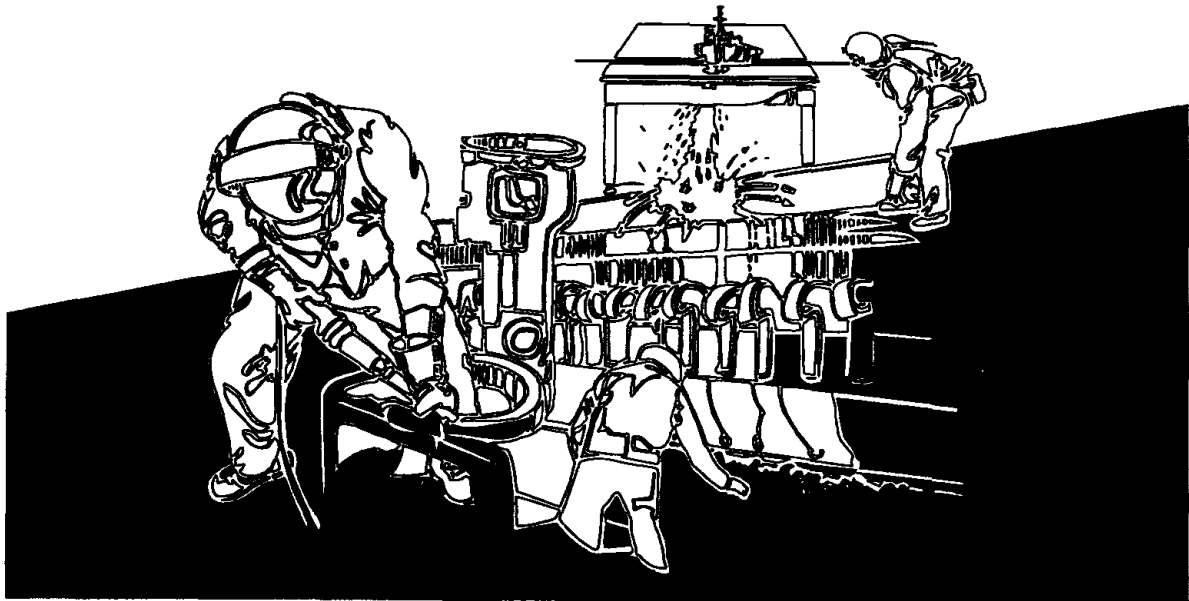


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NIOSH HEALTH HAZARD EVALUATION REPORT

**HETA 94-0190-2474
GEN CORP AUTOMOTIVE
LOGANSPORT, INDIANA**



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



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 and 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.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 94-0190-2474
DECEMBER 1994
GEN CORP AUTOMOTIVE
LOGANSPOORT, INDIANA

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I. SUMMARY

The National Institute for Occupational Safety and Health (NIOSH) conducted a health hazard evaluation (HHE) at Gen Corp Automotive in Logansport, Indiana, at the request of the United Rubber, Cork, Linoleum, and Plastic Workers of America. According to the request, workers in department 634 had been experiencing skin problems and reproductive problems that they thought were work-related. There were concerns about exposures to various solvents and to nitrosamines.

On July 7, 1994, NIOSH investigators conducted a walk-through survey of department 634 and had informal discussions with employees and union representatives, and confidential interviews with employees that were experiencing symptoms. Investigators reviewed previous air monitoring records, Occupational Safety and Health Administration (OSHA) citation records, the health and safety program, medical records, OSHA 200 Injury and Illness Logs, and Material Safety Data Sheets. General area air sampling for nitrosamines, lead, and solvents were also collected.

There were no exposures to nitrosamines (minimal detectable concentration of 0.09 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) or lead (minimal detectable concentration of 0.01 milligrams per cubic meter [mg/m^3]) detected on the air samples collected on the day of the site visit. Employees reported experiencing headaches, dizziness, and nausea, which may be suggestive of low level solvent exposures. NIOSH investigators observed poor hygiene practices, which could potentially be increasing worker exposure to solvents through dermal absorption. Four employees had been experiencing symptoms of dermatitis and urticaria, which were reported to be worse at work and better in the evenings and on weekends.

