HETA 93–0596–2533
Rex–Nord Bearing Company
Indianapolis, Indiana

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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.

ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Calvin K. Cook and Michael Parker, M.D., of the Hazard Evaluations and Technical Assistance Branch, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS). Field assistance was provided by David Marlow, Hazard Evaluations and Technical Assistance Branch, DSHEFS. Desktop publishing by Ellen E. Blythe.

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Health Hazard Evaluation Report 93–0596–2533
Rex–Nord Bearing Company
Indianapolis, Indiana
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SUMMARY

In February 1993, the National Institute for Occupational Safety and Health (NIOSH) received a request from the United Steelworkers Union, Local #1150, to conduct a health hazard evaluation (HHE) at the Rex–Nord Bearing Division located in Indianapolis, Indiana. The request reported employees with respiratory problems and skin irritation believed to be related to cutting fluid exposures during the production of bearings and bearing components.

On September 28, 1993, an initial site visit was made by NIOSH medical and industrial hygiene personnel. NIOSH investigators conducted a walk–through survey of the plant that included review of plant injury and medical records, confidential medical interviews with employees, review of pertinent Material Safety Data Sheets (MSDSs), and collection of bulk cutting fluid samples. No cases of respiratory disease were identified, however, a number of cases of skin diseases, including contact dermatitis, cellulitis or skin infection and skin burns were noted in company medical records. Analysis of bulk cutting fluid samples collected from the Bearing Plant's grinding machines detected nitrosamine compounds and microbiological contaminants.

On January 26–27, 1994, a return visit was made by NIOSH industrial hygienists to perform environmental monitoring for nitrosamine compounds, oil mists, and petroleum hydrocarbon compounds. Environmental monitoring results revealed personal breathing–zone (PBZ) exposures to nitrosamines (N=13) that were below the analytical detection limit. PBZ measurements (N=12) for oil mists ranged from none–detected to 1.39 milligrams per cubic meter (mg/m^3), below the NIOSH and the Occupational Safety and Health Administration (OSHA) exposure criteria for mineral oil mist of 5 mg/m^3 as an 8–hour time–weighted average (TWA). Personal air samples (N=2) collected for total hydrocarbons (as refined petroleum products) revealed TWA concentrations of 44.8 mg/m^3 and 61.3 mg/m^3, below the NIOSH recommended exposure limit (REL) of 350 mg/m^3. The highest TWA concentrations for xylene were 0.74 mg/m^3, well below the NIOSH and OSHA exposure criteria of 435 mg/m^3.

Based on the environmental and medical data obtained during the evaluation, NIOSH investigators determined that a potential health hazard existed at the Rex–Nord Bearing Company. The investigators concluded that, although airborne exposures to nitrosamines were none–detected, bulk sample analyses indicate that nitrosamines are present in the cutting fluids. Skin contact with cutting fluids should be avoided because these compounds as a group are classified as potential occupational carcinogens. Recommendations are made in this report to implement feasible means of avoiding worker exposures to cutting oils by providing additional or more effective splash guards, providing proper personal protective equipment, and encouraging good personal hygiene practices.

Keywords: 3463 (Nonferrous Forgings), nitrosamines, oil mist, skin irritation, cutting fluids, respiratory irritation, dermatitis, hydrocarbons.

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INTRODUCTION

On February 1, 1993, the National Institute for Occupational Safety and Health (NIOSH) received a request from the United Steelworkers Union, Local #1150 to conduct a health hazard evaluation (HHE) at the Rex–Nord Bearing Division located in Indianapolis, Indiana. The request stated that workers were concerned about reports of respiratory problems and skin irritation that were potentially related to cutting fluid exposures during the production of bearings and bearing components for agricultural machinery.

