NMHU HAZARD COMMUNICATION PROGRAM

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Introduction

The Hazard Communication Standard is required by the Occupational Safety and Health Administration (OSHA) for the purpose of reducing the occurrence of employee occupational illness and injury due to hazardous chemicals. The standard requires the evaluation of the potential hazards of chemicals and the communication of that information and the appropriate protective measures to employees.

You as an employee have the right to know about the chemicals you use. This includes chemical physical hazards (e.g., flammability, corrosivity, reactivity, etc.), the health hazards of the chemicals (e.g., toxicity, skin irritation, carcinogenicity, etc.), recognizing symptoms of exposure to chemicals, interpreting Material Safety Data Sheets (MSDSs), and the use of equipment and methods for protecting yourself and others from exposure to chemicals. Consequently, every new and continuing employee receives training about the chemical hazards of their job.

You have the right to request chemical health and safety information at any time from your supervisor, or the NMHU Environmental Health and Safety Committee

Definitions

Chemical: Any element, chemical compound or mixture of elements and/or compounds.

Hazardous chemical: Any chemical which is a physical hazard or a health hazard.

Health hazard: A chemical that has been shown to cause acute or chronic health effects.

Material Safety Data Sheet (MSDS): Written or printed material prepared by the manufacturer of a hazardous chemical that contains information about the hazards of the chemical and the appropriate work practices required for use.

Physical hazard: A chemical that has been shown to be combustible, explosive, flammable, reactive, a compressed gas, an organic peroxide or an oxidizer.

Corrosives: Biological corrosives attack human tissue and cause irritation, chemical burns, and in severe cases, tissue destruction. In case of skin or eye contact with corrosives, prompt treatment with a physiologically correct buffered saline is important. Consultation with a medical professional is required. Safety showers and eyewash fountains must be provided for this purpose and must be readily available to all lab occupants. In laboratories which do not have safety showers, the nearest location should be posted. All labs should have eyewash stations. Types of corrosives and examples of each are: Acids, Bases, Halogens, and organic compounds

Acids: Inorganic or mineral acids include sulfuric, nitric, hydrochloric, phosphoric and hydrofluoric. Concentrated solutions of hydrofluoric acid(HF) can penetrate the skin and soft tissue, causing destruction and intense pain. A neutralizing gel shall be kept in the lab any time HF is used. Organic acids contain a carboxylic group, (-COOH) and are generally less acidic and corrosive than the mineral acids. Common organic acids include acetic, benzoic, citric, and oxalic.

Bases: Bases are alkaline substances that have a pH above 7 when dissolved in water. Contact with the skin causes a "slippery" or "soapy" feeling. Examples of common bases include: Ammonium hydroxide Calcium hydroxide Potassium carbonate Potassium hydroxide Sodium carbonate Sodium hydroxide. The eye is especially susceptible to alkalies and splash goggles or face shields are required whenever there is a possibility of eye contact.

Halogens: The elemental halogens (bromine, chlorine, fluorine, and iodine) are all extremely corrosive, especially to the respiratory system. They are also capable of causing the deterioration of many materials of construction used for gaskets, piping and tubing.

Organic Compounds: Can be as corrosive as the inorganic acids and bases. Examples include phenols, amines and some unsaturated ketones. In addition, many organics can be absorbed through the intact skin and produce toxic effects.

Section 1:
Hazard Communication Responsibilities and Program Coverage

1.1. Chemical Hazard Communication Responsibilities

Environmental health and safety responsibilities at NMHU, including Hazard Communication responsibilities, are described in the NMHU Environmental Health and Safety Policy.

A. Building Supervisor

The building supervisor has responsibility for the safety and upkeep of instructional and laboratory building spaces assigned to them. The building supervisor, in collaboration with laboratory and studio supervisors, ensures that all employees and students follow NMHU environmental health and chemical safety policies within the building, including hazard communication and documentation about chemicals and training.

Specifically, the building supervisor shall:

- Ensure that appropriate training is being provided to employees and students;
- Ensure that regulatory compliance practices are being adhered to in the building and
- Perform periodic inspections.

B. Laboratory or Studio Supervisor

The laboratory or studio supervisor is the faculty member who is the sole or primary faculty member responsible for operations in the studio or laboratory space(s). The laboratory or studio supervisor has ultimate responsibility for hazard communication throughout his or her workspaces.

Specifically, the lab or studio supervisor shall:

- Maintain inventories of chemicals and formulated products, along with hazardous wastes;
- Ensure that appropriate training has been provided to employees and students in the labs or studios, and that the training has been documented;
- Maintain a current knowledge of the legal requirements of hazardous and regulated materials in his or her workspaces; and
- Review and improve the laboratory's or studio's hazard communication portion of the chemical hygiene plan on an annual basis.

C. Employees

Employees have the responsibility to:

- follow all procedures outlined in this program;
- report hazardous conditions and work related injuries or exposures to their supervisors; and
- wear/utilize Personal Protective Equipment when recommended and provided.

