

PLAINTIFF'S EXHIBIT

MON-1304

HAZARD COMMUNICATION PROGRAM

MONSANTO TEXAS CITY

NOVEMBER 15, 1985

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1. INTRODUCTION/
COPY OF STANDARD

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I. INTRODUCTION

The contents of this book represent the Monsanto Texas City Hazard Communication Program, as mandated by the publication of OSHA's Hazard Communication Final Rule in the Federal Register on November 25, 1983. The written sections represent information included in the Texas City training and education program for Texas City.

The purpose of the new OSHA Federal Standard is to ensure that the hazards of all chemicals manufactured or received in this workplace are evaluated, and that information concerning their hazards is communicated to our employees, customers and contractors.

No one piece of paper can define or describe how the employees of this location are trained and educated on their jobs. Training and education result from the communication of the information contained in this book to all employees in a meaningful way that ensures employee understanding.

All employees, new and old, are told of their rights under this standard. They are told that they have the right to know about the substances with which they work and to which they are exposed and how to protect themselves. They are told about this list of substances in the workplace and work area, the location of the lists, the hazards of the operations, the existence and availability of Material Safety Data Sheets and where they are located (copies are made available as requested). The contents of Material Safety Data Sheets are used as further raw material to train and educate our employees.

A copy of the new standard and summary is contained in this manual for easy reference. A summary of Monsanto's procedure for evaluating hazardous substances is contained and described to all employees. Also included are guidelines used by Monsanto to develop its Material Safety Data Sheets (MSDS).

The Hazard Communication and Training/Education Program also includes reference to existing written procedures for vessel-entry (for cleaning and repairs), maintenance on pipes and process equipment that may be unmarked (where employee exposure may possibly occur), lockout procedures, special sampling, loading and unloading procedures if they are nonroutine. Other plant operating procedures exist that are not necessarily included here as part of this program.

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This program further includes a description of how information is passed to contractors to ensure that their employees are adequately trained and warned of hazards that they may be exposed to on our property.

Our employees are told how we label and identify hazardous substances in our workplace. They are told how to reference an identity in the workplace with the corresponding Material Safety Data Sheet for more detailed information. Some process equipment and piping systems may be labeled and some not. Where no visible markings exist, employees will have access to operating instructions, batch tickets, process flow diagrams, process procedures, postings, charts, placards, etc., to give them the necessary health and safety information.

Our employees are told about the methods and observations used to detect the presence of hazardous substances in the workplace and where industrial hygiene programs exist. Employees are told what personal protective equipment is available, where located and how to use it to protect themselves.

Special emergency procedures, such as hurricane preparation, evacuation, and fire/spill alarms, exist for the Texas City plant that are explained to all employees. In addition, emergency information is available on each individual MSDS to cover fire-fighting, spill disposal and first aid.

In cases where Monsanto has elected not to publicly record the exact chemical identity of a substance on a Material Safety Data Sheet or on a container label, we make note of this exception on the MSDS. We do show a trade name, product name or common name in all cases. The MSDS includes all other information concerning hazards and health effects. Monsanto will support the need for protecting its proprietary business information as necessary.

Throughout our Hazard Communication Education and Training Program we have tried to apply the intent of the standard - communicate information about the hazards of substances in the workplace to our employees.

To judge our compliance, we ask that an observer ask one question if some specific label or warning or piece of paper is not readily apparent - ask if an employee has ready access somewhere in the workplace to all the information required by the standard - available in one form or another? If the employee has all of this knowledge available to him, we judge that we are in compliance with this OSHA Standard. An observer should be able to make this same judgement by reviewing this Hazard Communication Package.

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HAZARD COMMUNICATION
DEPARTMENT:

TEXAS CITY PLANT
HC-1-1

Specific sections follow providing detailed information on the
Hazard Communication Program elements summarized above.

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federal register

Friday
November 25, 1983

Part IV

Department of Labor

Occupational Safety and Health
Administration

Hazard Communication; Final Rule

IV. Summary and Explanation of the Standard

The following is a paragraph-by-paragraph summary of the provisions of the final standard:

(a) *Purpose.* In the final standard, a paragraph has been added to specify what OSHA intends to accomplish through promulgation of the standard. In essence, the paragraph states that the final Hazard Communication standard is intended to ensure that all employees in the manufacturing sector, Standard Industrial Classification (SIC) Codes 20 through 39, are apprised of the hazards they work with through a hazard communication program. This program is to include container labeling material safety data sheets, and employee training.

The paragraph goes on to state that OSHA intends to comprehensively address the issue of evaluating and communicating chemical hazards to employees in the manufacturing sector in this standard, and to preempt any state law pertaining to this subject. Thus if a state wishes to regulate in this area, it can only do so if the standard is approved by OSHA under section 18(b) of the Act which deals with state plans.

This preemption will serve to reduce the burden on interstate commerce produced by conflicting state and local regulations and will ensure that all employees in the manufacturing sector are accorded the same degree of protection. OSHA will examine carefully any state requests to regulate in this area to determine any potentially burdensome impact on interstate commerce as well as to ascertain whether there is a compelling need for a separate regulation.

(b) *Scope and application.* The final hazard communication standard applies to employers and employees in the manufacturing SIC Codes, 20 through 39. The manufacturers in these SIC codes who produce chemicals for use or distribution, and importers of such chemicals, must evaluate the hazards of these substances. All employers in the manufacturing sector must establish a hazard communication program for their employees. In addition, distributors of hazardous chemicals are required to transmit hazard information to their manufacturing sector customers.

The proposed standard also applied to the manufacturing SIC codes. As discussed elsewhere in this preamble, OSHA has concluded that the need for hazard communication is greatest in the manufacturing sector, and is exercising its priority setting authority by choosing to regulate this segment of industry at this time, and reserving the right to separately regulate other segments in the future.

The scope of the final standard has been expanded to cover importers and distributors. The rulemaking record indicated that in order for the flow of hazard information from upstream manufacturers to downstream users to be continuous and effective, all aspects of the supply chain have to be specifically included in the scope of the standard. Thus, in the final standard importers are required to supply the same information as domestic manufacturers of a hazardous chemical. Distributors are to ensure the downstream flow of information by shipping labeled containers and making an appropriate material safety data sheet available to downstream purchasers.