Workers may be exposed to low concentrations of solvents in this work area, but the concentrations measured on the day of the site visit were all well below the recommend standards. Some workers appear to be experiencing irritant or allergic reactions, which might be work-related. Recommendations were made for reducing chemical exposures; for improved communication and education, especially concerning health and safety; and for management of employees' skin problems.

KEYWORDS: SIC 3061 (molded, extruded, and lathe-cut mechanical rubber goods), rubber products, organic solvents, irritant reactions, allergic reactions, dermatitis, urticaria

II. INTRODUCTION

On July 7, 1994, the National Institute for Occupational Safety and Health (NIOSH) conducted a health hazard evaluation (HHE) at Gen Corp Automotive in Logansport, Indiana. The United Rubber, Cork, Linoleum, and Plastic Workers of America (URW) requested that NIOSH investigate department 634 because a few workers had been experiencing skin irritation and rashes. Workers were also generally concerned about their exposures to solvents and n-nitrosamines, and that work exposures might be resulting in miscarriages. Gen Corp Automotive also mentioned that lead dust may be present because one of the parts that is purchased externally and used in the production of an automotive part has a coating that contains lead.

III. BACKGROUND

The Gen Corp Automotive plant in Logansport, Indiana, produces automotive vibration control products using rubber stock from the Gen Corp Automotive plant in Wabash, Indiana, and metal parts from a variety of companies. Approximately 512 people presently work in the plant, most of whom belong to the URW, Local 798. Department 634, or Toyo, contains metal preparation processes, molding presses, paint dip tanks, elastomer adhesive spray processes, grinding and buffing operations, assembly, and packaging. Ninety-six URW employees work over three eight-hour shifts, although it is not uncommon for employees to work several hours of overtime. The employees in this department rotate jobs through all of the processes. Most of the processes have local exhaust ventilation (LEV), and there are several floor fans operating throughout the department.

One employee in this department has been diagnosed with vasculitis, and was recommended to discontinue working in this industry. Two other employees reported experiencing symptoms similar to the early symptoms of the affected worker, and they and other employees are concerned about also not being able to work in this industry. Employees also mentioned concerns about miscarriages and repetitive motion disorders.

IV. EVALUATION CRITERIA

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ evaluation criteria for the assessment of a number of chemical (and physical) agents. The primary sources of environmental evaluation criteria for the workplace are the following: (1) NIOSH Criteria Documents and Recommended Exposure Limits (RELs), (2) the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs), and (3) the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).^{1,2,3} The objective of these

criteria for chemical agents is to establish levels of exposure to which the vast majority of workers may be exposed without experiencing adverse health effects.

Full-shift and shorter duration criteria are available depending on the specific physiologic properties of the agent. Full-shift limits are based on the time-weighted average (TWA) airborne concentration of a substance that workers may be repeatedly exposed to during an eight or 10 hour workday, up to 40 hours a week for a working lifetime, without adverse health effects. Some substances have short-term exposure limits (STELs) or ceiling limits (CLs) which are intended to supplement the full-shift criteria where there are recognized irritative or toxic effects from brief exposures to high airborne concentrations. STELs are based on 15 minute TWA concentrations, whereas CL concentrations should not be exceeded even momentarily.

Occupational health criteria are established based on the available scientific information provided by industrial experience, animal or human experimental data, or epidemiologic studies. Differences between the NIOSH RELs, OSHA PELs, and ACGIH TLVs may exist because of different philosophies and interpretations of technical information. It should be noted that RELs and TLVs are guidelines, whereas PELs are standards which are legally enforceable. OSHA PELs take into account the technical and economical feasibility of controlling exposures in various industries where the agents are present. The NIOSH RELs are primarily based upon the prevention of occupational disease without assessing the economic feasibility of the affected industries and as such tend to be very conservative. ACGIH is not a government agency, it is a professional organization whose members are industrial hygienists or other professionals in related disciplines and are employed in the public or academic sector. TLVs are developed by consensus agreement of the ACGIH TLV committee and are published annually. The documentation supporting the TLVs (and proposed changes) is periodically reviewed and updated if believed necessary by the committee. It is not intended by the ACGIH for TLVs to be applied as the threshold between safe and dangerous exposures.

