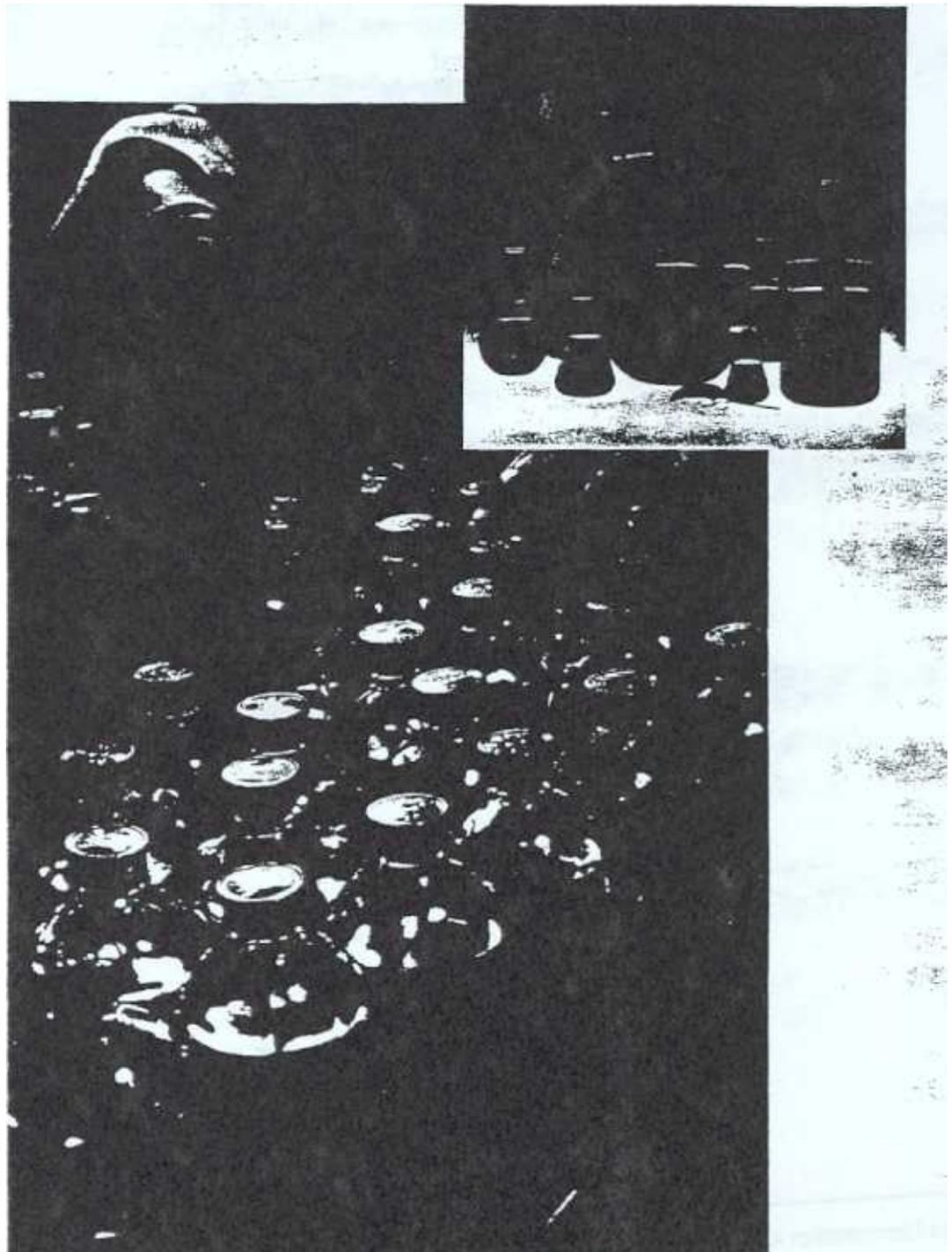


Hazard Communication A Compliance Kit



U.S. Department of Labor
Occupational Safety and Health

OSHA 310
1999 (R)



Hazard Communication A Compliance Kit



U.S. Department of Labor
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This guide is intended primarily to assist employers who use hazardous chemicals in their workplaces to comply with the Hazard Communication Standard promulgated by the Occupational Safety and Health Administration (OSHA). The Hazard Communication Standard gives workers the right to know the hazards and identities of chemicals in their workplaces. A copy of the rule is included in Appendix I. This guide will serve equally well the needs of general industry, maritime, agriculture, and construction employers. This compliance kit provides guidance on the step-by-step requirements for complying with the Hazard Communication Standard.

Specifically, it identifies the components of a hazard communication program and a worker training program. It explains how to use material safety data sheets (MSDSs) and how to identify

and list hazardous chemicals present in the workplace. The kit also provides references, resources, and contacts to assist employers in obtaining additional information on the hazard communication regulation. This kit can be expanded by the employer to meet his/her individual needs, including company hazard communication and training programs, MSDSs and requests for MSDSs, and training or other records.

Employers should be aware that OSHA's Hazard Communication Standard requires them to include in their written hazard communication program "the methods the employer will use to provide the other employers (on a multi-employer worksite) with a copy of the material safety data sheet, or to make it available at a central location in the workplace, for each hazardous chemical the other employer(s)' employees may be exposed to while working."

Tab A

Steps to Come into Compliance

Check with your purchasing department to ensure that all hazardous chemicals purchased are included on your list.

Review your list and determine whether any substances are exempt (see paragraph (b) especially (b)(5) and (b)(6) of the rule for exemptions).

Establish a file on hazardous chemicals used in your workplace, and include a copy of the latest MSDS, and any other pertinent information.

Develop procedures to keep your list current. When new substances are used, add them to your list.

3. Obtain material safety data sheets for all chemical substances.

- If you do not have an MSDS for a hazardous substance in your workplace, request a copy from the chemical manufacturer, distributor or importer as soon as possible. (See Tab H for a sample letter requesting an MSDS.) An MSDS must accompany or precede the shipment and must be used to obtain identifying information such as the chemical name and the hazards of a particular substance.
- Review each MSDS to be sure that it is complete and clearly written. The MSDS must contain the physical and chemical properties of a substance, as well as the physical and health hazards, routes of exposure, precautions for safe handling and use, emergency and first-aid procedures, and control measures. (See Tab F for a sample MSDS and other information. Also, for a sample copy of the American National Standards Institute (ANSI) MSDS, write ANSI, 11 West 42nd Street, New York 10036.)

If the MSDS is incomplete or unclear, contact the manufacturer or importer to get clarification on the missing information.

Make sure the MSDS is available to employees, designated representatives, and to the Assistant Secretary for Occupational Safety and Health.

- If MSDSs are available electronically, be sure no barriers exist and that a backup system is in place.

4. Make sure that all containers are labeled.

The manufacturer, importer or distributor is responsible for labeling containers, but the employer must adhere to the following:

- Ensure that all containers of hazardous substances in the workplace are labeled, tagged or marked and include the identity of the hazardous chemical, and the appropriate hazard warnings. Container labels for purchased chemicals must also include the name and address of the chemical manufacturer, importer, or other responsible party.
- Check all incoming shipments of hazardous chemicals to be sure that they are labeled.
- If a container is not labeled, obtain a label or the label information from the manufacturer, importer, or other responsible party or prepare a label using information obtained from these sources. Employers are responsible for ensuring that containers in the workplace are labeled, tagged, or marked.
- **Any employer who receives a package of hazardous material which is required to be marked, labeled, or placarded in accordance with the U.S. Department of Transportation's Hazardous Materials Regulations (49 CFR Parts 171 through 180) must retain those markings, labels, and placards on the package until the packaging is sufficiently cleaned of residue and purged of vapors to remove any potential hazards. (1910.1201(a))**
- Do not remove or deface existing labels on containers unless the container is immediately marked with the required information.
- **Instruct employees on the importance of labeling portable receptacles into which they have poured hazardous substances. If the portable container is for their immediate use, then the container does not have to be labeled.**

Introduction

About 35 million workers are potentially exposed to one or more chemical hazards. There are hundreds of thousands of existing chemical products, and hundreds of new ones are being introduced annually. This poses a serious problem for exposed workers and their employers. Chemical exposure may cause or contribute to many serious health effects such as heart ailments, kidney and lung damage, sterility, cancer, burns, and rashes. Some chemicals may also be safety hazards and have the potential to cause fires and explosions and other serious accidents.

Because of the seriousness of these safety and health problems, and because many employers and employees knew little or nothing about them, the Occupational Safety and Health Administration (OSHA) issued, in 1983, a rule called "Hazard Communication" that applied to employers in the manufacturing sector of industry. The scope of the rule was expanded in 1987 to include employers in the non-manufacturing sector as well. In 1994, OSHA modified the rule to add and clarify certain exemptions from labeling and other requirements; modified and clarified aspects of the written hazard communication program and labeling requirements; clarified and slightly modified the duties of distributors, manufacturers, and importers to provide material safety data sheets (MSDSs) to employees; clarified certain provisions regarding MSDSs. (See Appendix I for a copy of the final rule, *Title 29 Code of Federal Regulations (CFR)*, Part 1910.1200, promulgated on February 9, 1994. Further explanation is contained in the **Federal Register** 59(27):6126-6184, February 9, 1994.)

The basic goal of the standard is to ensure that employers and employees know about chemical hazards in their workplaces and protective measures to be taken to prevent harmful exposures. This knowledge, in turn, should help to reduce the incidence of chemical source illnesses and injuries.

What the Standard Requires

The Hazard Communication Standard establishes uniform requirements to assure that the hazards of all chemicals imported into, produced or used in U.S. workplaces are evaluated, and that the resultant hazard information and associated protective measures are transmitted to affected employers and potentially exposed employees.

Chemical manufacturers and importers must convey the hazard information they learn from their evaluations to downstream employers by means of labels on containers and material safety data sheets (MSDSs). In addition, all covered employers must have a hazard communication program to get this information to their employees through labels on containers, MSDSs, and training.

This program ensures that all employers receive the information they need to inform and train their employees properly and to design and put in place employee protection programs. It also provides necessary hazard information to employees, so they can participate in, and support, the protective measures in place at their workplaces.

How to Comply with the Standard

The following steps should aid you in complying with the standard and in developing your hazard communication program. (See sample program, Tab B.)

1. Read the standard.

- Make sure you understand the provisions of the standard. The requirements of the standard that deal specifically with the hazard communication programs are (e) written hazard communication programs; (f) labels and other forms of warnings; (g) material safety data sheets; and (h) information and training.
- Know your responsibility as an employer.
- Identify responsible staff.

2. List the hazardous chemicals in the workplace.

Walk around the workplace, read all container labels, and list the identity of all materials that may be hazardous: the manufacturer's product name, location, and telephone number; and the work area where the product is used. Be sure to include hazardous chemicals that are used or generated in the work operation but are not in a container (e.g., piping systems, welding, and exhaust fumes).

5. Develop and implement a written hazard communication program.

This program must include:

- container labeling and other forms of warnings;

material safety data sheets;

- employee training based on the list of chemicals, MSDSs, and labeling information; and

methods for communicating hazards and protective measures to employees and others

methods the employer will use to provide employers at multi-employer workplaces on-site access to material safety data sheets and any precautionary measures that need to be taken to protect employees during normal operating conditions and in foreseeable emergencies.

inform employees who travel between workplaces during a workshift where the hazard communication program will be kept at the primary workplace facility.

The following sections of this kit will discuss each of these steps in more detail and provide you with samples of the material discussed as well as lists of products, services, and other resources.

Yes No

1. Listed all of the hazardous chemicals in our workplace.
 2. Established a file for information on hazardous chemicals.
 3. Obtained an MSDS for each hazardous chemical in use.
 4. Developed a system to ensure that all incoming hazardous chemicals are labeled.
 5. Reviewed each MSDS to be sure it is complete.
 6. Made sure that MSDS are immediately available where necessary.
 7. Developed a written hazard communication program.
 8. Developed a method to communicate hazards to employees and others.
 9. Informed employees of protective measures for hazardous chemicals used in the workplace.
 10. Alerted employees to other forms of warning that may be used.
-

Tab B

**Sample Hazard
Communication
Program**

Introduction

The Hazard Communication Standard requires you to develop a written hazard communication program, as discussed in Tab A.

The following is a *sample* hazard communication program that you may use as a guide in developing your program.

Our Hazard Communication Program

General Company Policy

The purpose of this notice is to inform you that our company is complying with the OSHA Hazard Communication Standard, *Title 29 Code of Federal Regulations* 1910.1200, by compiling a hazardous chemicals list, by using MSDSs, by ensuring that containers are labeled, and by providing you with training.

This program applies to all work operations in our company where you may be exposed to hazardous substances under normal working conditions or during an emergency situation.

The safety and health (S&H) manager, Robert Jones, is the program coordinator, acting as the representative of the plant manager, who has overall responsibility for the program. Mr. Robert Jones will review and update the program, as necessary. Copies of the written program may be obtained from Mr. Jones in Room SD-10.

Under this program, you will be informed of the contents of the Hazard Communication Standard, the hazardous properties of chemicals with which you work, safe handling procedures, and measures to take to protect yourselves from these chemicals. You will also be informed of the hazards associated with non-routine tasks, such as the cleaning of reactor vessels, and the hazards associated with chemicals in unlabeled pipes.

List of Hazardous Chemicals

The safety and health manager will make a list of all hazardous chemicals and related work practices used in the facility, and will update the list as necessary. Our list of chemicals identifies all of the chemicals used in our ten work process areas. A separate list is available for each work area and is posted there. Each list also identifies the corresponding MSDS for each chemical. A master list of

these chemicals will be maintained by, and is available from Mr. Jones' in Room SD-10.

Material Safety Data Sheets (MSDS)

MSDSs provide you with specific information on the chemicals you use. The safety and health manager, Mr. Jones, will maintain a binder in his office with an MSDS on every substance on the list of hazardous chemicals. The MSDS will be a fully completed OSHA Form 174 or equivalent. The plant manager, Jeff O'Brien, will ensure that each work site maintains an MSDS for hazardous materials in that area. MSDSs will be made readily available to you at your work stations during your shifts.

The safety and health manager, Mr. Jones, is responsible for acquiring and updating MSDS's. He will contact the chemical manufacturer or vendor if additional research is necessary or if an MSDS has not been supplied with an initial shipment. All new procurements for the company must be cleared by the safety and health manager. A master list of MSDSs is available from Mr. Jones in Room SD-10.

Labels and Other Forms of Warning

The safety and health manager will ensure that all hazardous chemicals in the plant are properly labeled and updated, as necessary. Labels should list at least the chemical identity, appropriate hazard warnings, and the name and address of the manufacturer, importer or other responsible party. Mr. Jones will refer to the corresponding MSDS to assist you in verifying label information. Containers that are shipped from the plant will be checked by the supervisor of shipping and receiving to make sure all containers are properly labeled.

If there are a number of stationary containers within a work area that have similar contents and hazards, signs will be posted on them to convey the hazard information. On our stationary process equipment, regular process sheets, batch tickets, blend tickets, and similar written materials will be substituted for container labels when they contain the same information as labels. These written materials will be made readily available to you during your work shift.

If you transfer chemicals from a labeled container to a portable container that is intended only for your immediate use, no labels are required on the portable container. Pipes or piping systems will not be labeled but their contents will be described in the training sessions.

Non-Routine Tasks

When you are required to perform hazardous non-routine tasks (e.g., cleaning tanks, entering confined spaces, etc.), a special training session will be conducted to inform you regarding the hazardous chemicals to which you might be exposed and the proper precautions to take to reduce or avoid exposure.

Training

Everyone who works with or is potentially exposed to hazardous chemicals will receive initial training on the Hazard Communication Standard and the safe use of those hazardous chemicals by the safety and health manager. A program that uses both audiovisual materials and classroom type training has been prepared for this purpose. Whenever a new hazard is introduced, additional training will be provided. Regular safety meetings will also be used to review the information presented in the initial training. Foremen and other supervisors will be extensively trained regarding hazards and appropriate protective measures so they will be available to answer questions from employees and provide daily monitoring of safe work practices.

The training plan will emphasize these items:

- Summary of the standard and this written program.

Chemical and physical properties of hazardous materials (e.g., flash point, reactivity) and methods that can be used to detect the presence or release of chemicals (including chemicals in unlabeled pipes).

Physical hazards of chemicals (e.g. potential for fire, explosion, etc.).

Health hazards, including signs and symptoms of exposure, associated with exposure to chemicals and any medical condition known to be aggravated by exposure to the chemical.

- Procedures to protect against hazards (e.g., personal protective equipment required, proper use, and maintenance; work practices or methods to assure proper use and handling of chemicals; and procedures for emergency response).
- Work procedures to follow to assure protection when cleaning hazardous chemical spills and leaks.
- Where MSDSs are located, how to read and interpret the information on both labels and MSDSs, and how employees may obtain additional hazard information. If electronic systems are used, how employees access the system and what to do if backup system is required.

The safety and health manager or designee will review our employee training program and advise the plant manager on training or retraining needs. Retraining is required when the hazard changes or when a new hazard is introduced into the workplace, but it will be company policy to provide training regularly in safety meetings to ensure the effectiveness of the program. As part of the assessment of the training program, the safety and health manager will obtain input from employees regarding the training they have received, and their suggestions for improving it.

Contractor Employers

The safety and health manager, Robert Jones, upon notification by the responsible supervisor, will advise outside contractors in person of any chemical hazards that may be encountered in the normal course of their work on the premises, the labeling system in use, the protective measures to be taken, and the safe handling procedures to be used. In addition, Mr. Jones will notify these individuals of the location and availability of MSDSs. Each contractor bringing chemicals on-site must provide us with the appropriate hazard information on these substances, including the labels used and the precautionary measures to be taken in working with these chemicals.

Additional Information

All employees, or their designated representatives, can obtain further information on this written program, the hazard communication standard, applicable MSDSs, and chemical information lists at the safety and health office, Room SD-10.

Tab C

**My Hazard
Communication
Program**

How to Identify Hazardous Chemicals

The responsibility for determining whether a chemical is hazardous lies with the chemical manufacturer or importer of a chemical. As a user of chemicals, you may rely on the evaluation received from these suppliers through labels on containers and material safety data sheets (MSDSs). To prepare a list of the chemicals in your facility that are covered by the rule, walk around and write down the names of chemicals that have a label indicating a potential hazard (e.g., carcinogen, corrosive, highly toxic, irritant). Don't limit yourself to chemicals in containers, however. Be aware of substances generated in work operations such as fumes or dusts, as these may be covered too.

"The floor" of chemicals considered to be hazardous are those

- regulated by OSHA in **29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances;**
- included in the American Conference of Governmental Industrial Hygienists (ACGIH) latest edition of **Threshold Limit Values for Chemical Substance and Physical Agents in the Work Environment;**

found to be suspected or confirmed carcinogens by the National Toxicology Program in the latest edition of the **Annual Report on Carcinogens**, or by the International Agency for Research on Cancer (IARC) in the latest edition of their **IARC monographs.**

Once you have a complete list, you will want to review it to determine if any of the items are exempted. In paragraph (b)(6) of the rule, OSHA has listed a number of items that are excluded. For example, rubbing alcohol maintained in a first-aid station would be exempt under paragraph (b)(6)(vi) because it is intended for personal use by employees. To be prudent, some employers include all chemicals even if they are exempted. In general, if there is any question regarding a particular chemical, it is best to include that chemical in the hazard communication program.

How to List Chemicals in the Workplace

All hazardous chemicals known to be present in your workplace should be listed using an identity that appears on the appropriate MSDS and label for the chemical. The list may also include common or trade names, Chemical Abstract Service (CAS) Registry numbers, MSDS reference numbers, etc. (See sample form included in this Tab.) The list can be compiled for the entire workplace, or for individual work areas in various sections of the facility.