On September 28, 1993, an initial site visit was made by NIOSH medical and industrial hygiene personnel. This visit included an opening conference with management and employee representatives, a walk–through survey of the plant, review of the Occupational Safety and Health Administration (OSHA) Form 200 Injury and Illness Logs, confidential medical interviews with employees, review of pertinent Material Safety Data Sheets (MSDSs), and collection of bulk cutting fluid samples. Analyses of bulk samples identified the presence of nitrosamine compounds. On January 26–27, 1994, a return visit was made to perform an industrial hygiene survey in Grinding Department #131 to assess worker exposures to airborne oil mists and nitrosamine compounds. During this second visit, NIOSH was also asked to perform air monitoring in Inspection Department #320 to evaluate worker exposures to petroleum hydrocarbon compounds present in a rust inhibitor solution applied to bearings.

BACKGROUND

The Rex–Nord Bearing Plant manufactures various types of bearings for agricultural machinery. Bearing parts are made of a variety of metals such as aluminum, babbitt, bronze, cast iron, and alloy steel. The 30,000-square-foot facility employs about 400 workers over three 8–hour shifts.

Grinding Department #131 employs about 80 workers (first shift: 40 workers, second shift: 25 workers, third shift: 15 workers) and is divided into four quadrants (northeast, southeast, northwest, and southwest), an area which comprises a total of 50 grinding machines. Each quadrant is served by an independent coolant distribution system which uses a water-soluble, mineral oil–based cutting fluid. The cutting fluid is also comprised of 10% triethanolamine and 10% ethanolamine. There is a filtration system designated for each of the north and south quadrants. These two centralized filtration systems are designed to remove metal particulates, hydraulic fluid, and other debris present in used cutting fluid. Cutting fluid in each system is monitored daily for pH, bacteria, and fungi. The fluids are completely replenished annually. To control biological growth, workers applied a biocide cleaning solution containing 2–butoxyethanol to cutting fluid systems as needed.

Several engineering controls were present in Grinding Department #131 to control oil mists. In the north quadrants, four ceiling–mounted exhaust fans were present, while two exhaust fans were present in the south quadrants. Each ceiling fan exhausted air directly to the roof outdoors. An Aerocology® Mist Collector, located in the south quadrant, was connected to frequently used grinding machines. All but three grinding machines were adequately equipped with splash guards to prevent cutting fluids from discharging from machines during operation.

Inspection Department #320 employs about 12 workers (generally four per shift). In this department, bearing parts and accessories are thoroughly inspected for quality control and treated with a rust inhibitor solution that contains 10–20% mineral oil and 30–60% petroleum solvents. Workers in this department were primarily concerned with their exposures to petroleum solvent components.

EVALUATION AND METHODS

Industrial Hygiene Evaluation

Oil Mist

In accordance with NIOSH sampling and analytical method 5026, 12 full–shift personal breathing–zone (PBZ) and four area air samples for oil mist were collected on 37-millimeter (mm) mixed cellulose ester (MCE) filters, using battery–operated air sampling pumps calibrated at a flow rate of 1 liter per minute (lpm).[1] The area air samples were collected at grinding machines in operation. Samples were analyzed by infrared spectrophotometry; the limits of detection and quantitation (LOD and LOQ) for this sample set were 100 micrograms (µg) per sample and 340 µg per sample, respectively.

Nitrosamines

In accordance with NIOSH sampling and analytical method 2522, 17 air samples (13 PBZ, four areas) were collected on Thermosorb/N® air samplers connected to high–flow air pumps operating at a flow rate of 2 lpm.[1] All samples were analyzed using gas chromatography (GC) with a capillary column. A high–resolution mass spectrometer (MS) operated in the selected ion–monitoring (SIM) mode was used to confirm the identity of any compound that eluted at the same retention time as the nitrosamine standards by monitoring its molecular ion. In this way, the chromatographic peak was confirmed as the nitrosamine compound of interest. The LOD for this sample set was less than 0.10 µg per sample. Sixteen bulk samples of used and unused cutting fluids were collected and analyzed for nitrosamines by GC\SIM.