The standard also applies only to chemicals which are known to be present in the workplace and to which employees may be exposed under normal conditions of use or in a foreseeable emergency. This means that employers must assess and communicate the hazards of any such chemicals, but do not have to analyze complex chemical mixtures in the

workplace to determine the precise composition and components. That is, the term "known" means the employee need not analyze intermediate process streams, for example, to determine the presence of quantity of trace contaminants. However, where the employer knows of such contaminants, and they are hazardous, then they fall under the provisions of the standard.

There are a number of laboratories in the manufacturing facilities covered by this standard, and they receive different treatment in terms of hazard communication requirements. Employers are to ensure that labels on incoming containers of hazardous chemicals are not removed or defaced. Furthermore, any material safety data sheets received with such chemicals are to be maintained, and accessible to employees. Employers are also to ensure that laboratory employees are apprised of the hazards of the chemicals they work with in accordance with the training provisions of this standard. In all other respects laboratories in the covered SIC Codes are exempt from the provisions of the hazard communication standard. For example, employers need not label every container used in the laboratory with an identity and hazard warning as would otherwise be required.

The standard also exempts potentially hazardous chemicals that are brought into the workplace for the personal consumption of employees, such as foods, drugs, cosmetics or tobacco products.

The standard also included specific labeling exemptions for chemicals which are regulated by other Federal agencies, and total exemptions for certain classes of substances which are not expected to be hazardous for purposes of this standard.

(c) *Definitions.* The final standard includes a number of definitions which provide the framework to determine which employers are covered by the standard; what substances are covered by the standard; how the standard defines hazards; and how OSHA defines other key terms for purposes of the standard, such as what constitutes a trade secret. Since a number of these definitions are unique to this standard, they should be consulted to ensure that the provisions are properly understood.

The standard applies to several different groups of businesses, in varying degrees of coverage. All of the hazard communication provisions apply to "employers" who are defined as businesses within SIC Codes 20 through 39 where chemicals are "either used, or are produced for use or distribution."

"Produce" means to "manufacture,

process, formulate, or repackage." "Use" means to "produce, handle, react, or transfer." Those "employers" who "produce" chemicals for "use or distribution" are considered to be "chemical manufacturers," and thus have additional hazard evaluation duties to perform.

The standard also requires "importers" to evaluate the hazards of chemicals. An importer "receives hazardous chemicals produced in other countries for the purpose of supplying them to distributors or manufacturing purchasers within the United States." "Distributors" supply "hazardous chemicals to other distributors or to manufacturing purchasers." "Manufacturing purchasers" are "employers" who purchase a hazardous chemical for use within a workplace in SIC Codes 20 through 39.

The standard applies to any chemical which is known to be present in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. A "chemical" is broadly defined as "any element, chemical compound, or mixture of elements and/or compounds."

"Articles" are excluded under the scope of the standard from being covered as a "chemical." A mixture is defined as "any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction." "Exposure" occurs when an employee may inhale, ingest, or absorb a hazardous chemical during the course of employment. The definition includes both potential and current "exposure." A "foreseeable emergency" is one which employers would normally plan for as a presumed potential occurrence, determined by the nature of the operation, i.e. equipment failure or rupture of containers.

The standard applies to both "physical" and "health" hazards. Each of these terms is defined by listing the various types of "physical" and "health" hazards covered. These listed hazards are then individually defined, or in the case of "health" hazards, further explained in Appendix A.

If a "container" of a hazardous chemical is present in, or leaves the workplace, it must be labeled with an "identity" and "hazard warning." A "container" is anything that holds hazardous chemicals except pipes and piping systems. A "label" is any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals. An "identity" is any name used on the material safety data sheet for the chemical, and on the list of hazardous chemicals in the workplace. The name used should permit cross-

references to be made among these three items. The "hazard warning" conveys the hazards of the chemical(s) in the container to employees. This message may be conveyed by words, symbols, pictures, or any combination thereof.

(d) *Hazard determination.* A new paragraph has been added to the final standard to separate out and highlight the provisions concerning the determination of what constitutes a hazard for purposes of the standard.

The primary duty for hazard evaluation lies with the chemical manufacturers and importers of hazardous chemicals. Under the provisions of this paragraph, they are required to evaluate the chemicals they produce or import in their workplaces to determine if they are hazardous. Employers may rely on the evaluation performed by the chemical manufacturer or importer for chemicals they use within their workplaces to satisfy this requirement.

The chemical manufacturers, importers, or employers are to be held accountable for the quality of the hazard determinations they perform. Each chemical is to be evaluated for its potential to cause adverse health effects, as well as its potential to pose physical hazards, such as flammability. The particular health and physical hazards to be considered are enumerated in the definition for a "hazardous chemical." Additional definitions are provided for the terms used in the definition for a hazardous chemical. The specific physical hazards are also defined in the definitions paragraph. The health hazard definitions are contained in Appendix A. Appendixes A and B are integral parts of this hazard determination paragraph.

Appendix A contains a discussion of the difficulty in definitively identifying all possible health effects, and indicates the broad approach the standard intends in its coverage of such effects. It further provides specific definitions for certain acute hazards, such as "corrosive" and "sensitizer." In addition, the Appendix includes a target organ categorization of health effects which gives examples of signs and symptoms of exposure as well as indications of substances which have been found to affect the target organ. This information is also provided to indicate the broad scope of health hazards to be covered. Essentially, the employer must report any adverse health effect for which there is scientific (i.e. statistically significant) evidence based on at least one positive study conducted in accordance with established scientific principles, that it

may occur as a result of employee exposure.

Appendix B provides further guidance to the employer in terms of the criteria to be applied in determining whether or not a chemical is hazardous for purposes of the standard. As examples of evidence to be considered, OSHA indicates that both human and animal data must be evaluated. Furthermore, if an available study indicates that an adverse health effect is likely to occur, and that study is conducted according to scientific principles and results in statistically significant findings, the employer is required to report it whether he agrees with the finding or not. Employers are free to report such findings in a non-conclusionary fashion, i.e. they don't have to agree with it, but they do have to report it. Employers may also report any negative data they believe is relevant to the hazard potential of the chemical. An additional Appendix C lists a number of sources which are available for employers in their search for information on hazards.