The list is to be an inventory of everything for which a material safety data sheet must be obtained. It will be part of the written program, and must be made available to employees upon request.

The following list identifies some types of potentially hazardous chemicals that may be present in the workplace

Acids	Insecticides
Adhesives	Herbicides
Aerosols	Janitorial supplies
Asbestos	Kerosene
Battery fluids	Lacquers
Benzene	Lead
Catalysts	Lye
Caustics	Oxalic acid
Cleaning agents	Paints
Coal tar pitch	Pesticides
Coatings	Plastics
Degreasing agents	Process chemicals
Detergents	Resins
Dusts	Sealers
Etching agents	Shellacs
Fiberglass	Solders
Flammables	Solvents
Foaming resins	Strippers
Fuels	Surfactants
Fungicides	Thinners
Gasoline	Varnishes
Glues	Water treatments
Greases	Wood preservatives
Industrial oils	Xylene
Inks	

Tab E

**My List of
Hazardous
Chemicals**



Tab F

**Material Safety
Data Sheet (MSDS)**

Introduction

The Material Safety Data Sheet (MSDS) is a detailed information bulletin prepared by the manufacturer or importer of a chemical that describes the physical and chemical properties, physical and health hazards, routes of exposure, precautions for safe handling and use, emergency and first-aid procedures, and control measures. Information on an MSDS aids in the selection of safe products and helps prepare employers and employees to respond effectively to daily exposure situations as well as to emergency situations.

The MSDSs are a comprehensive source of information for all types of employers. There may be information on the MSDS that is not useful to you or not important to the safety and health in your particular operation. Concentrate on the information that is applicable to your situation. Generally, hazard information and protective measures should be the focus of concern.

This kit contains a glossary of terms used on MSDSs (see Appendix II). Some employers who are not very familiar with chemical terminology may find this helpful in reading and understanding MSDSs.

OSHA Requirements

Employers must maintain a complete and accurate MSDS for each hazardous chemical that is used in the facility. They are entitled to obtain this information automatically upon purchase of the material. When new and significant information becomes available concerning a product's hazards or ways to protect against the hazards, chemical manufacturers, importers, or distributors must add it to their MSDS within three months and provide it to their customers with the next shipment of the chemical. Employers must have an MSDS for each hazardous chemical used in the workplace. If there are multiple suppliers of the same chemical, there is no need to retain multiple MSDS for that chemical.

While MSDSs are not required to be physically attached to a shipment, they must accompany or precede the shipment. When the manufacturer/supplier fails to send an MSDS with a shipment labeled as a hazardous chemical, the employer must obtain one from the chemical manufacturer, importer, or distributor as soon as possible. Similarly, if the MSDS is incomplete or unclear, the employer should contact the manufacturer or

importer to get clarification or obtain missing information. (See Tab H for sample letters requesting an MSDS, or additional information.)

When an employer is unable to obtain an MSDS from a supplier or manufacturer, he/she should submit a written complaint, with complete background information, to the nearest OSHA area office. (Although written complaints do not have to be submitted on an OSHA-7 Form, one is included on p. F-7 and may be reproduced for your convenience.) OSHA will then, at the same time, call and send a certified letter to the supplier or manufacturer to obtain the needed information. If the supplier or manufacturer still fails to respond within a reasonable time, OSHA will inspect the supplier or manufacturer and take appropriate enforcement action.

Sections of an MSDS and Their Significance

OSHA specifies the information to be included on an MSDS, but does not prescribe the precise format for an MSDS. A non-mandatory MSDS form (see blank OSHA Form 174 at the end of this section) that meets the Hazard Communication Standard requirements has been issued and can be used as is or expanded as needed. The MSDS must be in English and must include at least the following information.

Section I. Chemical Identity

- The chemical and common name(s) must be provided for single chemical substances.
- An identity on the MSDS must be cross-referenced to the identity found on the label.

Section II. Hazardous Ingredients

- For a hazardous chemical mixture that has been tested as a whole to determine its hazards, the chemical and common names of the ingredients that are associated with the hazards, and the common name of the mixture must be listed.
- If the chemical is a mixture that has not been tested as a whole, the chemical and common names of all ingredients determined to be health hazards and comprising 1 percent or greater of the composition must be listed.

Chemical and common names of carcinogens must be listed if they are present in the mixture at levels of 0.1 percent or greater.

All components of a mixture that have been determined to present a physical hazard must be listed.

Chemical and common names of all ingredients determined to be health hazards and comprising less than 1 percent (0.1 percent for carcinogens) of the mixture must also be listed if they can still exceed an established Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV) or present a health risk to exposed employees in these concentrations.

Section III. Physical and Chemical Characteristics

- The physical and chemical characteristics of the hazardous substance must be listed. These include items such as boiling and freezing points, density, vapor pressure, specific gravity, solubility, volatility, and the product's general appearance and odor. These characteristics provide important information for designing safe and healthful work practices.

Section IV. Fire and Explosion Hazard Data

- The compound's potential for fire and explosion must be described. Also, the fire hazards of the chemical and the conditions under which it could ignite or explode must be identified. Recommended extinguishing agents and fire-fighting methods must be described.

Section V. Reactivity Data

- This section presents information about other chemicals and substances with which the chemical is incompatible, or with which it reacts. Information on any hazardous decomposition products, such as carbon monoxide, must be included.

Section VI. Health Hazards

- The acute and chronic health hazards of the chemical, together with signs and symptoms of exposure, must be listed. In addition, any medical conditions that are aggravated by exposure to the compound, must be included. The specific types of chemical health hazards defined in the standard include carcinogens, corrosives, toxins, irritants, sensitizers, mutagens, teratogens, and

effects on target organs (i.e., liver, kidney, nervous system, blood, lungs, mucous membranes, reproductive system, skin, eyes, etc.).

The route of entry section describes the primary pathway by which the chemical enters the body. There are three principal routes of entry: inhalation, skin, and ingestion.

This section of the MSDS supplies the OSHA PEL, the ACGIH TLV, and other exposure levels used or recommended by the chemical manufacturer.

- If the compound is listed as a carcinogen (cancer-causing agent) by OSHA, the National Toxicology Program (NTP), or the International Agency for Research on Cancer (IARC), this information must be indicated on the MSDS.

Section VII. Precautions for Safe Handling and Use

- The standard requires the preparer to describe the precautions for safe handling and use. These include recommended industrial hygiene practices, precautions to be taken during repair and maintenance of equipment, and procedures for cleaning up spills and leaks. Some manufacturers also use this section to include useful information not specifically required by the standard, such as EPA waste disposal methods and state and local requirements.

Section VIII. Control Measures

- The standard requires the preparer of the MSDS to list any generally applicable control measures. These include engineering controls, safe handling procedures, and personal protective equipment. Information is often included on the use of goggles, gloves, body suits, respirators, and face shields.

Employer Responsibilities

Employers must ensure that each employee has a basic knowledge of how to find information on an MSDS and how to properly make use of that information. Employers also must ensure the following:

- Complete and accurate MSDSs are made available during each work shift to employees when they are in their work areas.
- Information is provided for each hazardous chemical.

In addition to using OSHA Form 174, ANSI's, or any other format, each MSDS must contain the following information:

1. Product or chemical identity used on the label.
 2. Manufacturer's name and address.
 3. Chemical and common names of each hazardous ingredient.
 4. Name, address, and phone number for hazard and emergency information.
 5. Preparation or revision date.
 6. The hazardous chemical's physical and chemical characteristics, such as vapor pressure and flashpoint.
 7. Physical hazards, including the potential for fire, explosion, and reactivity.
 8. Known health hazards.
 9. OSHA permissible exposure limit (PEL), ACGIH threshold limit value (TLV) or other exposure limits.
 10. Emergency and first-aid procedures.
 11. Whether OSHA, NTP or IARC lists the ingredient as a carcinogen.
 12. Precautions for safe handling and use.
 13. Control measures such as engineering controls, work practices, hygienic practices or personal protective equipment required.
 14. Primary routes of entry.
 15. Procedures for spills, leaks, and clean-up.
-

Section V — Reactivity Data

Stability	Unstable	Conditions to Avoid
	Stable	

Incompatibility (*Materials to Avoid*)

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur	Conditions to Avoid
	Will Not Occur	

Section VI — Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
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Health Hazards (*Acute and Chronic*)

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
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Signs and Symptoms of Exposure

Medical Conditions Generally Aggravated by Exposure

Emergency and First Aid Procedures

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled

Waste Disposal Method

Precautions to Be Taken in Handling and Storing

Other Precautions

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)

Ventilation	Local Exhaust	Special
	Mechanical (General)	Other

Protective Gloves	Eye Protection
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Other Protective Clothing or Equipment

Work/Hygenic Practices

For the General Public:Form Approved
O.M.B. No. 1218-0064

This form is provided for the assistance of any complainant and is not intended to constitute the exclusive means by which a complaint may be registered with the U.S. Department of Labor.

Sec. 8(f)(1) of the Williams-Steiger Occupational Safety and Health Act, 29 U.S.C. 651, provides as follows: Any employees or representative of employees who believe that a violation of a safety or health standard exists that threatens physical harm, or that an imminent danger exists, may request an inspection by giving notice to the Secretary or his authorized representative of such violation or danger. Any such notice shall be reduced to writing, shall set forth with reasonable particularity the grounds for the notice, and shall be signed by the employees or representative of employees, and a copy shall be provided the employer or his agent no later than at the time of inspection, except that, upon request of the person giving such notice, his name and the names of individual employees referred to therein shall not appear in such copy or on any record published, released, or made available pursuant to subsection (g) of this section. If upon receipt of such notification the Secretary determines there are reasonable grounds to believe that such violation or danger exists, he shall make a special inspection in accordance with the provisions of this section as soon as practicable to determine if such violation or danger exists. If the Secretary determines there are no reasonable grounds to believe that a violation or danger exists, he shall notify the employees or representative of the employees in writing of such determination.

NOTE: Section 11(c) of the Act provides explicit protection for employees exercising their rights, including making safety and health complaints.

For Federal Employees:

This report format is provided to assist Federal employees or authorized representatives in registering a report of unsafe or unhealthful working conditions with the U.S. Department of Labor.

The Secretary of Labor may conduct unannounced inspections of agency workplaces when deemed necessary if an agency does not have occupational safety and health committees established in accordance with Subpart F, 29 CFR Part 1960; or in response to reports of unsafe or unhealthful working conditions upon request of such agency committees under Sec. 1-3, Executive Order 12196; or in the case of a report of imminent danger when such a committee has not responded to the report as required in Sec. 1-201(h).

INSTRUCTIONS:

Open the form and complete items 2 through 18 as accurately and completely as possible. Describe each hazard you think exists in as much detail as you can. If the hazards described in your complaint are not all in the same area, please identify where each hazard can be found at the worksite. If there is any particular evidence that supports your suspicion that a hazard exists (for instance, a recent accident or physical symptoms of employees at your site) include the information in your description. If you need more space than is provided on the form, continue on any other sheet of paper.

After you have completed the form, return it to your local OSHA office.

NOTE: It is unlawful to make any false statement, representation or certification in any document filed pursuant to the Occupational Safety and Health Act of 1970. Violations can be punished by a fine of not more than \$10,000, or by imprisonment of not more than six months, or by both.
(Section 17(g))

Notice of Alleged Safety or Health Hazards

U.S. Department of Labor
Occupational Safety and Health Administration



MOD Date

1. Complaint Number

2. Employer Name

3. Site Location (Street, City, State, ZIP)

4. Mailing Address (if different) (Street, City, State, ZIP)

5. Management Official

6. Telephone Number

7. Type of Business

8. Hazard Description. Describe briefly the hazard(s) which you believe exist. Include the approximate number of employees exposed to or threatened by each hazard:

Lined area for hazard description

9. Hazard Location. Specify the particular building or worksite where the alleged violation exists

Lined area for hazard location

Employer

11. Please indicate your desire:

Do not reveal my name to the Employer. My name may be revealed to the Employer.

12. The Undersigned: (Mark "X" in one box)

Employee Federal Safety and Health Committee
 Representative of Employees Other (specify)

believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form

13. Complainant Name (Type or print name)

14. Telephone Number

15. Address (Street, City, State, ZIP)

16. Signature

17. Date

18. If you are an authorized representative of employees affected by this complaint, please state the name of the organization that you represent and your title:

Organization Name:

Your Title:

19. Reporting ID

20. Previous Activity?

Yes No

21. Optional Complaint Number

If Yes, enter Type: Number

22. Establishment Name Change?

23. Site Address Change?

25. City Code

28. County Code

27. Received by

28. Send OSHA-7?

29. Date

30. Time

AM

PM

31. Supervisor(s) Assigned:

32. Primary SIC

33. Ownership (Mark "X" in one box):

a Private Sector b Local Government c State Government d Federal Agency/Code

34. Evaluated by:

35. Subject and Severity

36. Is This a Valid Complaint?

Yes No

37. Formality

Formal Nonformal

38. Migrant Farmworker Camp

Discrimination

Imminent Danger

Serious

Other

Safety

Health

39. Send Letter:

a. No Inspection — for Invalid Complaints
 Too Vague or Unsubstantiated
 Recent Inspection or Objective Evidence
(Date of Inspection: _____)
 Not in OSHA's Jurisdiction

b. No Inspection — for Nonformal Complaints
 No Imminent Danger or No Standard
 No Direct Relation to S&H
 Not Enough information To Evaluate

c. OSHA-7 for Signature With Letter
 Complete or Partial
d. Nonformal Complaint Notification to Employer
 Complaint Notified Explanation of 11(c)
e. Complainant Notification With Letter d
 Name Not Revealed Explanation of 11(c)
f. Acknowledgement to Complainant (Optional)
g. Other (specify)

40. Date Letter Sent: _____

41. Date Response Due (For letters c or d) _____

42.

If Yes, Priority:

If No, Reason:

43. Transfer to (Name): _____

44. Transfer Date: _____

45. Transfer to (Category):

a. Federal OSHA/Reporting ID
b. State OSH/Reporting ID

c. Other Federal Agency/Code
d. State/Local Government
e. Other

46. Optional Information

Type ID

Value

Type ID

Value

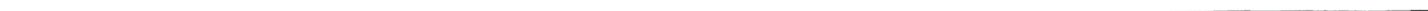
47. Total Entries

48. Close Complaint

49. Comments

Tab G

My MSDSs



Tab H

MSDS Requests

Blitz Manufacturing Company
1923 Oak Grove Lane
Springfield, Massachusetts 02110

Dear Sir:

The Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200) requires employers be provided Material Safety Data Sheets (MSDS) for all hazardous substances used in their facility, and to make these MSDS available to employees potentially exposed to these hazardous substances.

We, therefore, request a copy of the MSDS for your product listed as Stock Number XXXX. We did not receive an MSDS with the initial shipment of the Blitz Solvent 90 we received from you on October 1st. We also request any additional information, supplemental MSDS, or any other relevant data that your company or supplier has concerning the safety and health aspects of this product.

Please consider this letter as a standing request to your company for any information concerning the safety and health aspects of using this product that may become known in the future.

The MSDS and any other relevant information should be sent to us within 10, 20, 30 days (select appropriate time). Delays in receiving the MSDS information may prevent use of your product. Please send the requested information to Mr. Robert Smith, Safety and Health Manager, XYZ Company, Boston, Massachusetts 02109.

Please be advised that if we do not receive the MSDS on the above chemical by (date), we may have to notify OSHA of our inability to obtain this information. It is our intent to comply with all provisions of the Hazard Communication Standard (1910.1200) and the MSDS are integral to this effort.

Your cooperation is greatly appreciated. Thank you for your timely response to this request. If you have any questions concerning this matter, please contact Mr. Smith on (617) 223-9460.

Sincerely,

George Rogers, President
XYZ Company

Date

ACE Chemical Company, Incorporated
214 Capitol Drive
Richmond, Virginia 23230

Dear Mr. Winston

In an effort to comply with the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard, my company is seeking additional information on a chemical produced by ACE Chemical Company. The MSDSs forwarded to us appear to be deficient as follows:

1. Clear-VU 210 - no health effects listed.
2. Clean-up 34 - Solvent - no physical hazard listed

Please be advised that for us to comply with the Hazard Communication Standard and to provide adequate training for our employees we must have complete MSDS, particularly with reference to the above-identified items. Your cooperation will be appreciated.

Sincerely,

Robert Stevens
Purchasing Agent
XYZ Company

Tab 1

**My MSDS
Request File**

Tab J

Sample Training Program

Introduction

Training is an integral part of your hazard communication program, as identified in Tab A.

Under the Hazard Communication Standard, effective February 9, 1994, each employer is required to inform and train employees at the time of their initial assignment to a work area where hazardous chemicals are present and whenever a new hazard is introduced into the work area.

While the outline of topics to be presented in employee information and training programs is the same for all employers, the actual information presented must be based on the specific hazard information conveyed by labels and MSDSs for that particular workplace or work area.

These are the topics to be covered in all information and training programs:

- The provisions of the Hazard Communication Standard

Any operations in employees' work areas where hazardous chemicals are present

The location and availability of the company's written hazard communication program, including the required list(s) of hazardous chemicals and MSDSs required by the Hazard Communication Standard

Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area

The physical and health hazards of the chemicals in the work area

The measures employees can take to protect themselves from these hazards, including information on work practices, emergency procedures and personal protective equipment required by the employer

The details of the employer's written hazard communication program, including an explanation of the labeling system used by the employer, MSDSs, and how employees can obtain and use the appropriate hazard information on the labels and in the MSDSs.

The following sections illustrate how a typical training program might be designed. Following the sample program is a non-mandatory training guide developed by OSHA for conducting any effective training program. Using the sample and the guidelines, together with establishment-specific label and MSDS information, employers can develop effective employee training programs that achieve the objective of the Hazard Communication Standard.

Know the Provisions of the Hazard Communication Standard

- Be familiar with the requirements of the standard
- Know your responsibilities under the law
- Inform all employees of the law and their rights under the law.

Identify Those Employees to be Trained

- Assess actual and potential employee exposure to hazardous chemicals
- Determine training needs based on this exposure during both normal use of hazardous chemicals and during emergencies
- Determine appropriate ways in which to train new employees and supervisors

Train employees and supervisors on the specific chemicals in your workplace and their hazards.

Know the Hazardous Chemicals in Your Workplace

- Define hazardous chemicals: Any chemical that is a physical or health hazard.

"Physical hazard" is one for which there is scientifically valid evidence that the chemical is a combustible liquid, a compressed gas, an explosive, a flammable substance, an organic peroxide, an oxidizer, a pyrophoric, or an unstable (reactive) or water-reactive substance.

“Health hazard” is one that includes cancer-causing, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on hematopoietic system, and agents that damage the lungs, skin, eyes, or mucous membranes. (Include additional information from Appendices A and B of the standard; see Appendix 1 of this kit for further explanations.)

Make a List of the Hazardous Chemicals in Your Workplace

- Your list should include the names of the chemicals, their hazards, any protective measures to be taken, and emergency and first-aid procedures.

Identify the process or operation where the chemicals are used, and the name and address of the manufacturer.

Make sure there is a material safety data sheet (MSDS) for each chemical and that the list references the corresponding MSDS for each chemical.

Make the list readily available to your employees (or to other employers at your worksite at their request).

- Make sure employees understand the information regarding the chemicals listed in the workplace.

Instruct Employees on How to Use and Interpret MSDSs

- Make sure you have an MSDS for each hazardous chemical product you package, handle, or transfer. (See Tab F.)

Check each MSDS you receive to ensure that it contains all the information required by the standard. (See checklist at end of this Tab.)

Obtain MSDS or information where necessary (i.e., when MSDS not received from manufacturer, importer or supplier, or when MSDS is incomplete. (See Tab H for sample letter requesting MSDS information.)