Total Hydrocarbons

In accordance with NIOSH sampling and analytical method 1600, two full–shift PBZ samples and one area sample for total hydrocarbons were collected on workers located in Inspection Department #320.[1] PBZ samples were analyzed quantitatively based on the qualitative results of the area sample. Air samples for total hydrocarbons were collected on 150 milligram (mg) charcoal tubes, using battery–powered air sampling pumps calibrated at a flowrate of 0.20 lpm.

Medical Evaluation

A NIOSH occupational medicine physician reviewed the 1992 and 1993 OSHA Log and Summary of Occupational Injuries and Illnesses (Form 200). During the initial site visit, employees were informed by union representatives that confidential medical interviews were available with the NIOSH physician; 16 self–selected employees chose to speak with the NIOSH physician. From the OSHA 200 logs and the medical interviews, the physician obtained information regarding occupational illnesses and injuries at the plant. The company's file of MSDS sheets was also reviewed to obtain information on the chemicals used in the work areas in question.

EVALUATION CRITERIA

General

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for the assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of exposure to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working lifetime without experiencing adverse health effects. It is, however, important to note that not all workers will be protected from adverse health effects even though their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a pre–existing medical condition, and/or hypersensitivity (allergy). In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at the level set by the criterion. These combined effects are often not considered in the evaluation criteria. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are the following: (1) NIOSH Recommended Exposure Limits (RELs),[2] (2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLVs),[3] and (3) the U.S. Department of Labor, OSHA Permissible Exposure Limits (PELs).[4] In July 1992, the 11th Circuit Court of Appeals vacated the 1989 OSHA PEL Air Contaminants Standard. OSHA is currently enforcing the 1971 standards which are listed as transitional values in the current Code of Federal Regulations; however, some states operating their own OSHA approved job safety and health programs continue to enforce the 1989 limits. NIOSH encourages employers to follow the 1989 OSHA limits, the NIOSH RELs, the ACGIH TLVs, or whichever is the most protective criterion. The OSHA PELs reflect the feasibility of controlling exposures in various industries where the agents are used, whereas NIOSH RELs are based primarily on concerns relating to the prevention of occupational disease. It should be noted when reviewing this report that employers are legally required to meet those levels specified by an OSHA standard and that the OSHA PELs included in this report reflect the 1971 values.

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

A list of the substances evaluated in this survey is presented in Table I, along with a brief summary of primary health effects. For total hydrocarbons, only xylene was found in significant concentrations.

RESULTS

Industrial Hygiene Evaluation

Air sampling results revealed 8–hour TWA concentrations for oil mist that ranged up to 1.39 milligrams per cubic meters, (mg/m^3), well below both the NIOSH REL and OSHA PEL of 5 mg/m^3 as an 8–hour TWA. Nitrosamines were not detected in any of the air samples.

While the qualitative analyses for total hydrocarbons identified numerous aliphatic compounds, the most predominant compound identified was xylene. Two full–shift area air samples for xylene revealed TWA concentrations of 0.24 mg/m^3 and 0.74 mg/m^3, well below both the NIOSH REL and OSHA PEL of 450 mg/m^3 as an 8–hour TWA. Total hydrocarbon concentrations for these air samples were 44.8 mg/m^3 and 61.3 mg/m^3, and both were well below their most stringent exposure criteria for refined petroleum products of 350 mg/m^3 recommended by NIOSH as an 8–hour TWA.

Medical Evaluation

No cases of respiratory disease were listed on the OSHA 200 logs for the years 1992 and 1993. In addition, no employee reported respiratory conditions during interviews with employees.

Several cases of skin disorders, including contact dermatitis, cellulitis (skin infection), and burns were recorded in the OSHA 200 log for 1992 (10 total cases) and 1993 (11 total cases). The majority of the dermatitis on the hands and forearms was confirmed by interviews. No records were available to determine whether the etiology of the dermatitis cases was irritant or allergic. MSDS review revealed several chemical compounds in use in Departments

131 and 320 that could cause acute skin and mucous membrane irritation or burns, and also irritant or allergic contact dermatitis.