The hazard determination paragraph also includes two provisions which establish certain substances as being hazardous chemicals in any occupational setting. These substances are those currently regulated by OSHA under 29 CFR Part 1910, General Industry Standards, and those listed by the American Conference of Governmental Industrial Hygienists (ACGIH) in their latest edition of the *Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment*. This provision establishes a "floor" of over 600 substances to be communicated to employees.

In addition, OSHA has defined a carcinogen for purposes of communication of hazards as any substance found to be a confirmed or suspected carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or OSHA. Use of these sources should eliminate much controversy involved in defining and identifying carcinogens. The hazard determination paragraph (d) also addresses the coverage of hazardous chemicals which are mixtures. Mixture coverage is divided into several considerations. First of all, if the employer has objective test data on the mixture as an entity, that data must be used to determine the hazards. If such data are not available for the health hazard determination, then the employer must consider the mixture to have the health hazards of those components which comprise one percent or more of the total composition.

If any of the components are carcinogens, the mixture must be considered to be carcinogenic if the component is present in concentrations of 0.1% or more.

If the mixture has not been objectively evaluated to determine its physical hazard potential, the employer may use whatever scientifically valid information is available to subjectively assess the potential hazards.

Finally, if the employer has evidence to indicate that a component which comprises less than one percent of the mixture could be released in concentrations which would exceed an established permissible exposure limit under normal conditions of use, it must be identified. Furthermore, if the employer has reason to believe that the component could be released in quantities hazardous to the health of employees, it shall also be identified even though present in quantities less than one percent of the total weight or volume, or less than 0.1% in the case of a carcinogen. The procedures used to evaluate hazards must be prepared in writing. The written description may be included in the written hazard communication program required under paragraph (e).

(e) *Written hazard communication program.* The final standard requires each employer to establish a comprehensive hazard communication program for their employees, which includes at least the mandated container labeling, material safety data sheets, and an employee training program. The program is to be written, and is to include how the employer plans to meet the criteria of the standard regarding labels, material safety data sheets, and training; a list of the hazardous chemicals in each work area, the methods the employer will use to inform employees of the hazards of non-routine tasks, as well as of the hazards associated with chemicals contained in unlabeled pipes in their work areas; and the methods employers will use to inform contractors in manufacturing facilities of the hazards to which their employees may be exposed.

The written program need not be lengthy or complicated, but should adequately address each of the required components in the program. Some employers already have aspects of their existing hazard communication programs in written form. These need not be modified to comply with this requirement as long as they address the minimal criteria established in the standard.

The written program is to be made available to employees, their designated

representatives, the Assistant Secretary for OSHA and the Director of NIOSH.

(f) *Labels and other forms of warning.* Chemical manufacturers, importers and distributors are required to ensure that containers of hazardous chemicals leaving the workplace are labeled, tagged or marked with the identity, appropriate hazard warnings, and the name and address of the manufacturer or other responsible party. Additionally, they are to ensure that these labels do not conflict with those applied in accordance with Department of Transportation regulations under the Hazardous Materials Transportation Act. If labels already applied by the manufacturer, importer, or distributor contain the minimal information required by OSHA, additional labels need not be affixed.

The final standard requires that each container in the workplace be labeled, tagged or marked with the identity of hazardous chemicals contained therein, and hazard warnings appropriate for employee protection. The term "identity" is defined for purposes of this standard as being any designation the employer chooses to use, as long as it also appears on the list of hazardous chemicals for the work area, and on the associated material safety data sheet. The hazard warning is to be any type of message, words, pictures, or symbols, which convey the hazards of the chemical(s) in the container. The employer is responsible for selecting the message and ensuring that it is effective for the purpose involved.

OSHA recognizes that container labeling may be difficult, or in some cases impractical, to accomplish within a plant. Therefore, several exemptions to in-plant individual container labels have been included in the final standard. If there are a number of stationary containers within a work area which have similar contents and hazards, the employer may post signs or placards which convey the hazard information required rather than individually labeling each piece of equipment. Employers may also use various types of standard operating procedures, process sheets, batch tickets, blend tickets, or other such written materials as substitutes for individual container labels on stationary process equipment. However, these written materials must contain the same information as is required on the labels, and must be readily accessible to workers in the work areas. This requirement does not apply to pipes or piping systems, which are exempted altogether from the labeling requirements.

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One additional exemption is included for in-plant containers. Employers are 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. According to the definition of immediate use, the container must be under the control of the employee performing the transfer, and used within the workshift when the transfer has been made, for the exemption to apply.

The standard also requires that employers ensure that labels on incoming containers of hazardous chemicals are not removed or defaced, unless they are immediately replaced with another label with the required information. In addition, labels are to be legible, in English and prominently displayed on the container. Employers may add information in other languages as well, as long as the message also appears in English.

(g) *Material safety data sheets.* The final standard requires chemical manufacturers and importers to develop material safety data sheets for each hazardous chemical they produce or import. Employers are required to obtain or develop a material safety data sheet for each hazardous chemical used in their workplaces.

Specific requirements are included for the information to be provided on the MSDS. Such information is to be in English, and includes the identity, as well as chemical and common names, for the hazardous chemical. Special provisions apply to the listing of ingredients for hazardous chemicals which are mixtures. For physical hazards, the employer is to list those ingredients which he or she has determined present a physical hazard. For health hazards, the employer must list each component which comprises 1% or more, and which is itself a health hazard. Any chemical which is determined to be a carcinogen must be listed if it is present in quantities of 0.1% or greater. Employers must also list ingredients present in concentrations of less than one percent if there is evidence that the permissible exposure limit may be exceeded or if it could present a health hazard in those concentrations.

In addition to identity information, the employer must provide information specified on the physical and chemical characteristics of the hazardous chemical, known acute and chronic health effects and related health information, as well as information concerning exposure limits, whether the chemical is considered to be a carcinogen by NTP, IARC, or OSHA,

precautionary measures, emergency and first aid procedures, and identification of the person responsible for the sheet.

In some situations, employers may have more than one complex mixture in the workplace which have similar contents and hazards. For example, petroleum streams have essentially the same chemical components, but may vary slightly in concentrations of these components. The hazards are essentially the same. Employers may prepare one MSDS for all of these similar mixtures in order to comply with the provisions of this standard.