Not all workers will be protected from adverse health effects if their exposures are maintained below these occupational health exposure criteria. A small percentage may experience adverse effects due to individual susceptibility, a pre-existing medical condition, previous exposures, and/or a hypersensitivity (allergy). In addition, some hazardous substances may act in combination with other workplace exposures, or with medications or personal habits of the worker (such as smoking) to produce health effects even if the occupational exposures are controlled to the limit set by the evaluation criterion. These combined effects are often not considered by the chemical specific evaluation criteria. Furthermore, many substances are appreciably absorbed by direct contact with the skin and thus potentially increase the overall exposure and biologic response beyond that expected from inhalation

alone. Finally, evaluation criteria may change over time as new information on the toxic effects of an agent become available. Because of these reasons, it is prudent for an employer to maintain worker exposures well below established occupational health criteria.

Exposure Criteria for Aromatic Hydrocarbons

Exposure to aromatic hydrocarbons can occur through inhalation of the vapors and absorption through the skin. Acute effects from exposure to high concentrations of aromatic hydrocarbons often include anesthesia, central nervous system (CNS) depression, impaired motor function, respiratory arrest, unconsciousness, and death.⁴ At lower concentrations, symptoms of dizziness, headache, fatigue, light-headedness, weakness, poor concentration, and mucous membrane irritation may occur.^{4,5} Chronic effects that have been reported among some workers exposed to organic solvents include peripheral neuropathies, organic affective syndrome, and mild chronic toxic encephalopathy. Organic affective syndrome is characterized by fatigue, memory impairment, irritability, difficulty in concentration, and mild mood disturbance. Mild chronic toxic encephalopathy is manifested by sustained personality or mood changes such as emotional instability, diminished impulse control and motivation, and learning capacity. The extent to which chronic neurotoxicity is reversible remains to be established.⁴

Occupational Skin Disorders

Occupational skin diseases account for a large percentage of all occupational illnesses; approximately 80% to 90% of these skin diseases may be classified as contact dermatitis.⁷ Contact dermatitis can be further classified as either irritant contact dermatitis (ICD) or allergic contact dermatitis (ACD). Clinically, both ICD and ACD initially appear at the point of skin contact as a red, itchy rash, often times punctated with small blisters (vesicles). In addition to contact dermatitis, urticaria (hives or wheals) is another skin disease that may be related to workplace exposures. In general, urticarial reactions make up a small percentage of occupational skin diseases relative to contact dermatitis. Urticaria is a transient vascular reaction of the skin that leads to localized swelling of tissue, with an individual lesion lasting less than 24 hours. Urticarial lesions may continue to appear for up to six weeks in cases of acute urticaria and much longer in cases of chronic urticaria.

ICD is a result of contact with a skin damaging chemical substance; ACD and many cases of urticaria are a result of allergic reactions. Allergic reactions occur when an individual responds to a specific substance, an allergen, with an immune system response. The individual must be sensitized to the allergen in order to have the reaction; and this sensitization develops based on an individual's genetic predisposition, the first exposure to the allergen, and the time and amount of exposure to the allergen. Once an individual becomes sensitized, exposure to even a small amount of the allergen can

result in a reaction. The important concept to understand about allergic reactions is that they are **specific to each individual**. Not every person exposed to an allergen will have a reaction; and those who do, might react with different symptoms and varying degrees of severity.

Vasculitis is a condition characterized by an inflammation and necrosis of the blood vessels and requires not only a clinical diagnosis, but also a pathologic one (a biopsy). Etiologic agents of vasculitis include infectious agents, drugs and chemicals, systemic diseases, and malignant diseases. Environmental exposures associated with vasculitis include insecticides, herbicides, and petroleum products. The mechanism of vasculitis is related to a reaction of the immune system. Urticarial vasculitis is a vasculitis that clinically is similar in appearance to urticaria but the lesions remain in one place for longer than 24 hours.