Instruct Employees on Labeling Requirements

- Check each container entering the workplace for appropriate labeling (i.e., identity of chemicals, hazard warnings; name and address of manufacturer/importer/responsible party).
- Explain the importance of reading labels and of following directions for the safe handling of chemicals.
- Label, tag, or mark containers into which hazardous chemicals are transferred with the chemical identity and hazard warnings.
- Hazard warning must convey specific physical and health hazards of the chemicals. Explain that words such as “caution,” “danger,” “harmful if absorbed by skin,” etc. are precautionary statements and do not identify specific hazards.
- Explain the labeling exemptions for portable and stationary process containers.
- Label portable containers when they are not for “immediate use.” (Note: Portable containers require no labels when chemicals are transferred into them from labeled containers and when the chemicals will be used immediately by the employee transferring the chemicals.)
- In lieu of labels, process sheets, batch tickets, standard operating procedures, or other written materials may be used on stationary process equipment if they contain the same information as a label and are readily available to employees in the work area or station.
- Cross-reference chemical identifiers on labels to MSDSs and the lists of hazardous chemicals.
- Be aware of other hazardous chemicals that may have specific labeling requirements under other standards (e.g., asbestos, lead, etc.).

Review Existing Methods of Controlling Workplace Exposures

- **Engineering Controls:** changes in machinery, work operations, or plant layout that reduce or eliminate the hazard (e.g., ventilation controls, process enclosures/hoods, isolation, etc.).

Administrative Controls: good housekeeping procedures, safe work practices, personal and medical monitoring, shortened shifts or changed work schedules, etc.

- **Personal Protective Equipment:** safety glasses, goggles, face shields, earplugs, respirators, gloves, hoods, boots, and full body suits.

Review Your Current Procedures for Handling Chemicals and Compare with Recommended Practices Identified on MSDSs and Labels

Consider Keeping a Record of Employee/Supervisor Training

- Follow-up and evaluate your training program to make sure employees know how to handle the chemicals they are using and are applying the training you have given them.

Establish a Written Emergency Action Plan

- Training in procedures such as emergency controls and phone numbers, evacuation plans, alarm systems, reporting and shut-down procedures, first-aid, personal protection, etc.
- How and when to report leaks and spills.

Complete Incomplete

1. Established a thorough training program.
2. Identified employees who need training. _____
3. Training program ensures that new employees are trained before their first assignment.
4. Informed employees of the specific information and training requirements of the Hazard Communication Standard.
5. Informed employees of the requirements of the standard, and their rights under the law.
6. Informed employees of our written program and training requirements. _____
7. Informed employees of the different types of chemicals and the hazards associated with them.
8. Informed employees of specific hazards of the chemicals and processes they work with and their proper use and handling.
9. Informed employees of the hazards associated with performing nonroutine tasks.
10. Employees know how to detect the presence or release of hazardous chemicals in the workplace.
11. Trained employees in the use of proper work practices, personal protective equipment and clothing, and other controls to reduce or eliminate their exposure to the chemicals in their work areas.
12. Trained employees in emergency and first-aid procedures and signs of overexposure.
13. Listed all the hazardous chemicals in our workplace.
14. Employees know when and how to update our hazardous chemical list.
15. Obtained or developed a material safety data sheet for each hazardous chemical in the workplace. _____
16. Explained how to use an MSDS.
17. Informed employees of the list of hazardous chemicals and MSDSs and where they are located.
18. Explained labels and their warnings to employees.
19. Developed a system to ensure that all incoming hazardous chemicals are checked for proper labels and data sheets.
20. Established procedures to ensure proper labeling or warnings signs for containers that hold hazardous chemicals.
21. Developed a way to identify and inform employees of new hazardous chemicals before they are introduced into a work area.
22. Established a way to inform employees of new hazards associated with the chemicals they already use.
23. Developed a way to evaluate the effectiveness of the training program and to keep track of who has received training.

I. Introduction

The Occupational Safety and Health Act of 1970 does not address specifically the responsibility of employers to provide health and safety information and instruction to employees, although Section 5(a)(2) does require that each employer "... shall comply with occupational safety and health standards promulgated under this Act." However, more than 100 of the Act's current standards do contain training requirements.

Therefore, the Occupational Safety and Health Administration has developed voluntary training guidelines to assist employers in providing the safety and health information and instruction needed for their employees to work at minimal risk to themselves, to fellow employees, and to the public.

The guidelines are designed to help employers to (1) determine whether a worksite problem can be solved by training; (2) determine what training, if any, is needed; (3) identify goals and objectives for the training; (4) design learning activities; (5) conduct training; (6) determine the effectiveness of the training; and (7) revise the training program based on feedback from employees, supervisors, and others.

The development of the guidelines is part of an agency-wide objective to encourage cooperative, voluntary safety and health activities among OSHA, the business community, and workers. These voluntary programs include training and education, consultation, voluntary protection programs, and abatement assistance.

A. Training Model

The guidelines provide employers with a model for designing, conducting, evaluating, and revising training programs. The training model can be used to develop training programs for a variety of occupational safety and health hazards identified at the workplace. Additionally, it can assist employers in their efforts to meet the training requirements in current or future occupational safety and health standards.

A training program designed in accordance with these guidelines can be used to supplement and enhance the employer's other education and training activities. The guidelines afford employers significant flexibility in the selection of content and training program design. OSHA encourages a personalized approach to the informational and instructional

programs at individual worksites, thereby enabling employers to provide the training that is most needed and applicable to local working conditions.

Assistance with training programs or the identification of resources for training is available through such organizations as OSHA full-service Area Offices, State agencies which have their own OSHA-approved occupational safety and health programs. OSHA-funded State onsite consultation programs for employers, local safety councils, the OSHA Office of Training and Education, and OSHA-funded New Directions grantees.

B. Review Commission Implications

OSHA does not intend to make the guidelines mandatory. And they should not be used by employers as a total or complete guide in training and education matters which can result in enforcement proceedings before the Occupational Safety and Health Review Commission. However, employee training programs are always an issue in Review Commission cases which involve alleged violations of training requirements contained in OSHA standards.

The adequacy of employee training may also become an issue in contested cases where the affirmative defense of unpreventable employee misconduct is raised. Under case law well-established in the Commission and the courts, an employer may successfully defend against an otherwise valid citation by demonstrating that all feasible steps were taken to avoid the occurrence of the hazard, and that actions of the employee involved in the violation were a departure from a uniformly and effectively enforced work rule of which the employee had either actual or constructive knowledge.

In either type of case, the adequacy of the training given to employees in connection with a specific hazard is a factual matter which can be decided only by considering all the facts and circumstances surrounding the alleged violation. The general guidelines presented here are not intended, and cannot be used, as evidence of the appropriate level of training in litigation involving either the training requirements of OSHA standards or affirmative defenses based upon employer training programs.

II Training Guidelines

OSHA's training guidelines follow

Determining Training is Needed

B. Identifying Training Needs

Identifying Goals and Objective

Developing Learning Activities

Conducting the Training

F. Evaluating Program Effectiveness

G. Improving the Program

A. Determining if Training is Needed

The first step in the training process is a basic one: to determine whether a problem can be solved by training. Whenever employees are not performing their jobs properly, it is often assumed that training will bring them up to standard. However, it is possible that other actions (such as hazard abatement or the implementation of engineering controls) would enable employees to perform their jobs properly.

Ideally, safety and health training should be provided before problems or accidents occur. This training would cover both general safety and health rules and work procedures, and would be repeated if an accident or near-miss incident occurred.

Problems that can be addressed effectively by training include those that arise from lack of knowledge of a work process, unfamiliarity with equipment, or incorrect execution of a task. Training is less effective (but still can be used) for problems arising from an employee's lack of motivation or lack of attention to the job. Whatever its purpose, training is most effective when designed in relation to the general safety and health program.

B. Identifying Training Needs

If the problem is one that can be solved, in whole or in part, by training, then the next step is to determine what training is needed. For this, it is necessary to identify what the employee is expected to do and in what ways, if any, the employee's performance is deficient. This information can be obtained by conducting a job analysis which pinpoints what an employee needs to know in order to perform a job.

When designing a new training program, or preparing to instruct an employee in an unfamiliar procedure or system, a job analysis can be developed by examining engineering data on new equipment or the safety data sheets on unfamiliar substances. The content of the specific Federal or State OSHA standards applicable to a business can also provide direction in developing training content. Another option is to conduct a Job Hazard Analysis (see OSHA 3071, same title, 1987). This is a procedure for studying and recording each step of a job, identifying existing or potential hazards, and determining the best way to perform the job in order to reduce or eliminate the risks. Information obtained from a Job Hazard Analysis can be used as the content for the training activity.

If an employee's learning needs can be met by revising an existing training program rather than developing a new one, or if the employee already has some knowledge of the process or system to be used, appropriate training content can be developed through such means as:

1. Using company accident and injury records to identify how accidents occur and what can be done to prevent them from recurring.

2. Requesting employees to provide, in writing and in their own words, descriptions of their jobs. These should include the tasks performed and the tools, materials and equipment used.

3. Observing employees at the worksite as they perform tasks, asking about the work, and recording their answers.

4. Examining similar training programs offered by other companies in the same industry, or obtaining suggestions from such organizations as the National Safety Council (which can provide information on Job Hazard Analysis), the

Bureau of Labor Statistics, OSHA-approved State programs, OSHA full-service Area Offices, OSHA-funded State consultation programs, or the OSHA Office of Training and Education.

The employees themselves can provide valuable information on the training they need. Safety and health hazards can be identified through the employees' responses to such questions as whether anything about their jobs frightens them, if they have had any near-miss incidents, if they feel they are taking risks, or if they believe that their jobs involve hazardous operations or substances.

Once the kind of training that is needed has been determined, it is equally important to determine what kind of training is not needed. Employees should be made aware of all the steps involved in a task or procedure, but training should focus on those steps on which improved performance is needed. This avoids unnecessary training and tailors the training to meet the needs of the employees.

C. Identifying Goals and Objectives

Once the employees' training needs have been identified, employers can then prepare objectives for the training. Instructional objectives, if clearly stated, will tell employers what they want their employees to do, to do better, or to stop doing.

Learning objectives do not necessarily have to be written, but in order for the training to be as successful as possible, clear and measurable objectives should be thought-out before the training begins. For an objective to be effective it should identify as precisely as possible what the individuals will do to demonstrate that they have learned, or that the objective has been reached. They should also describe the important conditions under which the individual will demonstrate competence and define what constitutes acceptable performance.

Using specific, action-oriented language, the instructional objectives should describe the preferred practice or skill and its observable behavior. For example, rather than using the statement: "The employee will understand how to use a respirator" as an instructional objective, it would be better to say: "The employee will be able to describe how a respirator works and when it should be used." Objectives are most effective when worded in sufficient detail that

other qualified persons can recognize when the desired behavior is exhibited.

D. Developing Learning Activities

Once employers have stated precisely what the objectives for the training program are, then learning activities can be identified and described. Learning activities enable employees to demonstrate that they have acquired the desired skills and knowledge. To ensure that employees transfer the skills or knowledge from the learning activity to the job, the learning situation should simulate the actual job as closely as possible. Thus, employers may want to arrange the objectives and activities in a sequence which corresponds to the order in which the tasks are to be performed on the job, if a specific process is to be learned. For instance, if an employee must learn the beginning processes of using a machine, the sequence might be (1) to check that the power source is connected, (2) to ensure that the safety devices are in place and are operative, (3) to know when and how to throw the switch, and so on.

A few factors will help to determine the type of learning activity to be incorporated into the training. One aspect is the training resources available to the employer. Can a group training program that uses an outside trainer and film be organized, or should the employer personally train the employees on a one-to-one basis? Another factor is the kind of skills or knowledge to be learned. Is the learning oriented toward physical skills (such as the use of special tools) or toward mental processes and attitudes? Such factors will influence the type of learning activity designed by employers. The training activity can be group-oriented, with lectures, role play, and demonstrations; or designed for the individual as with self-paced instruction.

The determination of methods and materials for the learning activity can be as varied as the employer's imagination and available resources will allow. The employer may want to use charts, diagrams, manuals, slides, films, viewgraphs (overhead transparencies), videotapes, audiotapes, or simply blackboard and chalk, or any combination of these and other instructional aids. Whatever the method of instruction, the learning activities should be developed in such a way that the employees can clearly demonstrate that they have acquired the desired skills or knowledge.

E. Conducting the Training

With the completion of the steps outlined above, the employer is ready to begin conducting the training. To the extent possible, the training should be presented so that its organization and meaning are clear to the employees. To do so, employers or supervisors should (1) provide overviews of the material to be learned; (2) relate, wherever possible, the new information or skills to the employees' goals, interests, or experience; and (3) reinforce what the employees learned by summarizing the program's objectives and the key points of information covered. These steps will assist employers in presenting the training in a clear, unambiguous manner.

In addition to organizing the content, employers must also develop the structure and format of the training. The content developed for the program, the nature of the workplace or other training site, and the resources available for training will help employers determine for themselves the frequency of training activities, the length of the sessions, the instructional techniques, and the individual(s) best qualified to present the information.

In order to be motivated to pay attention and learn the material that the employer or supervisor is presenting, employees must be convinced of the importance and relevance of the material. Among the ways of developing motivation are (1) explaining the goals and objectives of instruction; (2) relating the training to the interests, skills, and experiences of the employees; (3) outlining the main points to be presented during the training session(s); and (4) pointing out the benefits of training (e.g., the employee will be better informed, more skilled, and thus more valuable both on the job and on the labor market; or the employee will, if he or she applies the skills and knowledge learned, be able to work at reduced risk).

An effective training program allows employees to participate in the training process and to practice their skills or knowledge. This will help to ensure that they are learning the required knowledge or skills and permit correction if necessary. Employees can become involved in the training process by participating in discussions, asking questions, contributing their knowledge and expertise, learning through hands-on experiences, and through roleplaying exercises.

F. Evaluating Program Effectiveness

To make sure that the training program is accomplishing its goals, an evaluation of the training can be valuable. Training should have, as one of its critical components, a method of measuring the effectiveness of the training. A plan for evaluating the training session(s) should be developed when the course objectives and content are developed. It should not be delayed until the training has been completed. Evaluation will help employers or supervisors determine the amount of learning achieved and whether an employee's performance has improved on the job. Among the methods of evaluating training are (1) **Student opinion.** Questionnaires or informal discussions with employees can help employers determine the relevance and appropriateness of the training program; (2) **Supervisors' observations.** Supervisors are in good positions to observe an employee's performance both before and after the training and note improvements or changes; and (3) **Workplace improvements.** The ultimate success of a training program may be changes throughout the workplace that result in reduced injury or accident rates.

However it is conducted, an evaluation of training can give employers the information necessary to decide whether or not the employees achieved the desired results, and whether the training session should be offered again at some future date.

G. Improving the Program

If, after evaluation, it is clear that the training did not give the employees the level of knowledge and skill that was expected, then it may be necessary to revise the training program or provide periodic retraining. At this point, asking questions of employees and of those who conducted the training may be of some help. Among the questions that could be asked are (1) Were parts of the content already known and, therefore, unnecessary? (2) What material was confusing or distracting? (3) Was anything missing from the program? (4) What did the employees learn, and what did they fail to learn?

It may be necessary to repeat steps in the training process, that is, to return to the first steps and retrace one's way through the training process. As the program is evaluated, the employer should ask (1) If a job analysis was conducted, was it accurate? (2) Was any critical feature of the job overlooked? (3) Were the important gaps in knowledge and skill

included? (4) Was material already known by the employees intentionally omitted? (5) Were the instructional objectives presented clearly and concretely? (6) Did the objectives state the level of acceptable performance that was expected of employees? (7) Did the learning activity simulate the actual job? (8) Was the learning activity appropriate for the kinds of knowledge and skills required on the job? (9) When the training was presented, was the organization of the material and its meanings made clear? (10) Were the employees motivated to learn? (11) Were the employees allowed to participate actively in the training process? (12) Was the employer's evaluation of the program thorough?

A critical examination of the steps in the training process will help employers to determine where course revision is necessary.

III. Matching Training to Employees

While all employees are entitled to know as much as possible about the safety and health hazards to which they are exposed, and employers should attempt to provide all relevant information and instruction to all employees, the resources for such an effort frequently are not, or are not believed to be, available. Thus, employers are often faced with the problem of deciding who is in the greatest need of information and instruction.

One way to differentiate between employees who have priority needs for training and those who do not is to identify employee populations which are at higher levels of risk. The nature of the work will provide an indication that such groups should receive priority for information on occupational safety and health risks.

A. Identifying Employees at Risk

One method of identifying employee populations at high levels of occupational risk (and thus in greater need of safety and health training) is to pinpoint hazardous occupations. Even within industries which are hazardous in general, there are some employees who operate at greater risk than others. In other cases the hazardousness of an occupation is influenced by the conditions under which it is performed, such as noise, heat or cold, or safety or health hazards in the surrounding area.

In these situations, employees should be trained not only on how to perform their job safely but also on how to operate within a hazardous environment.

A second method of identifying employee populations at high levels of risk is to examine the incidence of accidents and injuries, both within the company and within the industry. If employees in certain occupational categories are experiencing higher accident and injury rates than other employees, training may be one way to reduce that rate. In addition, thorough accident investigation can identify not only specific employees who could benefit from training but also identify company-wide training needs.

Research has identified the following variables as being related to a disproportionate share of injuries and illnesses at the worksite on the part of employees:

1. The age of the employee (younger employees have higher incidence rates).
2. The length of time on the job (new employees have higher incidence rates).
3. The size of the firm (in general terms, medium size firms have higher incidence rates than smaller or larger firms).
4. The type of work performed (incidence and severity rates vary significantly by Standard Industrial Classification, or SIC, Code).
5. The use of hazardous substances (by SIC Code).

These variables should be considered when identifying employee groups for training in occupational safety and health.

In summary, information is readily available to help employers identify which employees should receive safety and health information, education and training, and who should receive it before others. Employers can request assistance in obtaining information by contacting such organizations as OSHA Area Offices, the Bureau of Labor Statistics, OSHA-approved State programs, State onsite consultation programs, the OSHA Office of Training and Education, or local safety councils.

B. Training Employees at Risk

Determining the content of training for employee populations at higher levels of risk is similar to determining what any employee needs to know, but more emphasis is placed on the requirements of the job and the possibility of injury. One useful tool for determining training content from job requirements is the Job Hazard Analysis described earlier. This procedure examines each step of a job, identifies existing or potential hazards, and determines the best way to perform the job in order to reduce or eliminate the hazards. Its key elements are (1) job description; (2) job location; (3) key steps (preferably in the order in which they are performed); (4) tools, machines and materials used; (5) actual and potential safety and health hazards associated with these key job steps; and (6) safe and healthful practices, apparel, and equipment required for each job step.

Material Safety Data Sheets (MSDS) can also provide information for training employees in the safe use of materials. These data sheets, developed by chemical manufacturers and importers, are supplied with manufacturing or construction materials and describe the ingredients of a product, its hazards, protective equipment to be used, safe handling procedures, and emergency first-aid responses. The information contained in these sheets can help employers identify employees in need of training (i.e., workers handling substances

described in the sheets) and train employees in safe use of the substances. Material Safety Data Sheets are generally available from suppliers, manufacturers of the substance, large employers who use the substance on a regular basis, or they can be developed by employers or trade associations. MSDS are particularly useful for those employers who are developing training on chemical use as required by OSHA's Hazard Communication Standard.

IV. Conclusion

In an attempt to assist employers with their occupational health and safety training activities, OSHA has developed a set of training guidelines in the form of a model. This model is designed to help employers develop instructional programs as part of their total education and training effort. The model addresses the questions of who should be trained, on what topics, and for what purposes. It also helps employers determine how effective the program has been and enables them to identify employees who are in greatest need of education and training. The model is general enough to be used in any of occupational safety and health training, and allows employers to determine for themselves the content and format of training. Use of this model in training activities is just one of the many ways that employers can comply with the OSHA standards that relate to training and enhance the safety and health of their employees.