If a manufacturer or importer cannot find the appropriate information to complete a specified category, then the MSDS must be marked to indicate that no information was found. In other words, the employer must not leave blank spaces on the sheets which would then be open to interpretation as to the significance of not having an entry in them. If the category is not applicable to the chemical involved, the space should be marked to indicate that as well.

The chemical manufacturer, importer or employer is to ensure that the MSDS accurately reflects the scientific evidence which formed the basis for the determination that the chemical in question is hazardous. The chemical manufacturers, importers, and employers should remain aware of the development of new and significant information regarding the potential health hazard of a chemical in their workplace. When they do obtain such information, they must add it to the MSDS within three months. If the chemical is not being produced at the time of the information is discovered, the information need not be entered onto the MSDS until the chemical is reintroduced into the workplace, and thus employees are potentially exposed.

An MSDS is to be provided to manufacturing purchasers of hazardous chemicals with their first shipment. Providing an MSDS does not imply that the sheet need be physically attached to the shipment. It may be transmitted by mail, through a computer link-up, or in any other effective manner the manufacturer chooses. When an MSDS is updated, the new version must be transmitted to the manufacturing purchaser with the next shipment. Although the chemical manufacturers and importers have a positive duty to provide such information, there may be situations where the MSDS is lost or misplaced. If one is not received as anticipated, the manufacturing purchaser must make efforts to obtain one as soon as possible.

Distributors are responsible for ensuring that manufacturing purchasers

of their hazardous chemicals are provided an appropriate MSDS. This may be accomplished by providing an MSDS prepared by the producer of the chemical.

Copies of the MSDSs for hazardous chemicals in a given work area are to be readily accessible to employees in that work area. In order for the MSDS to serve as a source of detailed information on hazards, it must be located close to workers, and readily available to them during each workshift.

As was the case with labels, alternatives to MSDSs within a plant are also permitted as long as they provide the appropriate information, and are readily accessible to employees. These would be expected to take the form of written operating procedures, manuals, etc. The employer may also use this alternative approach to address the hazards of a process, rather than individual chemicals. However, information must still be available to employees for each hazardous chemical involved.

MSDSs are to be made available to employees and their designated representatives, the Assistant Secretary and the Director. They must be maintained in a current fashion, and need not be retained for any specified period of time beyond that, except to the extent required by the Employee Access to Exposure and Medical Records rule, 29 CFR 1910.20.

(h) *Employee information and training.* Employers are to establish a training and information program for employees exposed to hazardous chemicals. Such training is to be provided at the time of initial assignment, and whenever a new hazard is introduced in their work area. Of course, any employees who have not been trained previously must receive training equivalent to the required initial assignment training when this standard takes effect.

The standard specifies the information to be transmitted to employees. First they are to be informed of the requirements of this regulation, i.e., that it exists, that employers are required to have hazard communication programs, and the components of the programs in their workplaces. Employees are also to be informed of any operations in their work area where hazardous chemicals are present, and where the employer will be keeping the written materials required under this standard, including the written hazard evaluation procedures, written program, lists of hazardous chemicals, and MSDSs required by this section.

Employees are also to be trained regarding methods and observations they may use to detect the presence of a hazardous chemical in their work area. For example, employees should be informed of the visual appearance or smell of the chemicals they may be exposed to, so they will know when they are being released into the work atmosphere. Employees are also to be trained specifically about the hazards of the chemicals in their work areas. This may be done by specific chemical or by categories of hazards, but in any case, the employee is to be aware that information is available on the specific hazards of individual chemicals through the material safety data sheets. Training is to include the measures employees can take to protect themselves from the hazards, and is to indicate the specific procedures implemented by the employer to provide protection, such as work practices and the use of personal protective equipment. In addition, the employer is to explain the hazard communication program implemented in that workplace, including how to read and interpret information on labels and material safety data sheets, and how employees can obtain and use the available hazard information.

(i) *Trade secrets.* OSHA recognizes in the final standard that specific chemical identity information can constitute a *bona fide* trade secret, and thus provisions are made to protect such an identity while providing for the proper protection of exposed employees. This is accomplished by providing for limited trade secret disclosure to health professionals under prescribed conditions of need and confidentiality. The term "specific chemical identity" is used to describe the trade secret information being discussed. This term refers to the chemical name, the Chemical Abstracts Services (CAS) Registry Number, or any other specific information which reveals the precise chemical designation. It does not include common names.

The proposed standard did not include a definition for the term "trade secret," although OSHA stated that the Agency considered the definition derived from the Restatement of Torts to be the appropriate one. In response to comments suggesting that the definition be explicitly stated in the final standard, a slightly modified version of that definition has been added to clarify what the Agency considers to be a trade secret for purposes of this standard.

Given that it is recognized that the specific chemical identity of a chemical may be a trade secret, the standard establishes an information disclosure

scheme which requires the release of essential hazard information, and defines the terms under which the specific chemical identity must also be released.

The chemical manufacturer, importer or employer is permitted to withhold the specific chemical identity from the MSDS if certain conditions can be met: (1) The chemical manufacturer, importer or employer can support the claim that the information withheld is a trade secret; (2) information concerning the properties and effects of the hazardous chemical is disclosed as required on the appropriate material safety data sheet; (3) the chemical manufacturer, importer, or employer indicates on the MSDS that the specific chemical identity is being withheld as a trade secret; and (4) the specific chemical identity is made available to health professionals under certain specified situations. Health professionals are considered to be physicians, industrial hygienists, toxicologists, or any other person providing medical or other occupational health services to exposed employees.

The final standard's provisions make a distinction between the trade secret disclosure requirements in the event of a medical emergency and in non-emergency situations.

In the case of a medical emergency, the chemical manufacturer, importer, or employer must immediately disclose the specific chemical identity of a hazardous chemical to a treating physician or nurse when the information is needed for proper emergency or first aid treatment. As soon as circumstances permit, however, the chemical manufacturer, importer, or employer may obtain a written statement of need and a confidentiality agreement as provided for below.

