samples Collected April 4, 1974)

Sample No.	Location/Job	Type of Welding	Sampling Period	Breathing Zone, Inside-the-Helmet, Particulate Measurements: Total Airborne Particulate mg/M³	Iron Oxide Fume mg/M³	Copper Fume mg/M³	Plume Measurements: *** Approximately 10 to 12 inches above arc. Carbon Monoxide ppm	Ozone ppm	$(NO + NO_2)$ ppm	Nitrogen Dioxide ppm	Comments
1	Dump Bed Line	Wire* E70S-3	0753--0916 ( )	8.9	5.9	0.056	8-13	<0.05	<0.5	< 1	Welding 75% of sampling period
2	Floor Sills Welding Jig	Stick E7014	0758--0939	1.6	0.6	0.001	<5	<0.05	10	< 1	
3	Hog	Stick E7024	0829--0948	6.8	2.3	0.002	<5	<0.05	2	< 1	Welding 50% of sampling period
4	Container Line	Wire E70S-3	0846--1118	8.0	5.4	0.042	.....				Welding 75% of sampling period
5	Parts Assembly Dump Bed Line	Wire E70S-3	0935--1115	15	6.9	0.060	.....				Welding almost steadily
6	Packer Set Up 4yd Assembly	Wire E70S-3	1004--1112	4.6	3.0	0.027	10	<0.05	5	< 1	Welding 50%; collector not used.
7	322 Rear Jig Weld	Stick E7014&24	1100--1124	5.0	1.0	0.039	.....				
8	Packer Set Up 4yd Assembly	Wire E70S-3	1227--1324	0.6**	1.4	0.033	.....				Welding 75%; collector in use.
9	PCO - Ejector	Stick E7014&24	1230--1502	4.7	2.0	0.009	<5	<0.05	6	< 1	
10	PCO Ram	Stick E7014&24	1255--1502	5.9	3.5	0.001	<5	<0.05	2	< 1	Welding almost steadily
11	Container Line	Wire E70S-3	1320--1445	8.8	5.2	0.055	.....				Welding inside container
12	Dump Bed Section	Wire E70S-3	1422--1512	9.9	5.7	0.003	.....				Welding almost steadily
13	Dump-Curved Side Jig	Wire E70S-3	1620--1801	9.3	5.1	0.044	.....				10 minutes out to adjust wire feed
14	Dump-Curved Floor Jig	Wire E70S-3	1622--1800	3.5	3.0	0.023	8	<0.05	4	< 1	
15	Small Parts	Stick E7014&24	1628--1757	7.7	3.2	0.021	.....				
16	PCO - Ejector	Wire E70S-3	1659--1753	9.8	3.2	0.025	.....				
17	Bay 8 at Foremans Station	----	0933--1634	1.2	0.5	-----	.....				

*All wire welding was performed with carbon dioxide shielding gas.
**Insufficient sample for accurate gravimetric analysis.
***Plume Measurements were short-term grab samples taken during the corresponding particulate sampling period.

capture of paint overspray. The paint overspray reportedly caused reduction in visibility by both obscuring objects in the booth and by causing eye irritation and tearing. It became obvious in interviewing the men that they had not been properly instructed in the wearing, function, and maintenance of their respiratory protective equipment. Furthermore, the men were not fully aware of the potential health hazards associated with spray painting. This was evidenced by the fact that many of the men washed their hands and face with the paint solvent (xylol/xylene) and that they were unaware that the prefilter to the cartridge respirator was necessary for proper protection.

b. Welding Employees

Eighteen welders were interviewed on April 4, 1974 by Messrs. Vandervort and Rosensteel. Fourteen of the eighteen were monitored with personal sampling equipment. One additional welder was monitored but not interviewed. Table III presents the date from interviews with welders.

Eleven wire welders and seven stick welders were interviewed. Three of the interviewed welders were symptomatic at the time they were interviewed. In general, welders were interviewed directly following air sampling. Five of the interviewed welders reported that they were chronically affected by either asthma, bronchitis or both. All interviewed welders reported that they presently smoked or that they were ex-smokers. Welders reporting bronchitis all had smoked cigarettes for many years, although one of these welders was not smoking at the time of interview.

The two most commonly reported symptoms occuring at least one time per month were headache (12 of 18) and watering or burning of the eyes (11 of 18). Watering or burning of the nose or throat (7 of 18), weakness (6 of 18), shortness of breath (6 of 18), and cough (5 of 18) were all reported to occur frequently among these welders. Other symptoms were reported less frequently.

Much of the reported symptomatology may be attributable to the welders' smoking habits, chronic illnesses, or both. There does not appear to be any correlation between measured exposure to iron oxide fume and symptomatology. In general, welders did not appear to be adversely affected on an acute basis from welding being conducted on the day of interviewing. Most welders did comment that conditions were not as severe on the day of interviewing as they had been on severely cold days. Welders were almost unanimous in stating that their sporadic symptoms occurred during the extremely cold days when little fresh air was allowed in the building.