**My Training
Program**



Tab. L

My Training Record



Appendix I

OSHA Hazard Communication Standard

(a) Purpose.

(1) The purpose of this section is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

(2) This occupational safety and health standard is intended to address comprehensively the issue of evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, and to preempt any legal requirements of a state, or political subdivision of a state, pertaining to the subject. Evaluating the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees, may include, for example, but is not limited to, provisions for: developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present; labeling of containers of chemicals in the workplace, as well as of containers of chemicals being shipped to other workplaces; preparation and distribution of material safety data sheets to employees and downstream employers; and development and implementation of employee training programs regarding hazards of chemicals and protective measures. Under section 18 of the Act, no state or political subdivision of a state may adopt or enforce, through any court or agency, any requirement relating to the issue addressed by this Federal standard, except pursuant to a Federally-approved state plan.

(b) Scope and application.

(1) This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers.

(2) This section applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

(3) This section applies to laboratories only as follows:

Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

(ii) Employers shall maintain any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees; and,

(iii) Employers shall ensure that laboratory employees are apprised of the hazards of the chemicals in their workplaces in accordance with paragraph (h) of this section.

(4) In work operations where employees only handle chemicals in sealed containers which are not opened under normal conditions of use (such as are found in marine cargo handling, warehousing, or retail sales), this section applies to these operations only as follows:

(i) Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced;

(ii) Employers shall maintain copies of any material safety data sheets that are received with incoming shipments of the sealed containers of hazardous chemicals, shall obtain a material safety data sheet for sealed containers of hazardous chemicals received without a material safety data sheet if an employee requests the material safety data sheet, and shall ensure that the material safety data sheets are readily accessible during each work shift to employees when they are in their work area(s); and.

- (11) Employers shall ensure that employees are provided with information and training in accordance with paragraph (h) of this section (except for the location and availability of the written hazard communication program under paragraph (h)(1)(iii)), to the extent necessary to protect them in the event of a spill or leak of a hazardous chemical from a sealed container.

(5) This section does not require labeling of the following chemicals:

- (i) Any pesticide as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 *et seq.*), when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Environmental Protection Agency;

Any food, food additive, color additive, drug, cosmetic, or medical or veterinary device, including materials intended for use as ingredients in such products (e.g. flavors and fragrances), as such terms are defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 *et seq.*) and regulations issued under that Act, when they are subject to the labeling requirements under that Act by the Food and Drug Administration;

Any distilled spirits (beverage alcohols), wine, or malt beverage intended for nonindustrial use, as such terms are defined in the Federal Alcohol Administration Act (27 U.S.C. 201 *et seq.*) and regulations issued under that Act, when subject to the labeling requirements of that Act and labeling regulations issued under that Act by the Bureau of Alcohol Tobacco, and Firearms; and.

- (iv) Any consumer product or hazardous substance as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 *et seq.*) and Federal Hazardous Substances Act (15 U.S.C. 1261 *et seq.*) respectively, when subject to a consumer product safety standard or labeling

requirement of those Acts, or regulations issued under those Acts by the Consumer Product Safety Commission.

(6) This section does not apply to:

- (i) Any hazardous waste as such term is defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6901 *et seq.*), when subject to regulations issued under that Act by the Environmental Protection Agency;
- (ii) Tobacco or tobacco products;
- (iii) Wood or wood products;
- (iv) Articles
- (v) Food, drugs, cosmetics, or alcoholic beverages in a retail establishment which are packaged for sale to consumers;
- (vi) Food, drugs, or cosmetics intended for personal consumption by employees while in the workplace;
- (vii) Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 *et seq.*) and Federal Hazardous Substances Act (15 U.S.C. 1261 *et seq.*) respectively, where the employer can demonstrate it is used in the workplace in the same manner as normal consumer use, and which use results in a duration and frequency of exposure which is not greater than exposures experienced by consumers; and,
- (iii) Any drug, as that term is defined in the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 *et seq.*), when it is in solid, final form for direct administration to the patient (i.e. tablets or pills).

(c) Definitions

“Article” means manufactured item

Which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which does not release, or otherwise result in exposure to, a hazardous chemical, under normal conditions of use.

“Assistant Secretary” means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

“Chemical” means any element, chemical compound or mixture of elements and/or compounds.

“Chemical manufacturer” means an employer with a workplace where chemical(s) are produced for use or distribution.

“Chemical name” means the scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS) rules of nomenclature, or a name which will clearly identify the chemical for the purpose of conducting a hazard evaluation.

“Combustible liquid” means any liquid having a flashpoint at or above 100 °F (37.8 °C), but below 200 °F (93.3 °C), except any mixture having components with flashpoints of 200 °F (93.3 °C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

“Common name” means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

“Compressed gas” means:

- (i) A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 °F (21.1 °C) or

a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 °F (54.4 °C) regardless of the pressure at 70 °F (21.1 °C); or

A liquid having a vapor pressure exceeding 40 psi at 100 °F (37.8 °C) as determined by ASTM D- 323-72.

“Container” means any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. For purposes of this section, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

“Designated representative” means any individual or organization to whom an employee gives written authorization to exercise such employee’s rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

“Director” means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

“Distributor” means a business, other than a chemical manufacturer or importer, which supplies hazardous chemicals to other distributors or to employers.

“Employee” means a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered.

“Employer” means a person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

“Explosive” means a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

“Exposure” or “exposed” means that an employee is subjected to a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.), and includes potential (e.g. accidental or possible) exposure.

"Flammable" means a chemical that falls into one of the following categories:

- (i) "Aerosol, flammable" means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;
- (ii) "Gas, flammable" means
 - a) A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent by volume or less; or
 - b) A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit;
- iii) "Liquid, flammable" means any liquid having a flashpoint below 100 °F (37.8 °C), except any mixture having components with flashpoints of 100 °F (37.8 °C) or higher, the total of which make up 99 percent or more of the total volume of the mixture;
- iv) "Solid, flammable" means a solid, other than a blasting agent or explosive as defined in §1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

"Flashpoint" means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

- i) Tagliabue Closed Tester (see American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24-1979 (ASTM D 56-79)) for liquids with a viscosity of less than 45 Saybolt University Seconds (SUS) at 100 °F (37.8 °C), that do not contain suspended solids and do not have a tendency to form a surface film under test; or
- ii) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7-1979 (ASTM D 93-79)) for liquids with a viscosity equal to or greater than 45 SUS at 100 °F (37.8 °C), or that contain suspended solids, or that have a tendency to form a surface film under test; or
- iii) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78))

Organic peroxides, which undergo autoaccelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

"Foreseeable emergency" means any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

"Hazardous chemical" means any chemical which is a physical hazard or a health hazard.

"Hazard warning" means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the hazard(s) of the chemical(s) in the container(s).

"Health hazard" means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotox-

ins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a chemical is to be considered hazardous for purposes of this standard.

“Identity” means any chemical or common name which is indicated on the material safety data sheet (MSDS) for the chemical. The identity used shall permit cross-references to be made among the required list of hazardous chemicals, the label and the MSDS.

“Immediate use” means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

“Importer” means the first business with employees within the Customs Territory of the United States which receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or employers within the United States.

“Label” means any written, printed, or graphic material, displayed on or affixed to containers of hazardous chemicals.

“Material safety data sheet (MSDS)” means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (9) of this section.

“Mixture” means any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

“Organic peroxide” means an organic compound that contains the bivalent-O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

“Oxidizer” means a chemical other than a blasting agent or explosive as defined in §1910.109(a) that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

“Physical hazard” means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

“Produce” means to manufacture, process, formulate, or repackage.

“Pyrophoric” means a chemical that will ignite spontaneously in air at a temperature of 130 °F (54.4 °C) or below.

“Responsible party” means someone who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

“Specific chemical identity” means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

“Trade secret” means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer’s business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D sets out the criteria to be used in evaluating trade secrets.

“Unstable (reactive)” means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

“Use” means to package, handle, react, or transfer.

“Water-reactive” means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

“Work area” means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

“Workplace” means an establishment, job site, or project, at one geographical location containing one or more work areas.

d) Hazard determination.

(1) Chemical manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to determine if they are

hazardous. Employers are not required to evaluate chemicals unless they choose not to rely on the evaluation performed by the chemical manufacturer or importer for the chemical to satisfy this requirement.

(2) Chemical manufacturers, importers, or employers evaluating chemicals shall identify and consider the available scientific evidence concerning such hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section.

Appendix A shall be consulted for the scope of health hazards covered, and Appendix B shall be consulted for the criteria to be followed with respect to the completeness of the evaluation, and the data to be reported.

(3) The chemical manufacturer, importer or employer evaluating chemicals shall treat the following sources as establishing that the chemicals listed in them are hazardous:

- (i) 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA); or,
- (ii) *Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment*, American Conference of Government Industrial Hygienists (ACGIH) (latest edition).

The chemical manufacturer, importer, or employer is still responsible for evaluating the hazards associated with the chemicals in these source lists in accordance with the requirements of this standard.

(4) Chemical manufacturers, importers and employers evaluating chemicals shall treat the following sources as establishing that a chemical is a carcinogen or potential carcinogen for hazard communication purposes:

- (i) National Toxicology Program (NTP), *Annual Report on Carcinogens* (latest edition);

International Agency for Research on Cancer (IARC) *Monographs* (latest editions); or

- iii) 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

Note—The *Registry of Toxic Effects of Chemical Substances* published by the National Institute for Occupational Safety and Health indicates whether a chemical has been found by NTP or IARC to be a potential carcinogen.

(5) The chemical manufacturer, importer or employer shall determine the hazards of mixtures of chemicals as follows:

- (i) If a mixture has been tested as a whole to determine its hazards, the results of such testing shall be used to determine whether the mixture is hazardous;
- (ii) If a mixture has not been tested as a whole to determine whether the mixture is a health hazard, the mixture shall be assumed to present the same health hazards as do the components which comprise one percent (by weight or volume) or greater of the mixture, except that the mixture shall be assumed to present a carcinogenic hazard if it contains a component in concentrations of 0.1 percent or greater which is considered to be a carcinogen under paragraph (d)(4) of this section;
- iii) If a mixture has not been tested as a whole to determine whether the mixture is a physical hazard, the chemical manufacturer, importer, or employer may use whatever scientifically valid data is available to evaluate the physical hazard potential of the mixture; and,

If the chemical manufacturer, importer, or employer has evidence to indicate that a component present in the mixture in concentrations of less than one percent (or in the case of carcinogens, less than 0.1 percent) could be released in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health hazard

to employees in those concentrations, the mixture shall be assumed to present the same hazard.

(6) Chemical manufacturers, importers, or employers evaluating chemicals shall describe in writing the procedures they use to determine the hazards of the chemical they evaluate. The written procedures are to be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director. The written description may be incorporated into the written hazard communication program required under paragraph (e) of this section.

(e) Written hazard communication program.

(1) Employers shall develop, implement, and maintain at the workplace, a written hazard communication program for their workplaces which at least describes how the criteria specified in paragraphs (f), (g), and (h) of this section for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

- (i) A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and,

The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

(2) Multi-employer workplaces. Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (e) include the following:

The methods the employer will use to provide the other employer(s) with a copy of the material safety data sheet, or to make it available at a central location in the workplace for each hazardous chemical the other employer(s) employees may be exposed to while working;

- (ii) The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and,
- (iii) The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

(3) The employer may rely on an existing hazard communication program to comply with these requirements, provided that it meets the criteria established in this paragraph (e).

(4) The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives the Assistant Secretary and the Director, in accordance with the requirements of 29 *CFR* 1910.20(e).

(f) Labels and other forms of warning.

(1) The chemical manufacturer, importer, or distributor shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked with the following information:

- (i) Identity of the hazardous chemical(s);
- ii) Appropriate hazard warnings; and

Name and address of the chemical manufacturer, importer, or other responsible party.

(2) For solid metal (such as a steel beam or a metal casting) that is not exempted as an article due to its downstream use, the required label may be transmitted to the customer at the time of the initial

shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of the first shipment. This exception to requiring labels on every container of hazardous chemicals is only for the solid metal itself and does not apply to hazardous chemicals used in conjunction with, or known to be present with, the metal and to which employees handling the metal may be exposed (for example, cutting fluids or lubricants).

(3) Chemical manufacturers, importers, or distributors shall ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked in accordance with this section in a manner which does not conflict with the requirements of the Hazardous Materials Transportation Act (49 U.S.C. 1801 *et seq.*) and regulations issued under that Act by the Department of Transportation.

(4) If the hazardous chemical is regulated by OSHA in a substance-specific health standard the chemical manufacturer, importer, distributor or employer shall ensure that the labels or other forms of warning used are in accordance with the requirements of that standard.

(5) Except as provided in paragraphs (f)(6) and (f)(7), the employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged, or marked with the following information:

- (i) Identity of the hazardous chemical(s) contained therein; and
- ii Appropriate hazard warnings

(6) The employer may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by paragraph (f)(5) of this section to be on a label. The written materials shall be readily accessible to the employees in their work area throughout each work shift.

(7) The employer is not required to label portable containers into which hazardous chemicals are

transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.

(8) The employer shall not remove or deface existing labels on incoming containers of hazardous chemicals unless the container is immediately marked with the required information.

(9) The employer shall ensure that labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. Employers having employees who speak other languages may add the information in their language to the material presented, as long as the information is presented in English as well.

(10) The chemical manufacturer, importer, distributor or employer need not affix new labels to comply with this section if existing labels already convey the required information.

(g) Material safety data sheets.

(1) Chemical manufacturers and importers shall obtain or develop a material safety data sheet for each hazardous chemical they produce or import. Employers shall have a material safety data sheet for each hazardous chemical which they use.

(2) Each material safety data sheet shall be in English and shall contain at least the following information:

- (i) The identity used on the label, and, except as provided for in paragraph (i) of this section on trade secrets:
 - a) If the hazardous chemical is a single substance, its chemical and common name(s);
 - b) If the hazardous chemical is a mixture which has been tested as a whole to determine its hazards, the chemical and common name(s) of the ingredients which contribute to these known hazards, and the common name(s) of the mixture itself; or,
 - c) If the hazardous chemical is a mixture which has not been tested as a whole:

(1) The chemical and common name(s) of all ingredients which have been determined to be health

hazard, and which comprise 1% or greater of the composition, except that carcinogens and mutagens shall be listed if the concentration is greater; and,

(2) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise less than 1% (0.1% for carcinogens) of the mixture, if there is evidence that the ingredient(s) could be released from the mixture in concentrations which would exceed an established OSHA permissible exposure limit or ACGIH Threshold Limit Value, or could present a health hazard to employees; and,

(3) The chemical and common name(s) of all ingredients which have been determined to present a physical hazard when present in the mixture;

Physical and chemical characteristics of the hazardous chemical (such as vapor pressure, flash point);

- ii) The physical hazards of the hazardous chemical, including the potential for fire, explosion, and reactivity;

The health hazards of the hazardous chemical, including signs and symptoms of exposure, and any medical conditions which are generally recognized as being aggravated by exposure to the chemical:

- v The primary route(s) of entry

The OSHA permissible exposure limit, ACGIH Threshold Limit Value, and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the material safety data sheet, where available:

Whether the hazardous chemical is listed in the *National Toxicology Program (NTP) Annual Report on Carcinogens* (latest edition) or has been found to be a potential carcinogen in the *International Agency for Research on Cancer (IARC) Monographs* (latest editions), or by OSHA:

- iii Any generally applicable precautions for safe handling and use which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, including appropriate hygienic practices, protective measures during repair and maintenance of contaminated equipment, and procedures for clean-up of spills and leaks;

- (ix) Any generally applicable control measures which are known to the chemical manufacturer, importer or employer preparing the material safety data sheet, such as appropriate engineering controls, work practices, or personal protective equipment;

Emergency and first aid procedures

- xi The date of preparation of the material safety data sheet or the last change to it; and,

- xii The name, address and telephone number of the chemical manufacturer, importer, employer or other responsible party preparing or distributing the material safety data sheet, who can provide additional information on the hazardous chemical and appropriate emergency procedures, if necessary.

(3) If no relevant information is found for any given category on the material safety data sheet, the chemical manufacturer, importer or employer preparing the material safety data sheet shall mark it to indicate that no applicable information was found.

(4) Where complex mixtures have similar hazards and contents (i.e. the chemical ingredients are essentially the same, but the specific composition varies from mixture to mixture), the chemical manufacturer, importer or employer may prepare one material safety data sheet to apply to all of these similar mixtures.

- (5) The chemical manufacturer, importer or employer preparing the material safety data sheet shall ensure that the information recorded accurately reflects the scientific evidence used in

making the hazard determination. If the chemical manufacturer, importer or employer preparing the material safety data sheet becomes newly aware of any significant information regarding the hazards of a chemical, or ways to protect against the hazards, this new information shall be added to the material safety data sheet within three months. If the chemical is not currently being produced or imported, the chemical manufacturer or importer shall add the information to the material safety data sheet before the chemical is introduced into the workplace again.

(6) Chemical manufacturers or importers shall ensure that distributors and employee are provided an appropriate material safety data sheet with their initial shipment, and with the first shipment after a material safety data sheet is updated. The chemical manufacturer or importer shall either provide material safety data sheets with the shipped containers or send them to the employer prior to or at the time of the shipment. If the material safety data sheet is not provided with a shipment that has been labeled as a hazardous chemical, the employer shall obtain one from the chemical manufacturer, importer, or distributor as soon as possible.

(7) Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers. Retail distributors which sell hazardous chemicals to commercial customers shall provide a material safety data sheet to such employers upon request, and shall post a sign or otherwise inform them that a material safety data sheet is available. Chemical manufacturers, importers, and distributors need not provide material safety data sheets to retail distributors which have informed them that the retail distributor does not sell the product to commercial customers or open the sealed container to use it in their own workplaces.

(8) The employer shall maintain copies of the required material safety data sheets for each hazardous chemical in the workplace, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s).

(9) Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the material safety data sheets may be kept at a central location at the primary workplace facility.

In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency.

(10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in their work area(s).

(11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the Assistant Secretary, in accordance with the requirements of 29 CFR 1910.1020. The Director shall also be given access to material safety data sheets in the same manner.

(h) Employee information and training.

Employers shall provide employees with information and training on hazardous chemicals in the work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

(1) **Information.** Employees shall be informed of:

The requirements of this section;

- ii) Any operations in their work area where hazardous chemicals are present; and,
- iii) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this section.

(2) **Training.** Employee training shall include at least:

Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

The physical and health hazard chemicals in the work area:

- (iii) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and,

The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

(i) Trade secrets.

(1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that:

- (i) The claim that the information withheld is a trade secret can be supported;
- (ii) Information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed;
- (iii) The material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret; and,
- (iv) The specific chemical identity is made available to health professionals, employees, and designated representatives in accordance with the applicable provisions of this paragraph.

(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse.

regardless of the existence of a written statement of need of a confidentiality agreement. The chemical manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of paragraphs (i)(3) and (4) of this section, as soon as circumstances permit.

(3) In non-emergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld under paragraph (i)(1) of this section, to a health professional (i.e. physician, industrial hygienist, toxicologist, epidemiologist, or occupational health nurse) providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, if:

- (i) The request is in writing;
- (ii) The request describes with reasonable detail one or more of the following occupational health needs for the information:
 - (a) To assess the hazards of the chemicals to which employees will be exposed;
 - (b) To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;
 - (c) To conduct pre-assignment or periodic medical surveillance of exposed employees;
 - (d) To provide medical treatment to exposed employees;
 - (e) To select or assess appropriate personal protective equipment for exposed employees;
 - (f) To design or assess engineering controls or other protective measures for exposed employees; and,
 - (g) To conduct studies to determine the health effects of exposure.