OSHA considers it to be appropriate for the treating physician or nurse to have the ultimate responsibility for determining that a medical emergency exists. At the time of the medical emergency, their professional judgment regarding the situation must form the basis for triggering the immediate disclosure requirement. Although there will undoubtedly be situations which, when viewed in retrospect, do not appear to be genuine emergencies, OSHA has determined that the short-term necessity for appropriate emergency treatment far outweighs the risk of unnecessary disclosure of secret information. Since the chemical manufacturer, importer, or employer can require a written statement of need and a confidentiality agreement to be completed after the emergency is abated, further disclosure of the trade

secret can be effectively controlled. If a chemical manufacturer, importer or employer refuses to provide specific chemical identity information in the event of a medical emergency, OSHA regulations would provide appropriate enforcement remedies.

In drafting the medical emergency disclosure requirement, OSHA considered whether to allow the chemical manufacturer, importer, or employer to suggest alternatives to disclosure of the type stated in the provisions for non-emergency situations (paragraph (i)(7)(v)). However, OSHA determined that the emergency nature of the situation addressed necessitates disclosure of the specific chemical identity immediately without the opportunity for the chemical manufacturers, importer or employer to explore possible suitable alternatives with the treating physician or nurse.

In non-emergency situations, chemical manufacturers, importers, or employers are required to disclose the withheld specific chemical identity to health professionals providing medical or other occupational health services to exposed employees if certain conditions are met. The concept of "health professional" is more broadly stated than for emergency situations, and includes any physicians, industrial hygienists, toxicologists, or epidemiologists who provide these medical or other occupational health services to exposed employees. Nurses are not included among the health professionals entitled to access to specific chemical identities in non-emergency situations. OSHA has determined that it is more appropriate, given the competing interests balanced in this standard, to entrust such information to the physician to whom a nurse would normally report. The request for information must be in writing, and must describe with reasonable detail the medical or occupational health need for the information. To be considered a medical or occupational health need for purposes of this standard, the health professional must be planning to use the specific chemical identity information for one or more of the following activities:

1. To assess the hazards of the chemicals to which employees will be exposed.
2. To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels.
3. To conduct pre-assignment or periodic medical surveillance of exposed employees.
4. To provide medical treatment to

exposed employees.

5. To select or assess appropriate personal protective equipment for exposed employees.
6. To design or assess engineering controls or other protective measures for exposed employees.
7. To conduct studies to determine the health effects of exposure.

It should be noted that for purposes of this standard, exposure includes potential, as well as current, exposure situations. Thus the health professionals will be able to obtain the necessary information prior to the actual exposure of employees, and can implement preventive measures to avoid the occurrence of health effects.

In addition, the written request must also explain in detail why the disclosure of the specific chemical identity is essential to providing the occupational health services, and why disclosure of the following types of information would not satisfy the health professional's need:

1. Properties and effects of the chemical.
2. Measures for controlling workers' exposure to the chemical.
3. Methods of monitoring and analyzing worker exposure to the chemical.
4. Methods of diagnosing and treating harmful exposures to the chemical.

OSHA anticipates that in many situations this alternative information will be sufficient to satisfy the health professional's needs.

The request for the information must further provide a description of the procedures to be used to protect the confidentiality of the information. An agreement not to use the information for any purpose other than the health need asserted or to release it under any circumstances other than to OSHA must also be included, and signed by the health professional as well as the employer or contractor of the health professional's services. The requirement that the employer or contractor of the health professional's services be a co-signatory to the agreement applies equally regardless of whether the health professional is providing occupational health or medical services to a downstream employer, labor organization, or individual employees, and regardless of whether the health professional is being paid for his services. This makes explicit that both the principal and the agent are legally responsible for compliance with the agreement, although only the health professional may actually have access to the specific chemical identity information.

The provisions of the confidentiality agreement may not include requiring the posting of a penalty bond. It may restrict use of the information to the purposes indicated in the statement of need, prohibit disclosure to anyone other than OSHA who has not signed an agreement, and provide for appropriate legal remedies, including stipulation of a reasonable pre-estimate of likely damages. Nothing in the standard is meant to preclude the parties from pursuing non-contractual remedies to the extent permitted by law.

If the health professional decides there is a need to disclose the information to OSHA, the chemical manufacturer, importer, or employer who provided the information must be informed by the health professional prior to, or at the same time as, such disclosure.

If the chemical manufacturer, importer, or employer denies the written request for information, the denial must also be in writing, and be provided to the health professional within thirty days of the request. The denial must provide evidence to support the claim that the chemical identity is a trade secret, state the specific reasons why the request is being denied, and explain in detail how alternative information may satisfy the occupational health need without revealing the specific chemical identity.

The requesting health professional who still needs the information may then refer the matter to OSHA for consideration. The original request, as well as the written denial, must be provided to OSHA at the time of this referral. OSHA will review these documents to determine whether the chemical manufacturer, importer, or employer has supported the claim that the specific chemical identity is a trade secret, and that the health professional has demonstrated a medical or occupational health need for the information, as well as adequate means to protect the confidentiality of the information.

If OSHA determines that the specific chemical identity is not a trade secret, the employer will be subject to citation. Similarly, the employer will be subject to citation if the specific chemical identity is a trade secret, but the requesting health professional has demonstrated a medical or occupational health need, executed a confidentiality agreement, and has shown adequate means for complying with the terms of the confidentiality agreement. Abatement of the citation will most likely be to divulge the specific chemical identity subject to the confidentiality agreement. However, consistent with

the power given to the Secretary in Section 15 of the Act, if the 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 chemical identity, the Assistant Secretary may issue such orders or impose such additional limitations or conditions upon disclosure 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. It is contemplated that the Assistant Secretary would personally review and approve such orders, limitations or conditions. If the employer continues to withhold the requested information after a citation has been issued, the contested citation will go to the Occupational Safety and Health Review Commission (OSHRC) for adjudication.

In accordance with OSHRC rules, The Administrative Law Judge (ALJ) from OSHRC may decide to review the matter *in camera*. At all stages of the proceeding, the normal OSHRC and judicial review procedures will be followed.

As a further clarification of the disclosure requirements of the final standard, the provisions specifically exclude trade secret processes or percentage of mixture information from disclosure. This is the type of information which is most likely to be trade secret and least likely to be of medical or occupational health interest. OSHA recognizes that, in rare cases, process information (such as where an intermediate hazardous chemical is not present in the final product) or even percentage of mixture information (such as for antidote treatment) may be necessary in an emergency situation. OSHA believes that responsible chemical manufacturers, importers, or employers will appropriately respond to such emergencies. Thus such information was not included in the concept of specific chemical identity.