V. EVALUATION METHODS

Environmental

The industrial hygiene evaluation consisted of a walk-through survey of the plant, focusing on department 634; review of previous air monitoring records, OSHA citation records, and Material Safety Data Sheets (MSDSs); informal discussions with employees and union representatives; review of the health and safety programs with the safety manager; and collection of general area (GA) air samples for solvents, metals, and nitrosamines. Solvent samples were collected on charcoal tubes using Gillian™ low-flow pumps at 100 milliliters per minute (ml/min) and analyzed according to NIOSH Method 1501; metal samples were collected on mixed cellulose ester filters using Gillian™ high-flow pumps at 2 liters per minute (l/min) and analyzed according to NIOSH Method 7300; and nitrosamine samples were collected on Thermosorb-N tubes using Gillian™ high-flow pumps at 1 l/min and analyzed using gas chromatography (GC) and a high resolution mass spectrometer (MS) operated in the selected-ion-monitoring (SIM) mode.

Medical

The medical evaluation consisted of confidential, informal interviews with department 634 employees, a review of employee medical records, and a review of the past five years of the Logansport OSHA 200 Injury and Illness Logs.

Medical interviews were conducted with department 634 employees who had been experiencing symptoms that they thought were related to working in that department. Information was collected about their employment history, primary job responsibilities, personal protective equipment usage, job and home-related chemical usage, medical and smoking history, and symptoms.

Interviews were also conducted with a random selection of first shift employees from department 634. NIOSH investigators questioned employees about the level of hazard communication, the provision and usage of personal protective equipment (PPE), the accessibility of MSDSs, symptoms or complaints that might be work-related, and the overall degree of job satisfaction. Each worker was also asked to give an opinion of the average daily working conditions at Gen Corp.

VI. RESULTS AND DISCUSSION

Environmental

Neither nitrosamines (minimal detectable concentration [MDC] of 0.09 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)) nor lead (MDC of 0.01 milligrams per cubic meter [mg/m^3]) were detected on GA air samples collected on the day of the site visit. However, it was revealed during the site visit that surface lead had been detected at the bracket buff area and inside sprayer area by an outside consultant during a previous site visit.

The aromatic hydrocarbon samples collected may not be a good representation of usual working conditions since two operations that use the elastomer adhesives were not operating on the day of the site visit. These operations were two of the three that were suspected by employees to cause the most health complaints. Since these were of concern to the employees, one of these, the inside sprayer, was started at 10:30 a.m. so that a GA air sample could be collected.

Based on the qualitative sampling results of an aromatic hydrocarbon air sample and on the bulk analysis of the "black water reduce dip enamel" and three elastomer adhesives, GA aromatic hydrocarbon samples were analyzed for methyl ethyl ketone (MEK), 1,1,1-trichloroethane (1,1,1-TCE), carbon tetrachloride (CCl_4), perchloroethylene (PCE), xylene, toluene, and 2-butoxyethanol (2-BC). Samples collected near the hydromount and insert press #7030 did not have quantifiable concentrations of any of these compounds. The MDCs for this sample were as follows: 0.05 parts per million (ppm) for 1,1,1-TCE, 0.07 ppm for CCl_4 , 0.04 ppm for MIBK, 0.04 ppm for PCE, 0.03 ppm for xylene, and 0.05 ppm for toluene. An air sample collected at the paint dip operation had a detectable concentration of 0.2 ppm 2-BC. The sample collected at the inside sprayer operation had detectable concentrations of 3.2 ppm 1,1,1-TCE, 1.5 ppm MIBK, 0.6 ppm PCE, 7.6 ppm xylene, and 1.1 ppm toluene. All of the concentrations are at least an order of magnitude below their relevant criteria. However, NIOSH considers PCE to be an occupational carcinogen and recommends that exposures be reduced to the lowest feasible concentration. The measured GA concentration of 0.6 ppm PCE may be the lowest feasible concentration for this process, but that must be decided by Gen Corp

Automotive. CCl_4 was not detected on any of the quantitated samples (MDC 0.07 ppm), but it was detected in the bulk sample analysis of two of the elastomer adhesives.