The request explains in detail why the disclosure of the specific chemical identity is essential and that, in lieu thereof, the disclosure of the following information to the health professional, employee, or designated representative, would not satisfy the purposes described in paragraph (i)(3)(iii) of this section:

The properties and effects of the chemical;
 Measures for controlling workers' exposure to the chemical;
 Methods of monitoring and analyzing worker exposure to the chemical; and,
 Methods of diagnosing and treating harmful exposures to the chemical:

The request includes a description of the procedures to be used to maintain the confidentiality of the disclosed information; and

The health professional, and the employer or contractor of the services of the health professional (i.e. downstream employer, labor organization, or individual employee), employee, or designated representative, agree in a written confidentiality agreement that the health professional, employee, or designated representative, will not use the trade secret information for any purpose other than the health need(s) asserted and agree not to release the information under any circumstances other than to OSHA, as provided in paragraph (i)(6) of this section, except as authorized by the terms of the agreement or by the chemical manufacturer, importer, or employer.

(4) The confidentiality agreement authorized by paragraph (i)(3)(iv) of this section;

- (i) May restrict the use of the information to the health purposes indicated in the written statement of need;
- (ii) May provide for appropriate legal remedies in the event of a breach of the agreement, including stipulation of a reasonable pre-estimate of likely damages; and,
- iii. May not include requirements for the posting of a penalty bond.

(5) Nothing in this standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

(6) If the health professional, employee, or designated representative receiving the trade secret information decides that there is a need to disclose it to OSHA, the chemical manufacturer, importer, or employer who provided the information shall be

informed by the health professional, employee, or designated representative prior to, or at the same time as, such disclosure.

(7) If the chemical manufacturer, importer, or employer denies a written request for disclosure of a specific chemical identity, the denial must:

- (i) Be provided to the health professional, employee, or designated representative, within thirty days of the request;

- ii) Be in writing

- iii) Include evidence to support the claim that the specific chemical identity is a trade secret;

State the specific reasons why the request is being denied; and,

- iv) Explain in detail how alternative information may satisfy the specific medical or occupational health need without revealing the specific chemical identity.

(8) The health professional, employee, or designated representative whose request for information is denied under paragraph (i)(3) of this section may refer the request and the written denial of the request to OSHA for consideration.

(9) When a health professional, employee, or designated representative refers the denial to OSHA under paragraph (i)(8) of this section, OSHA shall consider the evidence to determine if:

- (i) The chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret;

The health professional, employee, or designated representative has supported the claim that there is a medical or occupational health need for the information; and,

The health professional, employee, or designated representative has demonstrated adequate means to protect the confidentiality

(10)(i) If OSHA determines that the specific chemical identity requested under paragraph (i)(3) of this section is not a *bona fide* trade secret, or that it is a trade secret, but the requesting health professional,

employee, or designated representative has a legitimate medical or occupational health need for the information, has executed a written confidentiality agreement, and has shown adequate means to protect the confidentiality of the information, the chemical manufacturer, importer, or employer will be subject to citation by OSHA.

If a chemical manufacturer, importer, or employer demonstrates to OSHA that the execution of a confidentiality agreement would not provide sufficient protection against the potential harm from the unauthorized disclosure of a trade secret specific chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations or conditions upon the disclosure of the requested chemical information as may be appropriate to assure that the occupational health services are provided without an undue risk of harm to the chemical manufacturer, importer, or employer.

(11) If a citation for a failure to release specific chemical identity information is contested by the chemical manufacturer, importer, or employer, the matter will be adjudicated before the Occupational Safety and Health Review Commission in accordance with the Act's enforcement scheme and the applicable Commission rules of procedure. In accordance with the Commission rules, when a chemical manufacturer, importer, or employer continues to withhold the information during the contest, the Administrative Law Judge may review the citation and supporting documentation *in camera* or issue appropriate orders to protect the confidentiality or such matters.

(12) Notwithstanding the existence of a trade secret claim, a chemical manufacturer, importer, or employer shall, upon request, disclose to the Assistant Secretary any information which this section requires the chemical manufacturer, importer, or employer to make available. Where there is a trade secret claim, such claim shall be made no later than at the time the information is provided to the Assistant Secretary so that suitable determinations of trade secret status can be made and the necessary protections can be implemented.

(13) Nothing in this paragraph shall be construed as requiring the disclosure under any circumstances of process or percentage of mixture information which is a trade secret.

(j) Effective dates.

(1) Chemical manufacturers, importers, and distributors shall ensure that material safety data sheets are provided with the next shipment of hazardous chemicals to employers after September 23, 1987.

(2) Employers in the non-manufacturing sector shall be in compliance with all provisions of this section by May 23, 1988. (Note: Employers in the manufacturing sector (SIC Codes 20 through 39) are already required to be in compliance with this section.)

Appendix A Health Hazard Definitions (Mandatory)

Although safety hazards related to the physical characteristics of a chemical can be objectively defined in terms of testing requirements (e.g. flammability), health hazard definitions are less precise and more subjective. Health hazards may cause measurable changes in the body—such as decreased pulmonary function. These changes are generally indicated by the occurrence of signs and symptoms in the exposed employees—such as shortness of breath, a non-measurable, subjective feeling. Employees exposed to such hazards must be apprised of both the change in body function and the signs and symptoms that may occur to signal that change.

The determination of occupational health hazards is complicated by the fact that many of the effects or signs and symptoms occur commonly in nonoccupationally exposed populations, so that effects of exposure are difficult to separate from normally occurring illnesses. Occasionally, a substance causes an effect that is rarely seen in the population at large, such as angiosarcomas caused by vinyl chloride exposure, thus making it easier to ascertain that the occupational exposure was the primary causative factor. More often, however, the effects are common, such as lung cancer. The situation is further complicated by the fact that most chemicals have not been adequately tested to determine their health hazard potential, and data do not exist to substantiate these effects.

There have been many attempts to categorize effects and to define them in various ways. Generally, the terms "acute" and "chronic" are used to delineate between effects on the basis of severity or duration. "Acute" effects usually occur rapidly as a result of short-term exposures, and are of short duration. "Chronic" effects generally occur as a result of long-term exposure, and are of long duration.

The acute effects referred to most frequently are those defined by the American National Standards Institute (ANSI) standard for Precautionary Labeling of Hazardous Industrial Chemicals (Z129.1-1982)—irritation, corrosivity, sensitization and lethal dose. Although these are important health effects, they do not adequately cover the considerable range of acute effects which may occur as a result of occupational exposure, such as, for example, narcosis.

Similarly, the term chronic effect is often used to cover only carcinogenicity, teratogenicity, and mutagenicity. These effects are obviously a concern in the workplace, but again, do not adequately cover the area of chronic effects, excluding, for example, blood dyscrasias (such as anemia), chronic bronchitis and liver atrophy.

The goal of defining precisely, in measurable terms, every possible health effect that may occur in the workplace as a result of chemical exposures cannot realistically be accomplished. This does not negate the need for employees to be informed of such effects and protected from them. Appendix B, which is also mandatory, outlines the principles and procedures of hazardous assessment.

For purposes of this section, any chemicals which meet any of the following definitions, as determined by the criteria set forth in Appendix B are health hazards:

1. Carcinogen: A chemical is considered to be a carcinogen if:

- (a) It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or
- (b) It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition); or,

regulated by OSHA as a carcinogen

2. Corrosive: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a chemical is considered to be corrosive if, when tested on the intact skin of albino rabbits by the method described by the U.S. Department of Transportation in Appendix A to 49 CFR Part 173, it destroys or changes

irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.

3. Highly toxic: A chemical falling within any of the following categories:

(a) A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

(b) A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

(c) A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

4. Irritant: A chemical, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41 for four hours exposure or by other appropriate techniques, it results in an empirical score of five or more. A chemical is an eye irritant if so determined under the procedure listed in 16 CFR 1500.42 or other appropriate techniques.

5. Sensitizer: A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

6. Toxic: A chemical falling within any of the following categories:

(a) A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.

(b) A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for

24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each.

(c) A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than two milligrams per liter but not more than 20 milligrams per liter of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

7. Target organ effects. The following is a target organ categorization of effects which may occur, including examples of signs and symptoms and chemicals which have been found to cause such effects. These examples are presented to illustrate the range and diversity of effects and hazards found in the workplace, and the broad scope employers must consider in this area, but are not intended to be all-inclusive.

a. Hepatotoxins: Chemicals which produce liver damage

Signs & Symptoms: Jaundice; liver enlargement
Chemicals: Carbon tetrachloride; nitrosamines

b. Nephrotoxins: Chemicals which produce kidney damage

Signs & Symptoms: Edema; proteinuria
Chemicals: Halogenated hydrocarbons; uranium

c. Neurotoxins: Chemicals which produce their primary toxic effects on the nervous system

Signs & Symptoms: Narcosis behavioral changes; decrease in moto; functions

Chemicals: Mercury; carbon disulfide

d. Agents which act on the blood or hematopoietic system: Decrease hemoglobin function; deprive the body tissues of oxygen

Signs & Symptoms: Cyanosis; loss of consciousness
Chemicals: Carbon monoxide; cyanides

e. Agents which damage the lung: Chemicals which irritate or damage the pulmonary tissue

Signs & Symptoms: Cough; tightness in chest; shortness of breath

Chemicals: Silica; asbestos

f. Reproductive toxins: Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses

(teratogenesis)

Signs & Symptoms: Birth defects; sterility
Chemicals: Lead; DBCP

9. Cutaneous hazards: Chemicals which affect the dermal layer of the body

Signs & Symptoms: Defatting of the skin; rashes
irritation

Chemicals: Ketones; chlorinated compounds

h. Eye hazards: Chemicals which affect the eye or visual capacity

Signs & Symptoms: Conjunctivitis; corneal damage
Chemicals: Organic solvents; acids

Appendix B Hazard Determination (Mandatory)

The quality of a hazard communication program is largely dependent upon the adequacy and accuracy of the hazard determination. The hazard determination requirement of this standard is performance oriented. Chemical manufacturers, importers, and employers evaluating chemicals are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the chemicals produced or imported in accordance with the criteria set forth in this Appendix.

Hazard evaluation is a process which relies heavily on the professional judgment of the evaluator, particularly in the area of chronic hazards. The performance orientation of the hazard determination does not diminish the duty of the chemical manufacturer, importer or employer to conduct a thorough evaluation, examining all relevant data and producing a scientifically defensible evaluation. For purposes of this standard, the following criteria shall be used in making hazard determinations that meet the requirements of this standard.

1. Carcinogenicity: As described in paragraph (d)(4) and Appendix A of this section, a determination by the National Toxicology Program, the International Agency for Research on Cancer, or OSHA that a chemical is a carcinogen or potential carcinogen will be considered conclusive evidence for purposes of this section.

2. Human data: Where available, epidemiological studies and case reports of adverse health effects shall be considered in the evaluation.

3. Animal data: Human evidence of health effects in exposed populations is generally not available for

the majority of chemicals produced or used in the workplace. Therefore, the available results of toxicological testing in animal populations shall be used to predict the health effects that may be experienced by exposed workers. In particular, the definitions of certain acute hazards refer to specific animal testing results (see Appendix A).

4. Adequacy and reporting of data. The results of any studies which are designed and conducted according to established scientific principles, and which report statistically significant conclusions regarding the health effects of a chemical, shall be a sufficient basis for a hazard determination and reported on any material safety data sheet. The chemical manufacturer, importer, or employer may also report the results of other scientifically valid studies which tend to refute the findings of hazards.

OSHA also has published *Guidelines for Hazard Determination* to help manufacturers or importers of chemicals to determine the hazards of the chemicals handled so that they can inform their employees and downstream users about these hazards. For a copy of the guidelines, write or call OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535, (202) 219-4667, (202) 219-9266 (fax), or from nearest OSHA regional or area office listed at the end of this publication. Send a self-addressed mailing label with your request.

Appendix C Information Sources (Advisory)

The following is a list of available data sources which the chemical manufacturer, importer, distributor, or employer may wish to consult to evaluate the hazards of chemicals they produce or import:

—Any information in their own company files, such as toxicity testing results or illness experience of company employees.

—Any information obtained from the supplier of the chemical, such as material safety data sheets or product safety bulletins.

—Any pertinent information obtained from the following source list (latest editions should be used):

Condensed Chemical Dictionary Van Nostrand Reinhold Co., 135 West 50th Street, New York, NY 10020.

The Merck Index: An Encyclopedia of Chemicals and Drugs

Merck and Company, Inc., 126 E. Lincoln Ave., Rahway, NJ 07065.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man Geneva: World Health Organization, International Agency for Research on Cancer, 1972-Present. (Multivolume work). Summaries are available in supplement volumes. 49 Sheridan Street, Albany, NY 12210.

Industrial Hygiene and Toxicology, by F. A. Patty John Wiley & Sons, Inc., New York, NY (Multivolume work).

Clinical Toxicology of Commercial Products Gleason, Gosselin, and Hodge

Casarett and Doull's Toxicology; The Basic Science of Poisons
Doull, Klaassen, and Amdur, Macmillan Publishing Co., Inc., New York, NY.

Industrial Toxicology, by Alice Hamilton and Harriet L. Hardy Publishing Sciences Group, Inc., Acton, MA.

Toxicology of the Eye, by W. Morton Grant Charles C. Thomas, 301-327 East Lawrence Avenue, Springfield, IL.

Recognition of Health Hazards in Industry
William A. Burgess, John Wiley and Sons, 605 Third Avenue, New York, NY 10158.

Chemical Hazards of the Workplace
Nick H. Proctor and James P. Hughes. J.P. Lippincott Company, 6 Winchester Terrace, New York, NY 10022.

Handbook of Chemistry and Physics
Chemical Rubber Company, 18901 Cranwood Parkway, Cleveland, OH 44128.

Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment and Biological Exposure Indices with Intended Changes

American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Avenue, Bldg. D-5, Cincinnati, OH 45211.

Information on the physical hazards of chemicals may be found in publications of the National Fire Protection Association, Boston, MA.

Bibliographic Data Bases

Note.—The following documents may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Occupational Health Guidelines NIOSH/OSHA (NIOSH Pub. No. 81-123)

NIOSH Pocket Guide to Chemical Hazards NIOSH Pub. No. 85-114

Registry of Toxic Effects of Chemical Substances

NIOSH Pub. No. 80-102

Miscellaneous Documents published by the National Institute for Occupational Safety and Health:

Criteria documents.

Special Hazard Reviews.

Occupational Hazard Assessments.

Current Intelligence Bulletins.

OSHA's General Industry Standards (29 CFR Part 1910)

NTP Annual Report on Carcinogens and Summary of the Annual Report on Carcinogens National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161: 1-800-553-(NTIS) 6847

Bibliography Data Bases

Service Provider

File Name

Bibliographic Retrieval Services (BRS)
1200 Route 7
Lanham, NY 12110

Biosis Previews
CA Search
Medlars
NTIS
Hazardline
American Chemical Society Journal
Excerpta Medica
IRCS Medical Science Journal
Pre-Med
Intl. Pharmaceutical Abstracts
Paper Chem

Lockheed—DIALOG
Information Service Inc
3460 Hillview Avenue
Palo Alto, CA 94304

Biosi Prev. Files
CA Search Files
CAB Abstracts
Chemical Exposure
Chemname
Chemsis Files
Chemzero
Embase Files
Environmental Bibliographies
Enviroline
Federal Research in Progress
IRL Life Science Collection
NTIS
Occupational Safety and Health (NIOSH)
Paper Chem

Service Provider	File Name
SDC-Orbit, SDC Information Service 2500 Colorado Avenue Santa Monica, CA 90406	CAS Files Chemdex, 2, 3 NYIS
National Library of Medicine Department of Health and Human Services Public Health Service National Institutes of Health Bethesda, MD 20209	Hazardous Substances Data Bank (NSDB) Medline Files Toxline Files Cancerlit RTECS Chemline
Pergamon International Information Corp. 1340 Old Chain Bridge Road McLean VA, 22101	Laboratory Hazard Bulletin
Questel, Inc. 1625 Eye Street, NW Suite 818 Washington, DC 20005	CIS/ILO Cancernet
Chemical Information System ICI (ICIS) Bureau of National Affairs 1133 15th Street, NW Suite 300 Washington, DC 20005	Structure and Nonenclature System (SANSS) Acute Toxicity (RTECS) Clinical Toxicology of Commercial Products Oil and Hazardous Materials Technical Assistance Data System CCRIS CESARS
Occupational Health Services 400 Plaza Drive Secaucus, NJ 07094	MSDS Hazardline

Definition of "Trade Secret" (Mandatory)

The following is a reprint of the Restatement of Torts section 757, comment b (1939):

b. Definition of trade secret. A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound, process of manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers. It differs from other secret information in a business (see § 759 of the Restatement of Torts which is not included in this Appendix) in that it is not simply information as to single or ephemeral events in the conduct of the business, as, for example, the amount or other terms of a secret bid for a contract or the salary of certain employees, or the security investments made or contemplated, or the date fixed for the announcement of a new policy or for bringing out a new model or the like. A trade secret is a process or device for continuous use in the operations of the business. Generally it relates to the production of goods, as, for example, a machine or formula for the production of an article. It may, however, relate to the sale of goods or to other operations in the business, such as a code for determining discounts, rebates or other concessions in a price list or catalogue, or a list of specialized customers, or a method of bookkeeping or other office management.

Secrecy. The subject matter of a trade secret must be secret. Matters of public knowledge or of general knowledge in an industry cannot be appropriated by one as his secret. Matters which are completely disclosed by the goods which one markets cannot be his secret. Substantially, a trade secret is known only in the particular business in which it is used. It is not requisite that only the proprietor of the business know it. He may, without losing his protection, communicate it to employees involved in its use. He may likewise communicate it to others pledged to secrecy. Others may also know of it independently, as, for example, when they have discovered the process or formula by independent invention and are keeping it secret.

Nevertheless, a substantial element of secrecy must exist, so that, except by the use of improper means, there would be a difficulty in acquiring the information. An exact definition of a trade secret is not possible. Some factors to be considered in determining whether given information is one's trade secret are: (1) The extent to which the information is known outside of his business; (2) the extent to which it is known by employees and others involved in his business; (3) the extent of measures taken by him to guard the secrecy of the information; (4) the value of the information to him and his competitors; (5) the amount of effort or money expended by him in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

Novelty and prior art. A trade secret may be a device or process which is patentable; but it need not be that. It may be a device or process which is clearly anticipated in the prior art or one which is merely a mechanical improvement that a good mechanic can make. Novelty and invention are not requisite for a trade secret as they are for patentability. These requirements are essential to patentability because a patent protects against unlicensed use of the patented device or process even by one who discovers it properly through independent research. The patent monopoly is a reward to the inventor. But such is not the case with a trade secret. Its protection is not based on a policy of rewarding or otherwise encouraging the development of secret processes or devices. The protection is merely against breach of faith and reprehensible means of learning another's secret. For this limited protection it is not appropriate to require also the kind of novelty and invention which is a requisite of patentability. The nature of the secret is, however, an important factor in determining the kind of relief that is appropriate against one who is subject to liability under the rule stated in this section. Thus, if the secret consists of a device or process which is a novel invention, one who acquires the secret wrongfully is ordinarily enjoined from further use of it and is required to account for the profits derived from his past use. If, on the other hand, the secret consists of mechanical improvements that a good mechanic can make without resort to the secret, the wrongdoer's liability may be limited to damages, and an injunction against future use of the improvements made with the aid of the secret may be inappropriate.

Appendix II

MSDS Glossary

The following glossary presents brief explanations of acronyms and common terms frequently used by chemical manufacturers in their MSDS.