F. Discussion and Recommendations

1. Spray Painting Operations

Although employee exposures to xylene (xylol) and chromium were found during this evaluation to be within accepted limits, exposures to lead

Table III Data from Interviews with Welders

	Type of Welding	Major Illnesses	Iron Oxide Fume Conc. mg/M^3	Present Smoker	Ex-Smoker	Never Smoked	Shortness of Breath	Burning of the Chest	Whistling or Wheezing in the Chest	Cough	Fever or Chills	Weakness	Watering or Burning of the Eyes	Watering or Burning of the Nose or Throat	Nausea	Headache	Dizziness
a	Wire		8.9	XX			T_M	T	R	W			T_W			W	T_W
b	Stick		1.6		XX		R	R					W	W	M	W	
c	Stick		6.8	XX									W	W			
d	Wire		8.0	XX									W				
e	Wire		15	XX												W	
f	Wire		4.6		XX											R	
g	Stick	Asthma	5.0	XX			M			W	W	M	W	W	W		M
h	Stick		4.7	XX									W	W		M	
i	Stick		5.9	XX			R			M	R	R	W			R	
j	Wire	Bronchitis	8.8	XX			T	W	W		R	W	W	W	W	W	
k	Wire		9.3	XX				R			R			W	W	M	
l	Wire		3.5	XX			M		M							M	
m	Stick	Bronchitis	7.7		XX		T		M	T						M	R
n	Wire		9.8	XX								W					
o	Wire	Bronchitis	---	XX						W	R	W				W	
p	Stick		---		XX							W	W	M		W	
q	Wire		---		XX		W					M	T_W		R	W	
r	Wire	Asthma/Bronch.	---	XX					W				W	R		W	
Tally of Symptoms Occurring at Least Once per Month							6	2	4	5	1	6	11	7	4	12	2

Symptom Frequency Definitions: T = Symptom was present at time of interview

W = Symptom occurs at least once per week

M = Symptom occurs at least once per month

R = Symptom occurs rarely i.e. less than once per month

were found to seriously exceed accepted limits and it is therefore concluded that toxic levels of lead were present in spray painting operations during the period sampled. It is true that spray painting employees were wearing respiratory protection (gauze-type masks during initial visit) (charcoal cartridge with prefilter during follow-up visit), however employees displayed a distinct lack of proper training in the use, function, and maintenance of their respiratory protection equipment. Under these conditions it is difficult to state whether or not employees are being adequately protected. The following recommendations are made in the interest of improving work practices and reducing potential hazard to employees:

a. Employees should be instructed in the function, maintenance, and use of their respiratory protection equipment.

b. A program of medical (biologic) and environmental monitoring should be instituted in accordance with the recommendations set forth in the NIOSH criteria document for Occupational Exposure to Inorganic Lead. (Copies of this document have been supplied to Peabody Galion Corp. - Lima, Ohio for use by management and the union-management safety committee.)

c. Filters in spray booths should be changed frequently. Replacement schedules may vary from booth to booth depending work load.

d. Whenever possible, spray painting should be conducted so that the painter sprays toward the booth filters. Many of the smaller objects to be painted can easily be positioned in front of the filters.

e. Booth Nos. 1 & 3, where large objects are painted, should be equipped with additional exhaust ventilation. Until additional ventilation is available, large objects should be painted in stages, turning when possible, so that paint spray is pulled away from the painter by the exhaust system.

f. Employees should not use xylene (xylol) for cleaning skin surfaces. A suitable skin cleanser e.g. waterless type hand cleanser should be made available.

2. Welding Operations

Employee exposures to emissions from welding were found to be within accepted limits during the days of this evaluation. Concentrations of iron oxide fume were moderate during actual welding, but welders were observed not to be welding continuously during the shift. The reported prevalence of irritative symptomatology during severely cold weather strongly suggests that contaminant concentrations can reach potentially toxic levels.

There may also be a hazard to some employees of developing a chronic respiratory ailment such as bronchitis. Employees who smoke or who have a history of respiratory problems are at most risk. Furthermore, the reported prevalence of eye irritation suggests that employees may be suffering chronic eye injury. This symptomatology may be due, in part, to accidental flash burn resulting from the absence of shielding of welding operations or use of inappropriate lenses in welding hoods. In the interest of improving work practices and reducing the potential hazard to employees the following recommendations are made:

a. The company should follow through with its plans to install particulate collectors on all wire welding units.

b. Where possible curtains or other shielding materials should be placed between/around welding operations.

c. When welding inside refuse containers, etc., an air mover should be used to provide fresh air and to disperse welding emissions.

d. A general ventilation system should be provided especially in bays with heavy concentrations of welding. The ventilation system should supply tempered fresh air and exhause contaminated air. Until such ventilation is installed welding operations should be curtailed as necessary during severely cold weather or other adverse atmospheric conditions to prevent employee symptomatology.

3. General

This plant should continue to encourage the wearing of safety shoes and glasses. Also, it is desirable that a physician become affiliated with the plant. This physician could care for or be aware of acute work-related injuries and illnesses. In terms of prevention, the physician could become familiar with plant processes and the injuries or illnesses that could arise therefrom and make pertinent recommendations. He could also carry out pre-employment physical exams, periodic physical exams, periodic biologic tests and help management with appropriate placement of employees. Additionally, he could assist in organizing health and safety instruction programs within the plant.

V. AUTHORSHIP AND ACKNOWLEDGEMENT

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