DISCUSSION AND CONCLUSIONS

There were several compounds in use at the plant during this survey which have properties known to cause allergic and irritant contact dermatitis. Contact dermatitis is the most common form of occupationally acquired skin disease. Criteria have been presented in the literature for determining occupational causation, as have methods of prevention.[5,6] Basic elements of prevention planning include hazard recognition, hazard control, personal protection, hygiene, education, motivation, and medical screening.

Air sampling results clearly indicate that workers in Grinding Department #131 and Inspection Department #320 are not exposed to significant air concentrations of oil mist, nitrosamines, and total hydocarbons. Based on the carcinogenic properties of nitrosamine compounds that are often present in cutting fluids, the U.S. Environmental Protection Agency (EPA) has banned the use of these compounds in cutting fluids. Many cutting fluids, however, contain amine compounds (e.g., ethanolamine) that react to produce nitrosamines in cutting fluids during the machining of metal parts. Although nitrosamines were not detected in air samples collected in the grinding areas, they were present in bulk cutting fluids. Thus, dermal exposure to nitrosamines in cutting fluids may pose a health hazard to workers.

RECOMMENDATIONS

1. The job or work practice which is suspected to cause a contact dermatitis case should be evaluated to determine if exposures related to the job are causative agent(s). Attempts should be made to eliminate or minimize the exposure(s) through process engineering controls (such as isolation or containment) if technically feasible. For example, the splash guards on older grinding machines could be improved by providing additional or more effective splash guards.

2. The frequencies with which specific chemicals in use cause allergic contact dermatitis in workers at highest risk (based on MSDS information, work patterns, and plant use) should be ascertained by the medical and safety/hygiene personnel for the plant. Cutaneous patch testing may be accomplished through contractual arrangements with medical practitioners skilled in this procedure (usually dermatologists). This knowledge may assist in limiting the persistence or chronicity of contact dermatitis and afford earlier and proper treatment for the workers by health care providers.

3. Appendix A contains information on the use of skin cleaners, protective clothing, and barrier creams. In addition, the following recommendations would be applicable in any situation where employees are handling materials which may cause skin irritation or sensitization.

   a. Workers should be periodically educated about the effects of the chemicals which they work with and the types of work practices that will minimize their exposure to them.

   b. Good factory housekeeping should be emphasized.

   c. Any skin problem should be immediately reported to the medical department.

4. Workers who handle bearing parts that are coated with cutting oils and petroleum solvents should be provided with and instructed to wear protective gloves that are resistant to permeation by these substances. If proper protective clothing is not selected, these toxic chemicals can be absorbed through the skin. Nitrile rubber offers good permeation resistance to both cutting oils and petroleum solvents.[8] While this glove material offers

permeation resistance, a glove's resistance to cuts, snags, abrasions, punctures, or tears must also be considered. Another factor is an adequate sleeve (or cuff) length to protect the forearm from solvent exposure.

REFERENCES

1. NIOSH [1994]. Manual of analytical methods, 4th edition. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 94–113.

2. CDC [1988]. NIOSH recommendations for occupational safety and health standards. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health. MMWR 37 (suppl S–7).

3. ACGIH [1994]. 1994–1995 Threshold limit values for chemical substances and physical agents and biological exposure indices for 1991–92. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

4. Code of Federal Regulations [1989]. OSHA Table Z–1. 29 CFR 1910.1000. Washington, DC: U.S. Government Printing Office, Federal Register.

5. NIOSH [1989]. Proposed national strategy for the prevention of dermatological conditions. 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. 89–136.

6. Tucker SB, Key MM [1992]. Occupational skin disease. In W.N. ROM (ED) Environmental and occupational medicine, 2nd edition. Little Brown and Company, Boston, MA.

7. Proctor NH, Hughes JP, Fischman ML [1991]. Chemical hazards of the workplace, 3rd ed. Philadelphia, PA: Van Nostrand Reinhold, pp. 553.

8. Mansdorf SZ [1993]. Quick selection guide to chemical protective clothing, 2nd ed. Van Nostrand Reinhold, New York, NY.