Absorbed Dose The amount of a substance that actually enters into the body, usually expressed as milligrams of substance per kilogram of body weight (mg/kg).

Absorption The process whereby a substance moves from outside the body into the body.

ACGIH American Conference of Governmental Industrial Hygienists is an organization of professional personnel in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH establishes recommended occupational exposure limits for chemical substances and physical agents. See TLV.

Acid Any chemical that undergoes dissociation in water with the formation of hydrogen ions. Acids have a sour taste and may cause severe skin burns. Acids have pH values of 0 to 6.

Acute Dose The amount of a substance administered or received over a very short period of time (minutes or hours), usually within 24 hours.

Acute Toxicity The toxic effects resulting from a single dose or short exposure to a substance.

Alkali Same as bases. They may cause severe burns to the skin. Alkalis have pH values from 8 to 14. They may be irritating or corrosive to the skin, eyes and mucous membranes, especially at very high pH levels.

Allergic Reaction An abnormal physiologic response in a person who has become hypersensitive to a specific substance. Some forms of dermatitis and asthma may be caused by allergic reactions to chemicals.

Anoxia An insufficient (below normal) supply of oxygen in the body tissues.

ANSI American National Standards Institute is a privately funded, voluntary membership organization that identifies industrial and public needs for national consensus standards and coordinates development of such standards.

Asphyxiant A vapor or gas that can cause unconsciousness or death by suffocation (lack of oxygen). Most simple asphyxiants are harmful to the body only when they become so concentrated that they reduce oxygen in the air (normally about 21 percent) to dangerous levels (18 percent or lower).

ASTM American Society for Testing and Materials. The world's largest source of voluntary consensus standards for materials, products, systems, and services. ASTM is a resource for sampling and testing methods, health and safety aspects of materials, safe performance guidelines, effects of physical and biological agents and chemicals.

ATSDR Agency for Toxic Substances and Disease Registry is responsible for emergency response to chemical spills and assessment of health effects of hazardous waste sites.

Auto-ignition Temperature The approximate lowest temperature at which a flammable gas or vapor-air mixture will spontaneously ignite without spark or flame. It is also the temperature to which a closed, or nearly closed container must be heated in order that the flammable liquid, when introduced into the container, will ignite spontaneously or burn.

Base A substance that (1) liberates hydroxide (OH) ions when dissolved in water, (2) receives hydrogen ions from a strong acid to form a weaker acid, and (3) neutralizes an acid. Bases react with acids to form salts and water. Bases have a pH greater than 7. See Alkali.

Benign Not recurrent or not tending to progress. Not cancerous.

Boiling Points-BP The temperature at which a liquid changes to a vapor state at a given pressure. The boiling point is usually expressed in degrees Fahrenheit at sea level pressure (760 mmHg, or one atmosphere). For mixtures, the initial boiling point or the boiling range may be given.

Flammable materials with low boiling points generally present special fire hazards. Some approximate boiling points:

Propane.	-44°F
Anhydrous Ammonia.	-28°F
Butane.	31°F
Gasoline.	100°F
Allyl Chloride.	113°F
Ethylene Glycol.	387°F

CAS Number A number assigned to specific chemicals by the Chemical Abstracts Service, an organization operated by the American Chemical Society. CAS Numbers are internationally used to identify specific chemicals or mixtures.

Cancer An uncontrolled growth of abnormal cells, creating a tumor that can invade surrounding tissues and may spread (metastasis) to distant organs.

Carcinogen A substance or agent capable of causing or producing cancer in mammals, including humans. A chemical is considered to be a carcinogen by OSHA if:

- (a) It has been evaluated by the *International Agency for Research on Cancer (IARC)*, and found to be a carcinogen or potential carcinogen; or
- (b) It is listed as a carcinogen or potential carcinogen in the *Annual Report on Carcinogens* published by the National Toxicology Program (NTP) (latest edition); or
- (c) It is regulated by OSHA as a carcinogen.

Carcinogenicity The complex process whereby normal body cells are transformed to cancer cells.

Caustic See Alkali.

cc Cubic centimeter is a volume measurement in the metric system that is equal in capacity to one milliliter (ml). One quart is about 946 cubic centimeters.

Ceiling Limit (PEL or TLV) The maximum allowable human exposure limit for an airborne substance which is not to be exceeded even momentarily. Also see PEL and TLV.

CFR Code of Federal Regulations. A collection of the regulations that have been promulgated under United States Law.

Chemical An element (e.g., chlorine) or a compound (e.g., sodium bicarbonate) produced by chemical reaction.

Chemical Name The name given to a chemical in the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS). The scientific designation of a chemical or a name that will clearly identify the chemical for hazard evaluation purposes.

CHEMTREC Chemical Transportation Emergency Center. A national center established by the Chemical Manufacturers Association (CMA) to relay emergency information concerning chemicals involved in a transportation emergency.

Chronic Toxicity Adverse (chronic) effects resulting from repeated doses or exposures to a substance over a relatively prolonged period of time.

Combustible A substance capable of fueling a fire. Also a term used to classify certain liquids on the basis of their flash points. Both NFPA and DOT generally define "combustible liquids" as having a flash point of 100°F (37.8°C) or higher but below 200°F (93.3°C). Nonliquid substances such as wood and paper are classified as "ordinary combustibles" by NFPA. Also see "flammable."

Common Name Any means used to identify a chemical other than its chemical name (e.g., code name, code number, trade name, brand name, or generic name). See Generic.

Concentration The relative amount of a substance when combined or mixed with other substances. Examples: 2 ppm hydrogen sulfide in air, or a 50 percent caustic solution.

Decomposition Breakdown of a material or substance (by heat, chemical reaction, electrolysis, decay, or other processes) into parts or elements or simpler compounds.

Dermal Relating to the skin.

DNA Deoxyribonucleic acid. The very large molecules in the nucleus of the cell, that carry the genetic information.

DOL U.S. Department of Labor. OSHA and MSHA are part of DOL.

Dose The amount of a substance received at one time. Dose is usually expressed as administered or absorbed dose (e.g., milligrams material/kilogram of body weight).

Dose-Response Curve A graphical representation of the quantitative relationship between doses of a substance and specific biological effects.

DOT U.S. Department of Transportation; it regulates transportation of chemicals and other hazardous and non-hazardous substances.

Employer A person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

EPA U.S. Environmental Protection Agency. The federal agency with environmental protection, regulatory and enforcement responsibility.

Epidemiology Science concerned with the study of disease in a general population. Determination of the incidence (rate of occurrence) and distribution of a particular disease (as by age, sex, or occupation) which may provide information about the cause of the disease.

Evaporation Rate The rate at which a material will vaporize (evaporate) when compared to the known rate of vaporization of a standard material. The evaporation rate can be useful in evaluating the health and fire hazards of a material. The designated standard material is usually normal butyl acetate (NBUAC or nBuAc), with a vaporization rate designated as 1.0. Vaporization rates of other solvents or materials are then classified as:

FAST - evaporating if greater than 3.0. Examples: Methyl Ethyl Ketone = 3.8, Acetone = 5.6, Hexame = 8.3.

MEDIUM - evaporating if 0.8 to 3.0. Examples: 190 proof (95%) Ethyl Alcohol = 1.4, VM&P Naphtha = 1.4, MIBK = 1.6.

SLOW = evaporating if less than 0.8. Examples: Xylene = 0.6, Isobutyl Alcohol = 0.6, Normal Butyl Alcohol = 0.4, Water = 0.3, Mineral Spirits = 0.1.

Explosive A chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Explosive Limits The range of concentration of a flammable gas or vapor (percent by volume in air) in which explosion can occur if an ignition source is present.

Exposure or Exposed State of being open and vulnerable to a hazardous chemical by inhalation, ingestion, skin contact, absorption, or any other course; includes potential (accidental or possible) exposure.

Flammable Limits The range of a vapor/gas concentration in air that will burn or explode if an ignition source is present. See also "explosive limit."

Flammable A material which is easily ignited and burns with extreme rapidity.

Flammable Aerosol An aerosol that, when tested by the method described in 16CFR500.4500 yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening.

Flashback Occurs when flame from a torch burns back into the tip, the torch, or the hose. It is often accompanied by a hissing or squealing sound with a smoky or sharp-pointed flame.

Flashpoint The minimum temperature at which a liquid gives off a vapor in sufficient concentration to form an ignitable mixture in air or oxygen. Testing should be conducted by the following methods:

(a) Tagliabue Closed Tester (see American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24 1979 [ASTM D56-79]).

(b) Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens Closed Tester, Z11.7-1979 JASTM D93-79)).

(c) Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester [ASTM D 3278-78]).

Genetic Pertaining to or carried by genes. Hereditary.

Hazard Communication Program (HCP) A written program that employers shall develop, implement, and maintain at each workplace which describes how they will comply with all aspects of the Hazard Communication Standard.

Hazard Communication Standard (HCS) An OSHA standard (29 CFR Part 1910.1200) established in 1983 requiring all employers to inform employees of the hazard of chemicals in the workplace and the steps necessary to avoid harm.

Hazard The inherent capacity of a substance to cause an adverse effect.

HCP See Hazard Communication Program.

HCS See Hazard Communication Standard.

Hazard Evaluator A person that evaluates information pertaining to the potential hazards of a substance and determines whether specific hazards exist and the extent of the hazard under various exposure situations.

IARC International Agency for Research on Cancer, a component of the World Health Organization. IARC is located in Lyon, France.

IDLH Immediately Dangerous to Life and Health. A NIOSH estimate for the maximum level of exposure from which a person could exit in 30 minutes without escape-impairing symptoms or irreversible health effects.

Ignitable A solid, liquid or compressed gas which is capable of being set afire.

In Vitro Outside a living organism (e.g., in a test tube).

In Vivo Occurring within a living organism.

Inhalation Breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.

Latency Period The period of time between an exposure and onset of toxicity.

LC₅₀ Lethal Concentration 50%. The calculated concentration of a gas at which 50% of the population is expected to die. The LC₅₀ can be expressed in several manners: 1) as parts of material per million parts of air, by volume (ppm) for gases and vapors. 2) micrograms of material per liter of air (g/L), or 3) as milligrams of material per cubic meter of air (mg/M³) for dusts and mists, as well as for gases and vapors.

LD₅₀ Lethal Dose 50%. The estimated dose at which 50% of the population is expected to die. A single dose of a material expected to kill 50 percent of a group of test animals. The LD₅₀ dose is usually expressed as milligrams or grams of material per kilogram of animal body weight (mg/kg or g/kg). The material may be administered by mouth or applied to the skin.

LEL, or LFL Lower explosive limit, or lower flammable limit, of a vapor or gas; the lowest concentration (lowest percentage of the substance in air) that will produce a flash or fire when an ignition source (heat, arc, or flame) is present. At concentrations lower than the LEL, the mixture is too "lean" to burn. Also see "UEL."

M³ Cubic meter. A metric measure of volume, approximately 35.3 cubic feet or 1.3 cubic yards.

Malignant Tending to become progressively worse and to result in death.

Malignant Tumor A tumor that can invade surrounding tissues or metastasize to distant sites resulting in life-threatening consequences.

Median Toxic Dose The dose level at which 50% of the population will experience toxic effects.

Melting Point The temperature at which a solid substance changes to a liquid state.

Metabolism The conversion of a chemical from one form to another within the body. Same as Biotransformation.

Metabolite A chemical produced when a substance is metabolized by a biological organism.

mg/kg Milligrams per kilogram. An expression of toxicological dose.

mg/M³ Milligrams per cubic Meter. A unit for measuring concentrations of particulates or gases in the air (a weight per unit volume).

milligram (mg) The most commonly used unit of measure in medicine and toxicity consisting of one thousandth of a gram (1x10³ g).

Mixture Any combination of two or more substances if the combination is not, in whole or part, the result of chemical reaction.

ml Milliliter, a metric unit of volume. There are 1,000 milliliters in one liter. (1) 1 teaspoon = 5 milliliters).

MSDS Material Safety Data Sheet.

Mutagen A substance or agent capable of altering the genetic material in a living cell (mutation).

NCI National Cancer Institute, a part of the National Institutes of Health.

NFPA National Fire Protection Association - an international membership organization which promotes/improves fire protection and prevention and establishes safeguards against loss of life and property by fire.

NIOSH National Institute for Occupational Safety and Health, a part of the U.S. Public Health Service, U.S. Department of Health and Human Services (DHHS).

NTP National Toxicology Program. The NTP publishes an Annual Report on Carcinogens.

Odor Threshold The lowest concentration of a substance's vapor, in air, that can be smelled.

OSHA The Occupational Safety and Health Administration. The component of the Department of Labor responsible for assuring safe working conditions.

Oxidation A change in a chemical characterized by the loss of electrons. In a literal sense, oxidation is a reaction in which a substance combines with oxygen provided by an oxidizer or oxidizing agent. See Oxidizing Agent.

Oxidizing Agent A chemical or substance that brings about an oxidation reaction. The agent may (1) provide the oxygen to the substance being oxidized (in which case the agent has to be oxygen

r contain oxygen), or (2) it may receive electrons being transferred from the substance undergoing oxidation (chlorine is a good oxidizing agent for electron-transfer purposes, even though it contains no oxygen).

PEL Permissible exposure limit; an exposure limit established by OSHA's regulatory authority. May be a time weighted average (TWA limit) or a "ceiling" maximum concentration exposure limit.

Polymer A high molecular weight material formed by chemically joining together five or more molecules (monomers).

Polymerization A chemical reaction in which a large number of relatively simple molecules combine to form a large chainlike molecule. A hazardous polymerization is a reaction which takes place at a rate which releases large amounts of energy.

ppm Parts per million; the concentration of a gas or vapor in air-parts (by volume) of the gas or vapor in a million parts of air; also the concentration of a particulate in a liquid or solid.

Reactivity The tendency of a substance to undergo chemical change with the release of energy.

Undesirable effects (pressure build-up, temperature increase, formation of noxious, toxic or corrosive by-products) may occur because of a reaction to heating, burning, direct contact with other materials or other conditions when in use or in storage.

REL The NIOSH REL (Recommended Exposure Limit) is the highest allowable airborne concentration which is not expected to injure the workers. It may be expressed as a ceiling limit or as a time-weighted average (TWA).

Risk The probability that a hazard or effect will occur at a specific level of exposure.

Solubility Ability of a substance to be dissolved in a solvent. The solubility is expressed according to the solvent, e.g. water solubility, solubility in acetone, etc.

Specific Chemical Identify The chemical name. Chemical Abstracts Service (CAS) Registry Number, or any precise chemical designation of a substance.

STEL Short-Term Exposure Limit (ACGIH terminology). See TLV.

Structure-Activity Relationship (SAR) The process by which the toxicity of a substance can be predicted based on its similarity in structure to that of other chemicals for which the toxicity is known.

Substance A frequently used term which stands for basically the material of which an object is composed. It may be an element, chemical compound or mixture.

Synonym Another name or names by which a material is known. Methyl alcohol, for example, is known as methanol or wood alcohol.

System Toxicity The adverse effects caused by a substance which affects the body in a general rather than a local manner.

Target Organ An organ in which a foreign substance exerts a toxic effect in the body.

Teratogen A substance that, upon exposure of a parent, can cause birth defects in the fetus.

Teratogenicity The development of birth defects as the result of exposure to a teratogenic toxicant.

Threshold Dose The dose at which a toxic effect is first encountered.

Threshold Limit Value (TLV) A term used by ACGIH to express the airborne concentration of material to which nearly all persons can be exposed day after day without adverse effects. ACGIH expresses TLVs in four ways.

TLV-TWA: The allowable Time-Weighted Average concentration for a normal 8-hour workday or 80-hour workweek.

TLV-STEL: The Short-Term Exposure Limit, or maximum concentration for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided the daily TLV-TWA is not exceeded).

TLV-C: The ceiling exposure limit-the concentration that should not be exceeded even momentarily.

TLV-Skin: The skin designation refers to the potential contribution to the overall exposure by the cutaneous route, including mucous membranes and the eye. Exposure can be either by airborne or direct contact with the substance. This "attention calling" designation suggests appropriate measures be taken to prevent skin absorption. The TLV is not invalidated.

Toxic Substance Any substance that can cause acute or chronic injury to the human body, or which is suspected of being able to cause diseases or injury under some conditions.

Toxicity Inherent capacity to produce injury. Adverse effects resulting from overexposure to a material, generally via the mouth, skin, eyes or respiratory tract.

Toxicologist A person who studies harmful effects of chemicals including the mechanisms by which the effects are produced and the probability that the effects will occur under specific exposure conditions.

Toxicology The study of the harmful interactions of chemicals on living organisms and biological systems.

Trade Name The trademark name or commercial trade name for a material or product.

TWA Time-Weighted Average exposure is the airborne concentration of a material to which a person is exposed, averaged over the total exposure time—generally the total workday (8 to 12 hours). Also see TLV.

UEL or UFL Upper explosive limit or upper flammable limit of a vapor or gas; the highest concentration (highest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At higher concentrations, the Mixture is too “rich” to burn. Also see LEL.

Unstable Tending toward decomposition or other unwanted chemical change during normal handling or storage.

Upper Flammable Limit (UFL) See UEL.

Vapor density The weight of a vapor or gas compared to the weight of an equal volume of air is an expression of the density of the vapor or gas. Materials lighter than air (examples: propane, hydrogen sulfide, ethane, butane, chlorine, sulfur dioxide) have vapor densities greater than 1.0. All vapors and gases will mix with air, but the lighter materials will tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low places along or under floors, in sumps, sewers, and manholes, in trenches and ditches—where they may create fire or health hazards.

Vapor pressure The pressure exerted by a saturated above its own liquid in a closed container. When quality control tests are performed on products, the test temperature is usually 100°F, and the vapor pressure is expressed as pounds per square inch (psig or psia), but vapor pressures reported as MSDS are in millimeters of mercury (mmHg) at 68°F (20°C), unless stated otherwise. Three facts are important to remember:

1. Vapor pressure of a substance at 100°F will always be higher than the vapor pressure of the substance at 68°F (20°C).
2. Vapor pressures reported on MSDS in mmHg are usually very low pressures; 760 mmHg is equivalent to 14.7 pounds per square inch.
3. The lower the boiling point of a substance, the higher its vapor pressure.

Volatility A measure of how quickly a substance changes from liquid or solid form to a gaseous form at ordinary temperatures.

Appendix III

Audiovisual and Publications Products

Federal Products OSHA Training Institute

The OSHA Training Institute in Des Plaines, Illinois, provides basic and advanced training and education in safety and health for Federal and state compliance officers; state consultants; and private sector employers, employees, and their representatives. Institute courses cover such areas as electrical hazards, machine guarding, industrial ventilation, ergonomics and abatement of chemical hazards. The Institute also has developed many audiovisual materials dealing with hazardous substances, including the following:

Eye Injuries and Eye Protection Equipment Hazard Communication Standard: 29 CFR 1910.1200

Safety and Health Factors for Working with Acids

Safety and Health Factors for Working with Formaldehyde

Safety and Health Factors for Working with Silica

Safety and Health Factors in Slips and Falls

Safety and Health Factors in Spray Application Operations

Safety and Health Factors with Temperature Stress

Safety and Health Factors in Welding and Cutting

Safety and Health Requirements for Working with Carbon Monoxide

Safety and Health Requirements for Working in Confined Spaces

These and other related slides, cassettes, and films may be ordered or purchased from

National Technical Information Service

5285 Port Royal Road

Springfield, VA 22161

Telephone: (800) 553-NTIS (6847)

State Products

Many state laws, standards, and regulations have requirements that may differ from federal OSHA's Hazard Communication Standard. Similarly, the types of audiovisual products available will vary by state. In state plan states (see Appendix VII),

employers should contact their local state office for the availability of audiovisual or other materials on state laws regarding Hazard Communication.