The chemical manufacturer, importer or employer is required to divulge to the Assistant Secretary or designee any information required under this standard. However, the chemical manufacturer, importer, or employer may claim trade secret status at the time the information is provided, and the Assistant Secretary will make the necessary arrangements to ensure protection of such trade secrets, in accordance with the provisions of

section 15 of the Act and Agency procedures.

(j) *Effective dates.* The effective dates of the final standard are structured according to activity; that is, information being sent downstream must be prepared first, then other provisions of the hazard communication program are to be complied with by a later date. Chemical manufacturers and importers have two years in which to comply with the labeling of containers shipped downstream, and to provide material safety data sheets to manufacturing purchasers. Distributors must also begin transferring information downstream by this initial compliance date. All employers must be in compliance with all provisions of the standard within 2½ years.

V. Authority, Signature and the Standard

This document was prepared under the direction of Thorne G. Auchter, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210. Pursuant to Sections 6(b) and 6(g) of the Act, 29 CFR is hereby amended by adding a new § 1910.1200 to read as set forth below.

List of Subjects in 29 CFR Part 1910

Occupational safety and health,
Hazard communication.

(Sec. 6(b), 6(c), and 6(g). Pub. L. 91-596, 84 Stat. 1593, 1599, 1600; 29 U.S.C. 655, 657; 29 CFR Part 1911; Secretary of Labor's Order No. 9-83 (48 FR 35736))

Signed at Washington, D.C. this 21st day of November 1983.

Thorne G. Auchter,

Assistant Secretary for Occupational Safety and Health.

PART 1910—[AMENDED]

Subpart 2 of Part 1910 of Title 29 of the Code of Federal Regulations (CFR) is hereby amended by adding a new § 1910.1200 to read as follows:

§ 1910.1200 Hazard communication.

(a) *Purpose.* (1) The purpose of this section is to ensure that the hazards of all chemicals produced or imported by chemical manufacturers or importers are evaluated, and that information concerning their hazards is transmitted to affected employers and employees within the manufacturing sector. 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 and communicating chemical hazards to employees in the manufacturing sector, and to preempt any state law pertaining to this subject. Any state which desires to assume responsibility in this area may only do so under the provisions of § 18 of the Occupational Safety and Health Act (29 U.S.C. 651 et seq.) which deals with state jurisdiction and state plans.

(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 in SIC Codes 20 through 39 (Division D, Standard Industrial Classification Manual) 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 in SIC Codes 20-39.

(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:

(i) 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) 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;

(ii) Any food, food additive, color additive, drug, or cosmetic, 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 of that Act and labeling regulations issued under that Act by the Food and Drug Administration;

(iii) 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.

(5) 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; and,

(v) Foods, drugs, or cosmetics intended for personal consumption by employees while in the workplace.

(c) *Definitions.* "Article" means a manufactured item: (i) 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 in SIC Codes 20 through 39 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

(ii) 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

(iii) 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 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 manufacturing purchasers.

"Employee" means a worker employed by an employer in a workplace in SIC Codes 20 through 39 who may be exposed to hazardous chemicals under normal operating conditions or foreseeable emergencies, including, but not limited to production workers, line supervisors, and repair or maintenance personnel. Office workers, grounds maintenance personnel, security personnel or non-resident management are generally not included, unless their job performance routinely

involves potential exposure to hazardous chemicals.

"Employer" means a person engaged in a business within SIC Codes 20 through 39 where chemicals are either used, or are produced for use or distribution.

"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 Universal 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.

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

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

"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, neurotoxins, 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 manufacturing purchasers within the United States.

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

"Manufacturing purchaser" means an employer with a workplace classified in SIC Codes 20 through 39 who purchases a hazardous chemical for use within that workplace.

"Material safety data sheet (MSDS)" means written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) 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 (including chemical name or other unique chemical identifier) 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.

"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 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 Governmental 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 the 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);

(ii) 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

(iv) If the 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 and implement 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);

(ii) 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; and,

(iii) The methods the employer will use to inform any contractor employees working in the employer's workplace of the hazardous chemicals their employees may be exposed to while performing their work, and any suggestions for appropriate protective measures.

(2) 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).

(3) 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
(iii) Name and address of the chemical manufacturer, importer, or other responsible party.

(2) 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 (18 U.S.C. 1801 et seq.) and regulations issued under that Act by the Department of Transportation.

(3) 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.

(4) Except as provided in paragraphs (f)(5) and (f)(6) 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.

(5) 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)(4) 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.

(6) 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.

(7) 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.

(8) 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.

(9) 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 (f) 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:

(f) The chemical and common name(s) of all ingredients which have been determined to be health hazards, and which comprise 1% or greater of the composition, except that chemicals identified as carcinogens under paragraph (d)(4) of this section shall be listed if the concentrations are 0.1% or greater; and,

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

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

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

(iv) 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;

(vi) 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;

(vii) 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;

(viii) 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;

(x) 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 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 manufacturing purchasers of hazardous chemicals 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 manufacturing purchaser prior to or at the time of the shipment. If the material safety data sheet is not provided with the shipment, the manufacturing purchaser 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 manufacturing purchasers of hazardous chemicals.

(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) 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).

(10) 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 1910.20(e). 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 their 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:

(i) 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:

(i) 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.);

(ii) The physical and health hazards of the 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

(iv) 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, 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 or 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, or epidemiologist) providing medical or other occupational health services to exposed employee(s) 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.

(iii) 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 would not enable the health professional to provide the occupational health services described in paragraph (ii) of this section:

(A) The properties and effects of the chemical;

(B) Measures for controlling workers' exposure to the chemical;

(C) Methods of monitoring and analyzing worker exposure to the chemical; and,

(D) Methods of diagnosing and treating harmful exposures to the chemical;

(iv) The request includes a description of the procedures to be used to maintain

the confidentiality of the disclosed information; and,

(v) The health professional, and the employer or contractor of the health professional's services (i.e., downstream employer, labor organization, or individual employer), agree in a written confidentiality agreement that the health professional 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 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 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 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;

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

(v) 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 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 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;

(ii) The health professional has supported the claim that there is a medical or occupational health need for the information; and,

(iii) The health professional 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 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.