Employee use of personal protective equipment and awareness of engineering controls was inconsistent. For example, several employees were wearing cotton gloves while working with solvents, and others wore no gloves at all. Cotton gloves are ineffective in protecting the skin from solvents, and may even increase the dermal absorption since they will absorb solvents and hold them against the skin. The effectiveness of engineering controls such as local exhaust ventilation (LEV) is reduced by the air currents generated from the floor fans. One table-top LEV was improperly used during the site visit; a worker placed a solid, plastic bin on top of a ventilated table and put solvent-coated parts into the bin to dry instead of on the table top.

During the walk-through inspection, NIOSH investigators observed employees putting unprotected hands and arms into the tanks at the hydromount operation. When questioned about glove usage, two employees reported that the gloves they had been provided had developed holes and had not been replaced. Two other employees reported that they had requested respirators from the company numerous times, but their requests were either refused or unacknowledged. They reported that they were never given any reason for the refusals.

During the investigation, both eating and smoking were observed at workstations; and there were no hand-washing facilities seen near any of the workstations.

A review of the MSDSs was conducted for those chemicals used in the Toyo department. Of particular concern were the black water reduce dip enamel and several elastomer adhesives. All of these chemicals can potentially cause skin irritation, dermatitis, eye irritation, respiratory tract irritation, dizziness, headaches, and nausea. The MSDS for one of the elastomer adhesives, Chemlok 205, lists skin sensitization as a possibility from skin contact. The black water reduce dip enamel MSDS lists "severe irritation and dermatitis" as a possibility from skin contact.

Safety concerns were also noticed during the walk-through inspection. Employees in high noise areas were observed wearing radio headsets and not their hearing protection. The shields at the grinder/buffer operations were not being used properly. Also, employees were not clear about the emergency evacuation plan. Many were concerned because they thought that they were not allowed to leave during an emergency until their supervisor dismisses them. This policy apparently had existed; but, according to management, it had been changed and the change had been communicated to employees. At the time of the survey, however, some workers had apparently not yet

been clearly informed that they may immediately leave the building during an emergency.

Medical

Confidential interviews were conducted with six Toyo department employees who had been experiencing health effects that they felt were job related. Five of the six employees reported experiencing headaches and eye irritation, especially when working with primer paint around the flat sprayer. Four of the five stated that the fumes are worse as the parts come out of the sprayer oven, and suggested that the LEV in this area was insufficient because fumes tend to linger in the work area.

Four of the six employees reported having skin irritations in the form of rashes, blisters, or hives; and all four reported that they had been operating mold presses or bonders just prior to the outbreaks. Three of the four reported having "red, itchy hives" which covered their bodies and lasted anywhere from several days to several weeks. Each reported, however, that the burning, itching, and swelling decreased dramatically while away from the plant each evening and on weekends and vacations. Two of the four employees reported "blister-like" lesions on their eyelids; both noted that these blisters always occur during and after operating the inside sprayer in the Toyo department. One of the six employees reported episodes of "big cysts" on the face which eventually scabbed over and took approximately one month to heal, but left scars.

At the time of the NIOSH investigation, two of the employees were observed to have pinkish-red raised areas of skin of approximately a half to two centimeters in diameter, which were reported to be all over their bodies. One individual was observed to have vesicles on the undersides of both the upper and lower eyelids.

Two of the six employees reported respiratory symptoms. The first individual reported a dry cough which occurs daily. This cough developed approximately four months before the NIOSH site visit. It is now lasting into the night, but does seem to improve over weekends. The second individual reported difficulty breathing while working with the primer paint in the Toyo Department. This individual has since been working with a water based paint and reportedly has had no further difficulties.