OSHA also has developed a variety of materials and publications to help employers develop and implement effective hazard communication programs. Lists of products, services, and resources are as follows:

OSHA Related Publications

A single free copy of the following publications can be obtained from the U.S. Department of Labor, OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535, (202) 693-1888, (202) 693-2498 (fax), or from the nearest OSHA regional or area office listed in Appendix VI. Send a self-addressed mailing label with your request.

These and other products can be ordered or downloaded from OSHA's Web Site at <http://www.osha.gov>.

All About OSHA—OSHA 2056

Consultation Services for the Employer—OSHA 3047

Employee Workplace Rights—OSHA 3021

How to Prepare for Workplace Emergencies—OSHA 3088

OSHA Inspections—OSHA 2098

Personal Protective Equipment—OSHA 3077

Respiratory Protection—OSHA 3079

Hazard Communication; Final Rule. Federal Register 59(27): 6126-6184, February 9, 1994.

The following publications are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 phone (202) 512-1800, fax (202) 512-2250. Include GPO Order No. and make checks payable to Superintendent of Documents.

Hazard Communication Guidelines for Compliance—OSHA 311

Order No. 029-016-00163-8; cost \$1.50.

Job Hazard Analysis—OSHA 3071

Order No. 029-016-00142-5; cost \$100.

Training Requirements in OSHA Standards and Training Guidelines—OSHA 2254

Order No. 029-016-00160-3; cost \$6.00.

Appendix IV

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Appendix V

Other Sources of OSHA Assistance

Safety and Health Program Management Guidelines

Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and their related costs. To assist employers and employees in developing effective safety and health programs, OSHA published recommended *Safety and Health Program Management Guidelines (Federal Register 54 (18): 3908-3916, January 26, 1989)*. These voluntary guidelines apply to all places of employment covered by OSHA.

The guidelines identify four general elements that are critical to the development of a successful safety and health management program:

- management commitment and employee involvement,
- worksite analysis,
- hazard prevention and control, and
- safety and health training.

The guidelines recommend specific actions under each of these general elements to achieve an effective safety and health program. A single free copy of the guidelines can be obtained from the U.S. Department of Labor, OSHA Publications, P.O. Box 37535, Washington, DC 20013-7535, by sending a self-addressed mail label with your request.

State Programs

The *Occupational Safety and Health Act of 1970* encourages states to develop and operate their own job safety and health plans. States with plans approved under section 18(b) of the Act must adopt standards and enforce requirements that are at least as effective as federal requirements. There are currently 25 state plan states: 23 of these states administer plans covering both private and public (state and local government) employees; the other 2 states, Connecticut and New York, cover public employees only. Plan states must adopt standards comparable to federal requirements within 6 months of a federal standard's promulgation. Until such time as a state standard is promulgated, federal OSHA provides interim enforcement assistance, as appropriate, in these states. A listing of approved state plans appears at the end of this publication.

Consultation Services

Consultation assistance is available on request to employers who want help in establishing and maintaining a safe and healthful workplace. Largely funded by OSHA, the service is provided at no cost to the employer. Primarily developed for smaller employers with more hazardous operations, the consultation service is delivered by state government agencies or universities employing professional safety consultants and health consultants. Comprehensive assistance includes an appraisal of all mechanical physical work practices, and environmental hazards of the workplace and all aspects of the employer's present job safety and health program.

The program is separate from OSHA's inspection efforts. No penalties are proposed or citations issued for any safety or health problems identified by the consultant. The service is confidential.

For more information concerning consultation assistance, see the list of consultation projects at the end of this publication.

Voluntary Protection Programs (VPPs)

Voluntary Protection Programs (VPPs) and onsite consultation services, when coupled with an effective enforcement program, expand worker protection to help meet the goals of the *OSH Act*. The three VPPs—Star, Merit, and Demonstration—are designed to recognize outstanding achievement by companies that have successfully incorporated comprehensive safety and health programs into their total management system. They motivate others to achieve excellent safety and health results in the same outstanding way as they establish a cooperative relationship among employers, employees, and OSHA.

For additional information on VPPs and how to apply, contact the OSHA area or regional offices listed at the end of this publication.

Training and Education

OSHA's area offices offer a variety of informational services, such as publications, audiovisual aids, technical advice, and speakers for special engagements. OSHA's Training Institute in Des Plaines, IL, provides basic and advanced courses in safety and health for federal and state compliance

officers, state consultants, federal agency personnel, and private sector employers, employees, and their representatives.

OSHA also provides funds to nonprofit organizations, through grants, to conduct workplace training and education in subjects where OSHA believes there is a lack of workplace training. Grants are awarded annually and grant recipients are expected to contribute 20 percent of the total grant cost.

For more information on grants, training and education, contact the OSHA Training Institute, Office of Training and Education, 1555 Times Drive, Des Plaines, IL 60018, (847) 297-4810.

For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

Electronic Information

Internet—OSHA standards, interpretations, directives, and additional information are now on the World Wide Web at <http://www.osha.gov/>.

CD-ROM—A wide variety of OSHA materials including, standards, interpretations, directives, and more, can be purchased on CD-ROM from the Government Printing Office. To order write to Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 or call (202) 512-1800. Specify OSHA Regulations, Documents and Technical Information on CD-ROM, (Order# S/N 729-13-00000-5. The price is \$43.00 annually (\$53.75 foreign); single copy \$17.00 (\$21.25 foreign).

Emergencies

For life-threatening situations, call (800) 321-OSHA. Complaints will go immediately to the nearest OSHA area or state office for help.

For further information on any OSHA program, contact your nearest OSHA area or regional office listed at the end of this publication.

Appendix VI

OSHA Regional and Area Offices

This Appendix contains a list of OSHA's Regional and Area Offices and other relevant addresses. These offices may be contacted for any further information on the Standard.

Region I— Boston (Connecticut,* Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont*)

Regional Office

US Department of Labor—OSHA

JKF Federal Building

Room E-340

Boston, MA 02203

Telephone: (617) 565-9830

Area Offices

Bridgeport Area Office

US Department of Labor - OSHA

1057 Broad Street

Bridgeport, Connecticut 06604

Telephone: (203) 579-5581

Hartford Area Office

US Department of Labor - OSHA

Federal Office Building

450 Main Street, Room 613

Hartford, Connecticut 06103

Telephone: (860) 240-3152

Bangor Area Office

US Department of Labor - OSHA

U.S. Federal Building

202 Harlow Street,

Room 211

Bangor, Maine 04401

Telephone: (207) 941-8177

Braintree Area Office

US Department of Labor - OSHA

639 Granite Street, 4th Floor

Braintree, Massachusetts 02184

Telephone: (617) 565-6924

Methuen Area Office

US Department of Labor - OSHA

Valley Office Park

13 Branch Street

Methuen, Massachusetts 01844

Telephone: (617) 565-8110

Springfield Area Office

US Department of Labor - OSHA

1145 Main Street, Room 108

Springfield, Massachusetts 01103-1493

Telephone: (413) 785-0123

Concord Area Office

US Department of Labor - OSHA

279 Pleasant Street, Suite 201

Concord, New Hampshire 03301

Telephone: (603) 225-1629

Providence Area Office

US Department of Labor - OSHA

380 Westminster Street, Room 243

Providence, Rhode Island 02903

Telephone: (401) 528-4669

Region II— New York City (New Jersey, New York,* Puerto Rico,* and the Virgin Islands*)

Regional Office

US Department of Labor—OSHA

201 Varick Street

Room 670

New York, NY 10014

Telephone: (212) 337-2378

Area Offices

Avenel Area Office

1030 Saint Georges Ave.

Plaza 35, Suite 205

Avenel, New Jersey 07001

Telephone: (908) 750-3270

Hasbrouck Heights Area Office

US Department of Labor - OSHA

500 Route 17 South, 2nd Floor

Hasbrouck Heights, New Jersey 07604

Telephone: (201) 288-1700

Marlton Area Office

US Department of Labor - OSHA
 Marlton Executive Park
 701 Route 73 South Bldg. 2
 Suite 120
 Marlton, New Jersey 08053
 Telephone: (609) 757-5181

Parsippany Area Office

US Department of Labor - OSHA
 299 Cherry Hill Road, Suite 304
 Parsippany, New Jersey 07054
 Telephone: (973) 263-1003

Albany Area Office

US Department of Labor - OSHA
 401 New Karner Road
 Suite 300
 Albany, New York 12205-3809
 Telephone: (518) 464-4338

Bayside Area Office

US Department of Labor - OSHA
 42-40 Bell Blvd. 5th Floor
 Bayside, New York 11361
 Telephone: (718) 279-9060

Bowmansville Area Office

US Department of Labor - OSHA
 5360 Genesee Street
 Bowmansville, New York 14026
 Telephone: (716) 684-3891

New York Area Office

US Department of Labor - OSHA
 6 World Trade Center, Room 881
 New York, New York 10007
 Telephone: (212) 466-2482

North Syracuse Area Office

US Department of Labor - OSHA
 3300 Vikery Road
 North Syracuse, New York 13212
 Telephone: (315) 451-0808

Tarrytown Area Office

US Department of Labor - OSHA
 660 White Plains Road
 4th Floor
 Tarrytown, New York 1059
 Telephone: (914) 524-7510

Westbury Area Office

US Department of Labor - OSHA
 990 Westbury
 Westbury, New York 11590
 Telephone: (516) 334-3344

Guaynabo Area Office

US Department of Labor - OSHA
 BBV Plaza Building, Suite 5B
 1510 F.D. Roosevelt Avenue
 Guaynabo, Puerto Rico 00968
 Telephone: (787) 277-1560

**Region III—Philadelphia (Delaware,
 Maryland,* Pennsylvania, Virginia,* and West
 Virginia)**

Regional Office

US Department of Labor—OSHA
 Gateway Building, Suite 2100
 3535 Market Street
 Philadelphia PA 19104
 Telephone: (215) 596-1201

Area Offices

Wilmington Area Office
 US Department of Labor - OSHA
 1 Rodney Square, Suite 402
 920 King Street
 Wilmington, Delaware 19801
 Telephone: (302) 573-6115

Baltimore Area Office

US Department of Labor - OSHA
 300 West Pratt Street
 Suite 1110
 Baltimore, Maryland 21201
 Telephone: (410) 962-2840

Allentown Area Office

US Department of Labor - OSHA
 850 North 5th Street
 Allentown, Pennsylvania 18102
 Telephone: (610) 776-0592

Erie Area Office

US Department of Labor - OSHA
 3939 West Ridge Road
 Suite B-12
 Erie, Pennsylvania 16506
 Telephone: (814) 833-5758

Harrisburg Area Office

US Department of Labor - OSHA
 Progress Plaza
 49 North Progress Avenue
 Harrisburg, Pennsylvania 17109
 Telephone: (717) 782-3902

Philadelphia Area Office

US Department of Labor - OSHA
 U.S. Custom House, Room 242
 2nd and Chestnut Street
 Philadelphia, Pennsylvania 19106
 Telephone: (215) 597-4955

Pittsburgh Area Office

US Department of Labor - OSHA
 Federal Building, Room 1428
 1000 Liberty Avenue
 Pittsburgh, Pennsylvania 15222
 Telephone: (412) 395-4903

Wilkes-Barre Area Office

US Department of Labor - OSHA
 Teymaier Building Suite 410
 North Wilkes-Barre Boulevard
 Wilkes-Barre, Pennsylvania 18701-3590
 Telephone: (717) 826-6538

Norfolk Area Office

US Department of Labor - OSHA
 AFOB, Room 835
 200 Granby Mall
 Norfolk, Virginia 23510
 Telephone: (757) 441-3820

Charleston Area Office

US Department of Labor - OSHA
 405 Capitol Street, Room 407
 Charleston, West Virginia 25301
 Telephone: (304) 347-5937

**Region IV—Atlanta (Alabama, Florida,
 Georgia, Kentucky,* Mississippi, North
 Carolina,* South Carolina,* and Tennessee*)**

Regional Office

US Department of Labor—OSHA
 Atlanta Federal Center
 51 Forsyth Street, SW, Room 6T50
 Atlanta, GA 30303
 Telephone: (404) 562-2300

Area Offices**Birmingham Area Office**

US Department of Labor - OSHA
 Tod Mall - 2047 Canyon Road
 Birmingham, Alabama 35216
 Telephone: (205) 731-1534

Mobile Area Office

US Department of Labor - OSHA
 3737 Government Blvd., Suite 100
 Mobile, Alabama 36693-4309
 Telephone: (334) 441-6131

Fort Lauderdale Area Office

US Department of Labor - OSHA
 Jacaranda Executive Court
 8040 Peters Road
 Building H-100
 Fort Lauderdale, Florida 33324
 Telephone: (954) 424-0242

Jacksonville Area Office

US Department of Labor - OSHA
 Ribault Building
 1851 Executive Center Drive
 Suite 227
 Jacksonville, Florida 32207
 Telephone: (904) 232-2895

Tampa Area Office

US Department of Labor - OSHA
 5807 Breckenridge Pkwy.
 Suite A
 Tampa, Florida 33610
 Telephone: (813) 626-1177

Savannah Area Office

US Department of Labor - OSHA
 450 Mall Blvd., Suite J
 Savannah, Georgia 31406
 Telephone: (912) 652-4393

Smyrna Area Office

US Department of Labor - OSHA
 2400 Herodian Way, Suite 250
 Smyrna, Georgia 30080-2968
 Telephone: (770) 984-8700

Tucker Area Office

US Department of Labor - OSHA
 La Vista Perimeter Office Park
 2183 N. Lake Parkway
 Bldg. 7, Suite 110
 Tucker, Georgia 30084
 Telephone: (770) 493-6644

Frankfort Area Office

US Department of Labor - OSHA
 John C. Watts Fed. Bldg., Room 108
 330 W. Broadway
 Frankfort, Kentucky 40601
 Telephone: (502) 227-7024

Jackson Area Office

US Department of Labor - OSHA
 3780 I-55 North
 Suite 210
 Jackson, Mississippi 39211
 Telephone: (601) 965-4606

Raleigh Area Office

US Department of Labor - OSHA
 Century Station Federal Building
 300 Fayetteville Street Mall
 Room 438
 Raleigh, North Carolina 27601-9998
 Telephone: (919) 856-4770

Columbia Area Office

US Department of Labor - OSHA
 Strom Thurman. Federal Building
 1835 Assembly Street, Room 1468
 Columbia, South Carolina 29201-2453
 Telephone: (803) 765-5904

Nashville Area Office

US Department of Labor - OSHA
 Green Hills Office Park
 2002 Richard Jones Road
 Suite C-205
 Nashville, Tennessee 37215-2809
 Telephone: (615) 781-5423

**Region V—Chicago (Illinois, Indiana,*
 Michigan,* Minnesota,* Ohio, and Wisconsin)**

Regional Office

US Department of Labor—OSHA
 230 South Dearborn Street
 Room 3244
 Chicago, Il 60604
 Telephone: (312) 353-2220

Area Offices**Calumet City Area Office**

US Department of Labor - OSHA
 1600 167th Street, Suite 9
 Calumet City, Illinois 60409
 Telephone: (708) 891-3800

Des Plaines Area Office

US Department of Labor - OSHA
 2360 E. Devon Avenue
 Suite 1010
 Des Plaines, Illinois 60018
 Telephone: (847) 803-4800

North Aurora Area Office

US Department of Labor - OSHA
 344 Smoke Tree Business Park
 North Aurora, Illinois 60542
 Telephone: (630) 896-8700

Peoria Area Office

US Department of Labor - OSHA
 2918 West Willow Knolls Road
 Peoria, Illinois 61614
 Telephone: (309) 671-7033

Indianapolis Area Office

US Department of Labor - OSHA
 46 East Ohio Street. Room 422
 Indianapolis, Indiana 46204
 Telephone: (317) 226-7290

Lansing Area Office

US Department of Labor - OSHA
 801 South Waverly Rd.
 Suite 306
 Lansing, Michigan 48917-4200
 Telephone: (517) 377-1892

Minneapolis Area Office

JS Department of Labor - OSHA
300 South 4th Street, Suite 1205
Minneapolis, Minnesota 55415
Telephone: (612) 664-5460

Cincinnati Area Office

US Department of Labor - OSHA
36 Triangle Park Drive
Cincinnati, Ohio 45246
Telephone: (513) 841-4132

Cleveland Area Office

US Department of Labor - OSHA
Federal Office Building, Room 899
1240 East 9th Street
Cleveland, Ohio 44199
Telephone: (216) 522-3818

Columbus Area Office

US Department of Labor - OSHA
Federal Office Bldg., Room 620
200 N. High Street
Columbus, Ohio 43215
Telephone: (614) 469-5582

Toledo Area Office

US Department of Labor - OSHA
Federal Office Bldg., Room 734
234 North Summit Street
Toledo, Ohio 43604
Telephone: (419) 259-7542

Appleton Area Office

US Department of Labor - OSHA
2618 North Ballard Road
Appleton, Wisconsin 54915-8644
Telephone: (920) 734-4521

Madison Area Office

US Department of Labor - OSHA
4802 East Broadway
Madison, Wisconsin 53716
Telephone: (608) 264-5388

Milwaukee Area Office

US Department of Labor - OSHA
Henry S. Reuss Bldg. Suite 1180
310 West Wisconsin Ave.
Milwaukee, Wisconsin 53203
Telephone: (414) 297-3315

**Region VI— Dallas (Arkansas, Louisiana,
New Mexico,* Oklahoma, and Texas)**

Regional Office

US Department of Labor—OSHA
525 Griffin Street
Room 602
Dallas, TX 75202
Telephone: (214) 767-4731

Area Offices**Little Rock Area Office**

US Department of Labor - OSHA
425 West Capitol
Suite 450
Little Rock, Arkansas 72201
Telephone: (501) 324-6291

Baton Rouge Area Office

US Department of Labor - OSHA
9100 Bluebonnet Center Blvd.
Suite 201
Baton Rouge, Louisiana 70806
Telephone: (504) 389-0474

Albuquerque Area Office

US Department of Labor - OSHA
505 Marquette Avenue, NW
Suite 820
Albuquerque, New Mexico 87102
Telephone: (505) 248-5302

Oklahoma Area Office

US Department of Labor - OSHA
420 West Main, Suite 300
Oklahoma City, Oklahoma 73102
Telephone: (405) 231-5351

Austin Area Office

US Department of Labor - OSHA
903 San Jacinto Blvd.
Suite 319
Austin, Texas 78701
Telephone: (512) 916-5783

Corpus Christi Area Office

US Department of Labor - OSHA
Wilson Plaza
606 North Carancahua, Suite 700
Corpus Christi, Texas 78476
Telephone: (512) 888-3420

Dallas Area Office

US Department of Labor - OSHA
8344 East R.L. Thornton Freeway
Suite 420
Dallas, Texas 75228
Telephone: (214) 320-2400

Fort Worth Area Office

US Department of Labor - OSHA
North Star 2 Building
Suite 302
8713 Airport Freeway
Fort Worth, Texas 76180-7604
Telephone: (817) 428-2470

Houston Area Offices

US Department of Labor - OSHA
17625 El Camino Real, Suite 400
Houston, Texas 77058
Telephone: (281) 286-0583

US Department of Labor - OSHA
350 North Sam Houston Parkway
Suite 120
Houston, Texas 77060
Telephone: (281) 591-2438

Lubbock Area Office

US Department of Labor - OSHA
Federal Building, Room 806
1205 Texas Avenue
Lubbock, Texas 79401
Telephone: (806) 472-7681

**Region VII— Kansas City (Iowa,* Kansas,
Missouri, and Nebraska)**

Regional Office

US Department of Labor—OSHA
City Center Square
1100 Main Street, Suite 800
Kansas City, MO 64105
Telephone: (816) 426-5861