TABLE I

HEALTH EFFECTS SUMMARY
REX–NORD BEARING COMPANY
INDIANAPOLIS, INDIANA
HETA 93–0596-2533

Substance	Primary Health Effects
Mineral Oil Mists	Mineral oil mist includes airborne mist of petroleum–based cutting oils. Mineral oil mist is considered to be of low toxicity, and epidemiological studies of exposed workers indicated a lack of illness related to these exposures. Excessive exposure could result in eye or respiratory tract irritation. The NIOSH REL and OSHA PEL for mineral oil mist is 5 mg/m^3 as an 8–hour TWA, and NIOSH has recommended 10 mg/m^3 as a 15 minute STEL.
Nitrosamines	Only one nitrosamine, nitrosodimethylamine (NDMA), is regulated in the United States. Both OSHA and NIOSH consider NDMA an occupational carcinogen, recommending that its exposure be reduced to the lowest feasible concentration. There are no established *numerical* exposure limits in this country for nitrosamines.
Xylene	Xylene is an irritant to the eyes, nose, throat, mucous membranes, and skin. Occupational exposure to xylene has been reported to cause headache, vertigo, stomach, discomfort, and giddiness. High exposure concentrations can cause narcosis (stupor). The current OSHA PEL, NIOSH REL, and ACGIH TLV for xylene are 435 mg/m^3 over an 8-hour TWA. In addition, OSHA and NIOSH have published STELs for xylene of 655 mg/m^3 averaged over 15 minutes.

APPENDIX A

Use of Skin Cleaners, Protective Clothing, and Barrier Creams

Skin Cleaners

Skin cleaners remove dirt, grease, and hazardous substances from the skin. Unfortunately, detergents in the cleaners can act as irritants. In addition, the cleaners sometimes contain mild abrasives and proteolytic enzymes which are added to improve cleaning and which can also act as irritants. "Following repeated use of skin cleaners, especially those with abrasive substances, the skin barrier may be broken down, leading to penetration through the epidermis of any potentially harmful substance that the worker may be using. This is the major cause of industrial irritant hand dermatitis and is a frequent background condition upon which contact allergic sensitization develops."[1] The backs of the hands and forearms (where the protective layers of the skin are relatively thin compared to that of the palm) are particularly susceptible to irritant dermatitis. Cleaners that contain abrasives are best used on the palm and even there, sparingly.

Waterless hand cleaners are skin cleaners that work without water. They are formulated to remove difficult oil and grease stains that cannot be easily removed with ordinary cleaners. The cleansing agent in a waterless hand cleaner can be a solvent, an organic amine, or an anionic detergent. Some of these agents can be irritating. Solvent- containing products are the most irritating. Those which contain anionic detergents are less irritating. In general, waterless hand cleaners are less irritating to the skin than cleaners that contain abrasives. However, those that contain solvents should be used sparingly during the day and after use, the potentially irritating residual film should be washed off with mild soap and water. Waterless hand cleaners must be removed from the skin after use. If towels are used to remove these waterless cleaners, they may contain significant amounts of irritating materials by the end of a shift. Thus, towels should be replaced at frequent intervals; better still, disposable towels should be provided.

The following general rules are appropriate for many occupational exposures.[2]

- Use the mildest soap for skin cleansing which will do the job.
- Use waterless hand cleaners instead of abrasive soaps for removing difficult oil and grease stains on the backs of hands and forearms.
- Use abrasive soaps only for removing difficult oil and grease stains on palmar skin.
- Use waterless cleaners and abrasive soaps sparingly and only when necessary. Do not, however, use them on inflamed skin.
- Wash the residual film of waterless hand cleaner off the skin with mild soap and water.
- Use a skin moisturizer after contact with soap or detergent, particularly if frequent hand washing or contact with industrial detergent is unavoidable. This will help combat the skin–drying effect of the detergent.