Results of the informal interviews with a random selection of employees suggest that employees have been experiencing headaches; nausea; dizziness; skin irritation; respiratory irritation; or eye, nose and throat irritation during the past year. The symptoms seem to occur when working at or near the mold presses, the inside and flat sprayers and ovens, and the roll coater. Many mentioned the primer paint and the mold spray as likely sources of irritation. Several mentioned having had symptoms when exposed to open

paint tanks and cleaning solvents. Many of the employees complained about the use of compressed air to blow out the molds, which they felt could potentially increase their dust exposure. One employee reported breaking out in "red, itchy bumps, much like mosquito bites" after being sprayed with core dust that was blown from one of the molds. Employees reported that during the preceding winter the exhaust ventilation systems were not operated at all and that fumes and odors filled the department. They also reported that even with the exhaust systems operating, fumes and odors often fill the area. Employees also stated that there have been times when make-shift operations were set-up and operated with no LEV, and that the fumes and odors were especially bad during those times.

Most of the employees noted that they had received training regarding the chemicals they specifically used, but not about the ones with which they only had infrequent contact. Other issues that appeared to be of concern to the employees were reproductive problems, such as miscarriages, and ergonomic problems, such as carpal tunnel syndrome.

The OSHA 200 Injury and Illness Logs were reviewed for indications of recurrent injuries and illnesses in the Toyo Department, especially those that have symptoms similar to those described by the employees. From 1989 through June 1994, the Toyo Department had five reported cases of rashes/contact dermatitis over multiple body parts. Other departments also had reported cases of rashes/dermatitis during this time period. Silentbloc Assembly had six, Injection Molding had two, and Silentbloc Workcell and Production Welding each had one. In general, the OSHA 200 Logs showed higher incidences per department of contusions (including lacerations and abrasions) and potential ergonomic injuries (including strains and repetitive trauma disorders) than of rashes/dermatoses.

VII. CONCLUSIONS

There appears to be a lack of communication and trust between the workers in department 634 and management. Workers reported that PPE is not provided properly; management reported that workers do not use it properly. NIOSH investigators witnessed both situations. The poor communication is serious enough that, at the time of the survey, some workers might have remained at a workstation in an emergency situation because they believed that it was policy. Efforts will need to be made by both sides to resolve this situation.

All of the measured air concentrations suggested that at the time of the survey, there was no significant acute hazard from inhaling organic solvent vapors in this work area. However, the combination of several organic solvent vapors can have additive effects; and, even at low levels, could result

in the symptoms of headaches, dizziness, and nausea, which are being experienced by some of the workers in this area.

Based on the reported symptoms, some employees could be experiencing irritant or allergic reactions. Many of the rubber components and the adhesives and elastomers used in department 634 can potentially cause irritant or allergic reactions, but so can many non-occupational exposures. There may not be only a single cause for some of these reactions; it could be a combination of exposures. If the cause appears to be work-related, eliminating, or at least reducing, exposures to the suspected causes is the best prevention for those experiencing these reactions. The symptoms of a person sensitized to an allergen often worsen with increased or prolonged exposure to that allergen. Engineering controls, administrative controls, and PPE can be used to reduce exposure.

The issues of miscarriages and ergonomic problems were not specifically addressed in this hazard evaluation. There are no exposures in department 634 to chemicals associated with a higher incidence of miscarriages, and the ergonomic issues can be evaluated by an outside consultant. Other Gen Corp Automotive plants have hired a consultant to do total ergonomic evaluations.

VIII. RECOMMENDATIONS

1. Rubber manufacturing involves employee contact with many compounds that can cause allergic reactions -- accelerators, antidegradents, fillers, and adhesives are a few examples. When employees demonstrate symptoms that suggest an allergic reaction, Gen Corp Automotive management should be receptive to the possibility, deal with each situation individually, and work with the employee(s), listening to their ideas, to try to alleviate the problem. It is important to educate the workers about allergic reactions so that they understand that not everyone exposed will have the same, if any, reaction.