Area Offices**Des Moines Area Office****Area Offices**

US Department of Labor - OSHA
210 Walnut Street, Room 815
Des Moines, Iowa 50309
Telephone: (515) 284-4794

Wichita Area Office

US Department of Labor - OSHA
300 Epic Center
301 N. Main
Wichita, Kansas 67202
Telephone: (316) 269-6644

Kansas City Area Office

US Department of Labor - OSHA
6200 Connecticut Avenue, Suite 100
Kansas City, Missouri 64120
Telephone: (816) 483-9531

St. Louis Area Office

US Department of Labor - OSHA
911 Washington Avenue
Room 420
St. Louis, Missouri 63101
Telephone: (314) 425-4249

Omaha Area Office

US Department of Labor - OSHA
Overland Wolf Bldg., Room 100
6910 Pacific Street
Omaha, Nebraska 68106
Telephone: (402) 221-3182

**Region VIII—Denver (Colorado, Montana,
North Dakota, South Dakota,
Utah,* and Wyoming*)**

Regional Office

US Department of Labor—OSHA
1999 Broadway, Suite 1690
Denver, CO 80202-5716
Telephone: (303) 844-1600

Area Offices**Denver Area Office**

US Department of Labor - OSHA
1391 North Speer Blvd.
Suite 210
Denver, Colorado 80204
Telephone: (303) 844-5285

Englewood Area Office

US Department of Labor - OSHA
7935 E. Prentice Ave., Suite 209
Englewood, Colorado 80011-2714
Telephone: (303) 843-4500

Billings Area Office
 U.S. Department of Labor - OSHA
 2900 4th Avenue North
 Suite 303
 Billings, Montana 59101
 Telephone: (406) 247-7494

Bismark Area Office
 US Department of Labor - OSHA
 3rd. & Rosser, P.O. Box 2439
 Room 348
 Bismark, North Dakota 58502
 Telephone: (701) 250-4521

Salt Lake City Area Office
 US Department of Labor - OSHA
 1781 South 300 West
 Salt Lake City, Utah 84115-1802
 Telephone: (801) 487-0073

**Region IX—San Francisco (American Samoa,
 Arizona,* California,* Guam, Hawaii,*
 Nevada,* Trust Territories of the Pacific)**

Regional Office
 US Department of Labor—OSHA
 71 Stevenson Street
 Room 420
 San Francisco, CA 94105
 Telephone: (415) 975-4310

Area Offices
Phoenix Area Office
 US Department of Labor - OSHA
 3221 North 16th Street, Suite 100
 Phoenix, Arizona 85016
 Telephone: (602) 640-2007

San Diego Area Office
 US Department of Labor - OSHA
 5675 Ruffin Road, Suite 330
 San Diego, California 92123
 Telephone: (619) 557-2909

Honolulu Area Office
 US Department of Labor - OSHA
 300 Ala Moana Blvd., Suite 5-146
 Honolulu, Hawaii 96850
 Telephone: (808) 541-2685

Carson City Area Office
 US Department of Labor - OSHA
 705 North Plaza, Room 204
 Carson City, Nevada 89701
 Telephone: (702) 885-6963

**Region X— Seattle (Alaska,* Idaho, Oregon,*
 and Washington*)**

Regional Office
 US Department of Labor—OSHA
 1111 Third Street
 Suite 715
 Seattle, WA 98101-3212
 Telephone: (206) 553-5930

Area Offices
Anchorage Area Office
 US Department of Labor - OSHA
 301 W. Northern Lights Blvd.
 Suite 407
 Anchorage, Alaska 99503
 Telephone: (907) 271-5152

Boise Area Office
 US Department of Labor - OSHA
 1150 North Curtis Road
 Suite 220
 Boise, Idaho 83706-1234
 Telephone: (208) 321-2960

Portland Area Office
 US Department of Labor - OSHA
 1220 S.W. 3rd Avenue, Room 640
 Portland, Oregon 97294
 Telephone: (503) 326-2251

Bellevue Area Office
 US Department of Labor - OSHA
 505 106th Avenue, N.E., Suite 302
 Bellevue, Washington 98004
 Telephone: (206) 553-7520

*These states and territories operate their own OSHA-approved job safety and health programs (Connecticut and New York plans cover public employees only). States with approved programs must have a standard that is identical to, or at least as effective as, the federal standard.



Appendix VII

States with Approved Plans

COMMISSIONER

Alaska Department of Labor
1111 West 8th Street
Room 306
Juneau, AK 99801
(907) 465-2700

DIRECTOR

Industrial Commission of Arizona
800 W. Washington
Phoenix, AZ 85007
(602) 542-5795

DIRECTOR

California Department of Industrial Relations
45 Fremont Street
San Francisco, CA 94105
(415) 972-8835

COMMISSIONER

Connecticut Department of Labor
200 Folly Brook Boulevard
Wethersfield, CT 06109
(860) 566-5123

DIRECTOR

Connecticut Department of Labor
38 Wolcott Hill Road
Wethersfield, CT 06109
(860) 566-4550

DIRECTOR

Hawaii Department of Labor
and Industrial Relations
830 Punchbowl Street
Honolulu, HI 96813
(808) 586-8844

COMMISSIONER

Indiana Department of Labor
State Office Building
402 West Washington Street
Room W195
Indianapolis, IN 46204
(317) 232-2378

COMMISSIONER

Iowa Division of Labor Services
1000 E. Grand Avenue
Des Moines, IA 50319
(515) 281-3447

SECRETARY

Kentucky Labor Cabinet
1047 U.S. Highway, 127 South, STE 2
Frankfort, KY 40601
(502) 564-3070

COMMISSIONER

Maryland Division of Labor and Industry
Department of Labor Licensing
and Regulation
1100 N. Eutaw Street, Room 613
Baltimore, MD 21201-2206
(410) 767-2215

DIRECTOR

Michigan Department of Consumer
and Industry Services
4th Floor, Law Building
P.O. Box 30004
Lansing, MI 48909
(517) 373-7230

COMMISSIONER

Minnesota Department of Labor
and Industry
443 Lafayette Road
St. Paul, MN 55155
(651) 296-2342

ADMINISTRATOR

Nevada Division of Industrial Relations
400 West King Street
Carson City, NV 89710
(702) 687-3032

SECRETARY

New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-2850

COMMISSIONER

New York Department of Labor
W. Averell Harriman State Office
Building - 12, Room 500
Albany, NY 12240
(518) 457-2741

COMMISSIONER

North Carolina Department of Labor
319 Chapanoke Road
Raleigh, NC 27603
(919) 662-4585

ADMINISTRATOR

Department of Consumer & Business
Services
Occupational Safety and Health
Division (OR-OSHA)
350 Winter Street, NE, Room 430
Salem, OR 97310-0220
(503) 378-3272

SECRETARY

Puerto Rico Department of Labor
and Human Resources
Prudencio Rivera Martinez Building
505 Munoz Rivera Avenue
Hato Rey, PR 00918
(787) 754-2119

DIRECTOR

South Carolina Department of Labor
Licensing and Regulation
Koger Office Park, Kingstree Building
110 Centerview Drive
P.O. Box 11329
Columbia, SC 29210
(803) 896-4300

COMMISSIONER

Tennessee Department of Labor
710 James Robertson Parkway
Nashville, TN 37243-0659
(615) 741-2582

COMMISSIONER

Industrial Commission of Utah
160 East 300 South, 3rd Floor
P.O. Box 146650
Salt Lake City, UT 84114-6650
(801) 530-6898

COMMISSIONER

Vermont Department of Labor
and Industry
120 State Street
Montpelier, VT 05620-3401
(802) 828-2288

COMMISSIONER

Virginia Department of Labor
and Industry
Powers-Taylor Building
13 South 13th Street
Richmond, VA 23219
(804) 786-2377

COMMISSIONER

Virgin Islands Department of Labor
2131 Hospital Street, Box 890
Christiansted
St. Croix, VI 00820-4666
(809) 773-1994

DIRECTOR

Washington Department of Labor and Industries
General Administrative Building
P.O. Box 44001
Olympia, WA 98504-4001
(360) 902-4200

ADMINISTRATOR

Worker's Safety and Compensation
Division (WSC)
Wyoming Department of Employment
Herschler Building, 2nd Floor East
122 West 25th Street
Cheyenne, WY 82002
(307) 777-7786

Appendix VIII

OSHA Consultation Project Directory

Consultation programs provide free services to employers who request help in identifying and correcting specific hazards, want to improve their safety and health programs, and/or need further assistance in training and education. Funded by OSHA and delivered by well-trained professional staff of state governments, consultation services are comprehensive, and include an appraisal of all workplace hazards, practices, and job safety and health programs; conferences and agreements with management; assistance in implementing recommendations; and a follow-up appraisal to ensure that any required corrections are made.

In a typical review of a company's operation, the consultant will examine the structural condition of the building, check equipment such as forklifts, examine storage conditions, check control of toxic substances and other environmental hazards, and confer with management about employee supervision and job training. The ultimate benefits of a successful consultation experience may include a highly effective safety and health program as well as recognition by OSHA.

For more information on consultation programs, contact the appropriate office in your state listed in this Appendix.

Alabama

Safety State Program
University of Alabama
425 Martha Parham West
P.O. Box 870388
Tuscaloosa, Alabama 35487
Telephone: (205) 348-7136

Alaska

Division of Consultation and Training
ADOL/OSHA
3301 Eagle Street, Suite 305
P.O. Box 107022
Anchorage, Alaska 99510
Telephone: (907) 269-4957

Arizona

Consultation and Training
Division of Occupational Safety and Health
Industrial Commission of Arizona
800 West Washington
Phoenix, Arizona 85007-9070
Telephone: (602) 542-5795

Arkansas

OSHA Consultation
Arkansas Department of Labor
10421 West Markham
Little Rock, Arkansas 72205
Telephone: (501) 682-4522

California

CAL/OSHA Consultation Service
Department of Industrial Relations
45 Fremont Street, Room 5246
San Francisco, California 94105
Telephone: (415) 972-8515

Colorado

Occupational Safety and Health Section
Colorado State University
115 Environmental Health Building
Fort Collins, Colorado 80523
Telephone: (970) 491-6151

Connecticut

Div. of Occupational Safety & Health
Connecticut Department of Labor
38 Wolcott Hill Road
Wethersfield, Connecticut 06109
Telephone: (860) 566-4550

Delaware

Occupational Safety and Health
Division of Industrial Affairs
Delaware Department of Labor
4425 Market Street
Wilmington, Delaware 19802
Telephone: (302) 761-8219

District of Columbia

Office of Occupational Safety and Health
D.C. Department of Employment
Services
950 Upshur Street, N.W.
Washington, D.C. 20011
Telephone: (202) 576-6339

Florida

7(c)(1) Onsite Consultation
 Program, Division of Safety
 Florida Department of Labor and
 Employment Security
 2002 St. Augustine Road
 Building E, Suite 45
 Tallahassee, Florida 32399-0663
 Telephone: (904) 488-3044

Georgia

7(c)(1) Onsite Consultation Program
 Georgia Institute of Technology
 O'Keefe Building - Room 22
 Atlanta, Georgia 30332
 Telephone: (404) 894-2643

Guam

OSHA Onsite Consultation
 Department of Labor, Government of Guam
 P.O. Box 9970
 Tamuning, Guam 96931
 Telephone: (671) 475-0136

Hawaii

Consultation and Training Branch
 Dept of Labor and Industrial Relations
 830 Punchbowl Street
 Honolulu, Hawaii 96813
 Telephone: (808) 586-9100

Idaho

Safety and Health Consultation Program
 Boise State University
 Department of Health Studies
 1910 University Drive, ET-338A
 Boise, Idaho 83725
 Telephone: (208) 385-3283

Illinois

Illinois Onsite Consultation
 Industrial Service Division
 Department of Commerce &
 Community Affairs
 State of Illinois Center
 100 West Randolph St.
 Suite 3-400
 Chicago, Illinois 60601
 Telephone: (312) 814-2337

Indiana

Division of Labor
 Bureau of Safety, Education and Training
 402 West Washington
 Room W195
 Indianapolis, Indiana 46204-2287
 Telephone: (317) 232-2688

Iowa

7(c)(1) Consultation Program
 Iowa Bureau of Labor
 1000 East Grand Avenue
 Des Moines, Iowa 50319
 Telephone: (515) 965-7162

Kansas

Kansas 7(c)(1) Consultation Program
 Kansas Department of Human
 Resources
 512 South West 6th Street
 Topeka, Kansas 66603-3150
 Telephone: (913) 296-7476

Kentucky

Division of Education & Training
 Kentucky Labor Cabinet
 1047 U.S. Highway 127, South
 Frankfort, Kentucky 40601
 Telephone: (502) 564-6895

Louisiana

7(c)(1) Consultation Program
 Louisiana Dept. of Labor
 P.O. Box 94094
 Baton Rouge, Louisiana 70804-9094
 Telephone: (504) 342-9601

Maine

Division of Industrial Safety
 Maine Bureau of Labor Stds.
 Workplace Safety & Health Division
 State House Station #82
 Augusta, Maine 04333
 Telephone: (207) 624-6460

Maryland

Division of Labor and Industry
 312 Marshall Avenue, Room 600
 Laurel, Maryland 20707
 Telephone: (410) 880-4970

Massachusetts

The Commonwealth of Massachusetts
 Department of Labor & Industries
 1001 Watertown Street
 West Newton, Massachusetts 02165
 Telephone: (617) 727-3982

Michigan (Health)

Department of Consumer and Industry
 Services
 3423 North Martin Luther King, Jr.
 Boulevard
 Lansing, Michigan 48909
 Telephone: (517) 322-1817(H)

Michigan (Safety)

Department of Consumer and Industry
 Services
 7150 Harris Drive
 Lansing, Michigan 48909
 Telephone: (517) 322-1809(S)

Minnesota

Department of Labor & Industry
 Consultation Division
 443 Lafayette Road
 St. Paul, Minnesota 55155
 Telephone: (612) 297-2393

Mississippi

Mississippi State University
 Center for Safety and Health
 2906 North State Street
 Suite 201
 Jackson, Mississippi 39216
 Telephone: (601) 987-3981

Missouri

Onsite Consultation Program
 Division of Labor Standards
 Department of Labor & Industrial Relations
 3315 West Truman Boulevard
 P.O. Box 449
 Jefferson City, Missouri 65109
 Telephone: (573) 751-3403

Montana

Department of Labor & Industry
 Bureau of Safety
 P.O. Box 1728
 Helena, Montana 59624-1728
 Telephone: (406) ~~444~~-6418

Nebraska

Division of Safety, Labor & Safety
 Standards
 Nebraska Department of Labor
 State Office Building, Lower Level
 301 Centennial Mall, South
 Lincoln, Nebraska 68509-5024
 Telephone: (402) 471-4717

Nevada

Division of Preventive Safety
 Department of Industrial Relations
 2500 W. Washington, Suite 106
 Las Vegas, Nevada 89106
 Telephone: (702) 486-5016

New Hampshire

New Hampshire Department of Health
 Division of Public Health Services
 6 Hazen Drive
 Concord, New Hampshire 03301-6527
 Telephone: (603) 271-2024

New Jersey

Division of Public Safety &
 Occupational Safety & Health
 New Jersey Department of Labor
 225 East State Street, 8th Floor West
 Post Office Box 953
 Trenton, New Jersey 08625-0953
 Telephone: (609) 292-3923

New Mexico

New Mexico Environment Department,
 Occupational Health & Safety Bureau
 525 Camino De Los Marquez, Suite 3
 Post Office Box 26110
 Santa Fe, New Mexico 87501
 Telephone: (505) 827-4230

New York

Division of Safety and Health
 State Office Campus
 Building 12, Room 130
 Albany, New York 12240
 Telephone: (518) 457-2238

North Carolina

Bureau of Consultative Services
 N.C. Department of Labor - OSHA
 319 Chapanoke Road, Suite 105
 Raleigh, North Carolina 27603-3432
 Telephone: (919) 662-4644

North Dakota

Division of Environmental Engineering
 1200 Missouri Avenue, Room 304
 Bismark, North Dakota 58504
 Telephone: (701) 328-5188

Ohio

Division of Onsite Consultation
 Bureau of Employment Services
 145 S. Front Street
 Columbus, Ohio 43216-1618
 Telephone: (614) 644-2246

Oklahoma

Oklahoma Department of Labor
 OSHA Division
 4001 North Lincoln Blvd.
 Oklahoma City, Oklahoma 73105-5212
 Telephone: (405) 528-1500

Oregon

Department of Insurance & Finance
 Occupational Safety & Health Div.
 Labor and Industries Building
 350 Winter Street, N.E., Room 430
 Salem, Oregon 97310
 Telephone: (503) 378-3272

Pennsylvania

Indiana University of Pennsylvania
 Safety Sciences Department
 205 Uhler Hall
 Indiana, Pennsylvania 15705-1087
 Telephone: (412) 357-2561

Puerto Rico

Occupational Safety and Health Office
 Department of Labor and Human Resources
 505 Munoz Rivera Avenue, 21st Floor
 Hato Rey, Puerto Rico 00918
 Telephone: (787) 754-2188

Rhode Island

Division of Occupational Health
 3 Capital Hill
 Providence, Rhode Island 02908
 Telephone: (401) 277-2438

South Carolina

South Carolina Department of Labor
 Licensing & Regulation
 3600 Forest Drive
 P.O. Box 11329
 Columbia, South Carolina 29204
 Telephone: (803) 896-4300

South Dakota

Engineering Extension
 Onsite Technical Division
 SD State University, West Hall
 907 Harvey Dunn Street
 Box 510
 Brookings, South Dakota 57007
 Telephone: (605) 688-4101

Tennessee

OSHA Consultative Services Division
 Tennessee Department of Labor
 710 James Robertson Parkway, 3rd Fl.
 Nashville, Tennessee 37243-0659
 Telephone: (615) 741-7036

Texas

Workers' Health and Safety Division
 Texas Workers' Compensation Commission
 Southfield Building
 4000 South I H 35
 Austin, Texas 78704
 Telephone: (512) 440-3854

Utah

State of Utah Labor Commission
 Workplace Safety and Health
 Consultation Services
 160 East 300 South
 Salt Lake City, Utah 84114-6650
 Telephone: (801) 530-7606

Vermont

Div. Of Occupational Safety & Health
Vermont Department of Labor and Industry
National Life Building, Drawer #20
Montpelier, Vermont 05602-3401
Telephone: (802) 828-2765

Virginia

Virginia Department of Labor & Industry
Occupational Safety and Health
Training and Consultation
13 S. 13th Street
Richmond, Virginia 23219
Telephone: (804) 786-6359

Virgin Islands

Division of Occupational Safety and Health
Virgin Islands Department of Labor
3021 Golden Rock
Christainsted
St. Croix, Virgin Island 00840
Telephone: (809) 772-1315

Washington

Washington Department of Labor
and Industries
Division of Industrial Safety and Health
P.O. Box 44643
Olympia, Washington 98504
Telephone: (360) 902-5638

West Virginia

West Virginia Department of Labor
Capitol Complex Building #3
1800 E. Washington Street, Room 319
Charleston, West Virginia 25305
Telephone: (304) 558-7890

Wisconsin (Health)

Wisconsin Department of Health and
Human Services
Division of Health
Section of Occupational Health
1414 E. Washington Avenue
Room 112
Madison, Wisconsin 53703
Telephone: (608) 266-8579

Wisconsin (Safety)

Wisconsin Department of Industry
Labor and Human Relations
Bureau of Safety Inspections
401 Pilot Court, Suite C
Waukesha, Wisconsin 53188
Telephone: (414) 521-5063

Wyoming

Wyoming Department of Employment
Workers' Safety and Compensation
Division
Herschler Building, 2 East
122 West 25th Street, 2nd Floor
Cheyenne, Wyoming 82002
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