(ii) 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, following the issuance of a citation and any protective orders, the chemical manufacturer, importer, or employer continues to withhold the information, the matter is referable to the Occupational Safety and Health Review Commission for enforcement of the citation. In accordance with Commission rules, the Administrative Law Judge may review the citation and supporting documentation *in camera* or issue appropriate protective orders.

(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 trade secret.

(j) *Effective dates.* Employers shall be in compliance with this section within the following time periods:

(1) Chemical manufacturers and importers shall label containers of hazardous chemicals leaving their workplaces, and provide material safety data sheets with initial shipments by November 25, 1985.

(2) Distributors shall be in compliance with all provisions of this section applicable to them by November 25, 1985.

(3) Employers shall be in compliance with all provisions of this section by May 25, 1986, including initial training for all current employees.

Appendix A to § 1910.1200—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 non-occupationally 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 obvious 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 hazard 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
(c) It is 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. Hepatotoxic:	Chemicals which produce liver damage.
Signs and Symptoms:	Jaundice; liver enlargement.
Chemicals:	Carbon tetrachloride; nitrobenzene.
b. Nephrotoxic:	Chemicals which produce kidney damage.
Signs and Symptoms:	Edema; proteinuria.
Chemicals:	Halogens; hydrocarbons; uranium.
c. Neurotoxic:	Chemicals which produce their primary toxic effects on the nervous system.
Signs and Symptoms:	Parosmia; behavioral changes; decrease in motor functions.
Chemicals:	Mercury; carbon disulfide.
d. Agents which act on the blood or hemopoietic system:	Decrease hemoglobin function; deprive the body tissues of oxygen.
Signs and Symptoms:	Cyanosis; loss of consciousness.
Chemicals:	Carbon monoxide; cyanides.
e. Agents which damage the lung:	Chemicals which irritate or damage the pulmonary tissue.
Signs and Symptoms:	Cough; tightness in chest; shortness of breath.
Chemicals:	Silica; asbestos.
f. Reproductive toxic:	Chemicals which affect the reproductive capabilities including chromosome damage (mutations) and effects on fetuses (teratogenesis).
Signs and Symptoms:	Birth defects; sterility.
Chemicals:	Lead; DBCP.
g. Cutaneous hazards:	Chemicals which affect the dermal layer of the body.
Signs and Symptoms:	Defolting of the skin; rash; irritation.
Chemicals:	Ketenes; chlorinated compounds.
h. Eye hazards:	Chemicals which affect the eye or visual capacity.
Signs and Symptoms:	Conjunctivitis; corneal damage.
Chemicals:	Organic solvents; acids.

Appendix B to § 1908.1200—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 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 hazard.

Appendix C to § 1908.1200—Information Sources (Advisory)

The following is a list of available data sources which the chemical manufacturer, importer, 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., 128 E. Lincoln Avenue, 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, 1972-1977. (Multivolume work), 49 Sheridan Street, Albany, New York
- Industrial Hygiene and Toxicology**, by F. A. Patty
John Wiley & Sons, Inc., New York, NY (Five volumes)
- 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, 805 Third Avenue, New York, NY 10158
- Chemical Hazards of the Workplace**
Nick H. Proctor and James P. Hughes, J. P. Lipincott 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 Workroom Environment with Intended Changes**
American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Bldg. D-5, Cincinnati, OH 45217
- Note.**—The following documents are on sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

**2. WORK AREA LIST OF
HAZARDOUS SUBSTANCES**

LAM004898

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003690

Workplace List of Hazardous Chemicals

This section contains a comprehensive list of Monsanto products and isolated intermediates, and purchased raw materials and supplies found in the Texas City plant. It is the responsibility of each work area to notify the Safety/Industrial Hygiene Department of new or "no longer used" chemicals in that area so that the list can be kept evergreen. An updated list must be issued at least annually.

SC 003691

LAM004899

Hazardous Substances in the Work Area

I. Criteria For Judging If A Material Is Hazardous

A material or a mixture is hazardous under the OSHA Hazard Communication Standard, and therefore, requires a Material Safety Data Sheet if:

1. The material or mixture has been tested and found to meet the health hazard criteria established in the OSHA Standard (29 CFR Part 1910.1200). Health hazards include carcinogens, corrosives, toxic materials, irritants, sensitizers and materials having target organ effects.
2. The material or mixture has been tested and found to be a physical hazard as defined by the Standard. Examples include compressed gases, explosives, oxidizers, flammables, combustibles and organic peroxides.
3. The mixture has not been tested as a whole, and any component is a carcinogen or potential carcinogen and is present at a level of 0.1% or more, including:
 - a. Any material listed in the latest edition of the NTP Annual Report on Carcinogens, the IARC (International Agency for Research on Cancer) monographs or 29 CFR 1910, Subpart Z (OSHA Carcinogens) is defined to be a carcinogen or potential carcinogen under OSHA.
 - b. Any material classified by Monsanto for labeling purposes as a carcinogen or potential carcinogen.
 - c. Any material classified by Monsanto internal procedures as a carcinogen or potential carcinogen.
4. The mixture has not been tested as a whole, and any component is listed on 29 CFR 1910, Subpart Z or the latest edition of the ACGIH TLV's, and is present at a level of 1% or more.
5. The material, a mixture, or any component of a mixture (if the mixture has not been tested as a whole) is classified by Monsanto for labeling purposes as requiring a warning statement of any type other than a good hygiene statement, and is present at 1% or greater.

SC

003692

6. The material, mixture, or any component of the mixture (if the mixture not been tested as a whole) is judged to be hazardous by Monsanto's Internal Hazard Evaluation Procedure. Examples at Texas City include lactonitrile and acetone cyanohydrin.
7. The mixture has not been tested as a whole and is judged by Monsanto, based on scientific literature, to be a physical hazard.

NOTE: Based on verbal communications with OSHA, a mixture for purposes of this criterion includes all components in a product, such as impurities, residual monomers in a polymer and unreacted raw materials.