Many exposures in this industry can also irritate the skin, eyes, or respiratory tract as well. Irritations can be experienced by anyone and can also be alleviated by reducing exposure. Gen Corp Automotive should have a mechanism for medical evaluation and appropriate exposure controls and accommodations for affected employees.

2. The operations in department 634 should not be run without the proper ventilation systems. Also, LEV systems should not be turned off in the winter in an effort to save on heating costs. The exhaust is necessary all year to minimize the worker exposures. Since workers complain of symptoms such as headaches, dizziness, and nausea that can be associated with low level solvent exposure, it would be prudent to

evaluate the ventilation systems (both LEV and general), to insure that they are functioning properly.

3. Since many of the chemicals used in department 634 are skin irritants and may also be absorbed through the skin, the proper skin protection is necessary. Apparently, Gen Corp Automotive was in the middle of implementing a program for proper glove selection and use at this plant during the NIOSH site visit. It is important that this program be started and enforced. Employees and management should be aware of which gloves are necessary for which operation and where replacement gloves are located. Cotton gloves should never be worn when working with solvents.
4. Besides inhalation and skin absorption, a third route of chemical exposure is through ingestion. This route is not as common in industry, but is possible when employees are allowed to eat and smoke in the work area. Separate eating and smoking areas need to be established and employees should always wash thoroughly before doing either.
5. Communication and trust between employees and management is necessary for a good health and safety program. Management should openly communicate with employees about health and safety issues, not just the required hazard communication. Employees should be able to discuss health and safety concerns with management and offer resolutions. When management has decided how to handle a problem, the solution should be communicated to the workers -- even if the solution is that nothing can be done at this time (with an explanation, of course). Management needs to listen to the legitimate concerns of workers; and workers need to know how their concerns are being addressed. A joint union-management health and safety committee can be an effective tool for communication, as long as each side feels they have trustworthy representation. The monthly safety meetings would be another avenue of communication, but the supervisors must serve as the link, making sure to communicate from employees to upper management and vice versa.
6. Gen Corp Automotive should consider performing an ergonomic evaluation at this plant. Most processes in department 634 (and this plant) are repetitive in nature, and the OSHA 200 Injury and Illness Logs did show some cases of strains, sprains, and cumulative trauma disorders.
7. Personal radio headsets do not offer hearing protection for the wearer and therefore should not be allowed in place of hearing protection (HP) in areas where HP is required. A recent development has resulted in the marketing of an earmuff with a gain-limited FM radio built into the muff so that workers can have protection from noise and still listen to radio programs while working. Even without high levels of background noise,

many personal radio headsets are capable of producing hazardous noise levels when the volume controls are set to the higher levels. The volume controls of an individual's radio are difficult to control and monitor to assure that sounds are always maintained at nonhazardous levels. Gen Corp Automotive should educate employees on the use of personal radio headsets in areas where HP is not required.

8. Since surface lead contamination has previously been detected by an outside consultant, NIOSH investigators recommend that Gen Corp Automotive prohibit the consumption of food and beverages, use of tobacco products, application of cosmetics, and similar activities that could result in the ingestion of lead in the work area. Employees should be instructed to wash thoroughly before engaging in such activities.

IX. REFERENCES

1. CDC [1992]. NIOSH recommendations for occupational safety and health: Compendium of policy documents and statements. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 92-100.
2. Code of Federal Regulations [1993]. OSHA Table Z-1. 29 CFR 1910.1000. Washington, DC: U.S. Government Printing Office, Federal Register.
3. ACGIH [1993]. 1993-1994 Threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
4. NIOSH [1987]. Current Intelligence Bulletin 48: Organic solvent neurotoxicity. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 87-104.
5. NIOSH [1990]. Pocket Guide to Chemical Hazards. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 90-117.
6. Proctor NH, Hughes JP, Hathaway GJ, Fischman ML [1991]. Chemical Hazards of the Workplace. 3rd ed. New York: Van Nostrand Reinhold.