Protective Clothing

Manufacturers of protective clothing provide guidelines for selection of materials for various types of exposure. However, these recommendations are qualitative and imprecise and almost never indicate the criteria upon which the evaluations were made. For example, aprons should cover the front of the body (to below the knees), be washable and lightweight, have heat–sealed seams without cloth stitching, and contain a trough at the base to prevent spillage onto footwear. They may need to be laundered daily.

Leather and canvas gloves can be used for handling dry materials. (Liquids make leather slippery and cause it to deteriorate.) Rubber and plastic gloves — which come in surgical, household, and industrial varieties — can be used for liquids. Natural rubber gloves can be made out of latex that contains isoprene and several additives. Synthetic rubber gloves may be made out of butyl rubber, neoprene, fluorocarbon rubber (such as Viton®), nitrile rubber, and styrene butadiene rubber. Plastic gloves may be made out of ethylene methyl acrylate, ethylene vinylacetate, polyethylene, polyvinyl alcohol, and polyvinyl chloride.

There is a great variation in the resistance of these gloves to specific chemicals. In addition, there can be significant differences in performance between glove materials of the same nominal composition from different manufacturers.[3] As with other types of personal protective equipment, maintaining a variety of sizes and models improves the selection, fit, protection, and comfort afforded workers.

In general, gloves should cover at least one–third of the forearm and fit snugly. Rubber and plastic gloves should be lined with cloth or another sweat–absorbing material. If they are worn for an entire shift, they should periodically be taken off to allow the skin to "breathe." This is especially true for finger cots, which are very occlusive. Surgical gloves should not be worn more than once and other gloves should be replaced if they become torn or if the insides become contaminated. (Insides can become contaminated if workers allow their bare hands to contact the substances they are working with and then place their hands inside clean gloves. This can be avoided by always wearing gloves when dealing with potentially hazardous agents.)

It should be noted that gloves can sometimes cause skin problems, such as itching, excessive sweating, and rashes. Possible causes for this include allergenic substances in the glove material, powder and linings, and occlusion effects. In addition, latex gloves may cause contact urticaria, systematic allergic reactions such as asthma, and in rare cases anaphylaxis.

Sleeves should cover the entire arm, including the wrist, and should be worn over the tops of gloves, rather than being tucked into them. Like aprons, they may need to be laundered daily.

Barrier Creams

Barrier creams are creams applied to the skin to protect it from hazardous substances. They are used when gloves or other protective clothing cannot be safely or conveniently utilized. Barrier creams are either nonspecific (i.e., broad–purpose) preparations or specific chemical neutralizers. The nonspecific preparations include vanishing creams, water–repellent creams, oil/solvent–repellent creams, and ionic exchangers.

Vanishing creams are somewhat effective against dust, glass fibers, and heavy oils, but not against water–soluble substances, many oils, and solvents. Water–repellent creams offer protection against water–soluble substances, acids, alkalies, soaps and detergents, but not against oils or solvents. A major problem with them, however, is that they are very greasy and slippery. Oil/solvent–repellent creams are useful against dusts, oils, solvents, and resins. Unfortunately, since they are water soluble, they tend to come off with perspiration.

The primary question is whether barrier creams can prevent or decrease the incidence of skin disease when used under working conditions. Unfortunately, the answer to this question is still unknown in most instances and, in fact, many barrier creams evaluated have not demonstrated substantial efficacy.[4] In addition, barrier creams provide a false sense of security, trap hazardous chemicals on the skin and/or increase their penetration, and may contain preservatives, fragrances, soaps, and other substances that may be irritants or allergens in some individuals.[4]

1. Adams R [1983]. Occupational skin diseases. Grune and Stratton, New York, New York.

2. Mathias CGT [1986]. Contact dermatitis from use or misuse of soaps, detergents, and cleansers in the workplace. Occupational Medicine: State of the Art Reviews, Vol. 1(2):205–218.

3. Tewari J [1980]. Differences in the extent of solvent penetration through natural rubber and nitrile gloves from various manufacturers. American Industrial Hygiene Journal 41:527–528. Akron, Ohio.

4. Orchard S [1984]. Barrier creams. Dermatologic Clinics, Vol. 2(4):619–629.