Monsanto products and isolated intermediates will be evaluated by the Department of Medical and Environmental Health (DMEH). We will rely on vendors' evaluations for their products, although the Industrial Hygiene Department at each location will review these evaluations. One example worksheet for vendor evaluations is included elsewhere in this section.

II. Monsanto Hazard Evaluation Procedure

Monsanto's products will not present an unreasonable risk of harm to human life or health or to the environment when they are properly handled, transported or used. The Department of Medical and Environmental Health (DMEH) has the responsibility for judging the adequacy of data developed to insure the safety and environmental compatibility of products and intermediates produced in its own workplaces and shipped to its customers. Physical and chemical hazard assessments are also carried out by fire professionals in our Department of Safety and Property Protection units.

As one means of discharging this responsibility, DMEH undertakes specific assessments of each new chemical or proposed new use of an existing chemical. While not subjected to all features of this procedure, established products are periodically reviewed to determine that their hazardous characteristics have been adequately assessed and classified, and Material Safety Data Sheets exist containing health and safety information. Final approval of safety and environmental assessments will be given by the Director, DMEH or his designate.

SC 003693

Monsanto will carefully evaluate its products and chemicals for potential to harm humans and the environment. Early in a new product development project, the following will be provided to the Department of Medical and Environmental Health to initiate the preliminary assessment of safety and environmental capability:

1. Product and Chemical Name
2. CAS Number (if available)
3. Common Names and Synonyms
4. Trade Names
5. Molecular and Structural Formula
6. Molecular Weight
7. Physical Data Sheet
8. Known or Expected Impurities
9. Expected Major Areas of Use and Volume
10. Toxicity Known
11. Expected Environmental Impact from Manufacturing Process Wastes and from Product Use and Disposal

This information, along with an appropriate literature search, will be used by DMEH to assess the tests needed for the product. Part of the literature search will include a review of available data bases such as Medline, Toxline, etc. and Appendices A and B of the OSHA Hazard Communication Standard.

Upon completion of the preliminary assessment, DMEH may list additional studies deemed necessary for completion of the comprehensive assessment of safety and environmental compatibility. They may also recommend dropping a product from consideration. The list of studies initially proposed may be expanded as information is accumulated from exposure data and clinical experience to confirm or deny the toxicology studies. Monsanto may conduct various toxicology tests in its own Environmental Health Laboratory or contract these studies at outside independent qualified laboratories. When the information requested has been obtained, a decision regarding product hazard and risk will be made.

It should also be noted that some products are also evaluated under other existing laws such as FIFRA (pesticides) and FDA (Food and Drug Administration) that require some different approaches to justify agency approval.

SC 003694

MATERIAL

VENDOR

Acetic Acid 1:1	MC Control Lab
Alcohols from 56	Monsanto
Alum	Stauffer Chem
Ammonium Chloride	LaMarka
Bon Ami	Faultless
Brine	Texas Brine
Brom Grn- Me Red Ind (EtOH) MO-27	LaMarka
Buffer Solution pH 7	LaMarka
Chemonitor Std Na Soln	Calgon
Chlorine	Dow
Conductivity Reagent A	Calgon
DPD Free Chlorine Reagent Powder 2094	Betz
Disodium Sulfite	<i>McKesson Chem.</i>
Draino	Drackett
Easy Off Oven Cleaner	Boyle-Midway
Erichrome Black T Indctr	J & S Sales
Fantastik	Texize
Gallic Acid # 276	Betz
Hardness Buffer Low Rnge	Craft Products
Hardness Titrnt # 292	Betz
Hardness Titrnt Low Rnge	Craft Products
High Flow Super Cell	<i>Crom Chem Co.</i>
Isopropanol	Stores
K-Plus	Kernite
Light Ends Oxo Heads (LEOH)	Monsanto
Lime (CaOH)	US Gypsum
Methyl Orange Indicator	LaMarka
Muriatic Acid	Monsanto
Muriatic Acid	Monsanto
Off Insect Repellent	Johnson
Phenolphthalein 20 GPL	LaMarka
Polymer 1192	Betz
Potassium Dichromate	Fisher
Potassium Iodide-Iodate	Betz
SC-100 Porcelain Cleaner	All States Chem
Silica Reag No 1,2,3	Calgon
Silver Nitrate	Betz
Sodium Buffer Soln FA	Calgon
Sodium Hydroxide, 20%	Dept 19 Header
Spic N Span	Proctor & Gamble
Styrene Tar	Monsanto
Sulfite Indicator # 219	Betz
Sulfuric Acid .02%	LaMarka
Sulfuric Acid N/50	LaMarka
TG-10	Calgon
Versenate Buffer Reagent	LaMarka
Versenite Indicator Mower	LaMarka

UTILITY DEPARTMENT CHEMICALS

Chemicals are hazardous because they are toxic, flammable or corrosive. Below are listed all the "chemicals" we use in Power 2. I have tried to put all chemicals in one of the three categories. Please look these over and see the "Hazard Communications" book for Material Safety Data sheets if you have questions.

TOXIC

Chlorine
Styrene Tar

FLAMABLE

Alcohols from 56
Isopropanol
Light Ends Oxo Heads (LEOH)

CORROSIVE

Acetic Acid 1:1
Alum
Ammonium Chloride
Bon Ami
Brine
Brom Grn- Me Red Ind (EtOH) MO-27
Buffer Solution pH 7
Chemonitor Std Na Soln
Conductivity Reagent A
DPD Free Chlorine Reagent Powder
Disodium Sulfite
Draino
Easy Off Oven Cleaner
Erichrome Black T Indctr
Fantastik
Gallic Acid # 276
Hardness Buffer Low Rnge
Hardness Titrnt # 292
Hardness Titrnt Low Rnge
High Flow Super Cell
K-Plus
Lime (CaOH)
Methyl Orange Indicator
Muriatic Acid
Off Insect Repellent
Phenolphthalein 20 GPL
Polymer 1192
Potassium Dichromate
Potassium Iodide-Iodate
SC-100 Porcelain Cleaner
Silica Reag No 1,2,3
Silver Nitrate
Sodium Buffer Soln FA
Sodium Hydroxide, 20%
Spic N Span
Sulfite Indicator # 219
Sulfuric Acid .02%
Sulfuric Acid N/50
Versenate Buffer Reagent
Versenite Indicator Mower

SC 003696

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