D. Environmental Health and Safety Program

The EHS program at NMHU includes a Campus Safety Officer, and a Campus Chemical-Biological Hygiene Officer. The EHS Program can direct supervisors to information resources and provide training and services in assistance with meeting environmental and safety regulatory concerns. The EHS Program provides technical and policy oversight of laboratory and studio activities that involve the use of hazardous chemicals.

1.2. Scope and Application of this Plan

The New Mexico Highlands University Hazard Communication Program (HCP) is intended to comply with the federal Occupational Health and Safety Administration (OSHA) Hazard Communication Standard (HCS) (29 CFR 1910.1200), and, the New Mexico State Occupational Safety and Health Act and associated regulations.

Hazard communication is employees' right-to-know about the chemical hazards of the substances they use in the workplace. Use includes packaging, handling, reacting, or transferring pure chemicals, mixtures or formulations of chemicals, compressed gases, and other materials or substances that pose a health or physical hazard to employees.

The hazard communication standard applies where any use of a chemical occurs, except for consumer items. This definition covers employees (including student employees, technicians, supervisors, maintenance personnel, researchers, and artists) who use chemicals or formulated products. It is the policy of the University that laboratory or studio students, while not legally covered under this standard, will be given training commensurate with the level of hazard associated with their laboratory or studio work.

This document provides information on the implementation of HCP at NMHU. Specific training is required in various units of NMHU, these specific training requirements are described in the Chemical Hygiene Plans (CHPs, see NMHU Chemical Hygiene Plan for Laboratories and Studios) of specific laboratories and art studios. Facilities Management units have Hazard Communication Plans specific to their operations.

Section 2: Chemical Inventory

2.1. Inventory Policy

Inventories of chemicals that are used by employees are required for each laboratory, studio, facilities management department, janitor's closet, and storage area. Chemical inventories are required in the OSHA Hazard Communication Standard and the Resource Conservation and Recovery Act (Superfund Amendment and Reauthorization Act) regulations. It is NMHU policy that all chemicals and formulated products (chemicals hereafter), with the exclusion of over-the-counter consumer products, shall be entered into a chemical inventory when they arrive on the main campus. The ultimate destination of a material shall also maintain an inventory. Disposition of the chemical shall be recorded, along with the volume of waste that contains the chemical. The ultimate idea is to maintain a "cradle-to-grave" tracking of chemicals on campus.

The chemical inventory is utilized in training to notify workers of the hazards of all chemicals in their workplace. A permanent file of Material Data Safety Sheets (MSDSs) shall be available to workers at a specific workplace. There must be MSDSs for all chemicals in the inventory at a workplace (see Section 3).

For the purposes of chemical inventory, there are 3 classes of substances:

- Pure Chemicals – These are pure chemicals that are not in a mixture with other substances. In most cases, these will only be encountered in laboratory and studio settings.
- Formulated Products – These are commercial products that are a mixture of hazardous and/or non-hazardous chemicals. Formulated products are materials like cleansers, disinfectants, deodorizers/scents in restrooms, paints, and other similar commercial products.
- High-volume Chemicals – Certain chemicals are utilized at relatively high-volumes on campus. Examples of high-volume chemicals are compressed propane in large pressure tanks, motor oil, paint solvents and similar materials. Many of these substances arrive clean, are used, and then must be disposed of as hazardous wastes.

2.2. Pure Chemical Inventory Form Instructions

The following is a template for conducting a chemical inventory of your research lab. At the top please fill in the **room number**, **name** of the inventory taker, **date** of inventory, and **page number**. You may use as many sheets as necessary. Please be thorough and check every drawer, cabinet, hood, refrigerator, freezer, etc. for chemicals.

Please print legibly! You must fill in the **compound name** exactly as it appears on the label, even if you routinely refer to it by a different name. Please include any specifiers that go along with the name, such as numbers, *cis*-, *trans*-, *o*-, *m*-, *p*-, α-, β-, *R*-, *S*-, **D**-, **L**-, (+), (-), etc. Sometimes the same compound will have a different name from different suppliers, but use the name as it appears on each label, whatever it is. Other information such as purity, physical form, etc. are not necessary for the inventory.

Chemicals do not need to be listed in any particular order. (They will be alphabetized later.) If the chemical **formula** is given on the label please include it. If not, we can supply missing formulae. The **size** column is for the size of the container, not how much is in it. Even if you have a four-liter bottle with only a few milliliters left in it, put 4 L as the size. This is so that we can more readily locate items based of the size of the container.

Please enter the **CAS Number** if it is given on the label. These numbers often appear in brackets, such as [67-64-1]. The number of digits in the first number varies, but the last two are always two and one digit, respectively. As with formulae, we can provide missing CAS numbers if they aren't given.

The **NMHU ID** is on a separate label or tag (or rarely, hand written on the original label) and consists of CI (inorganic), CO (organic) or CS (stain) followed by five digits, such as CO07484. This is our in-house identification number, and should be on every chemical, although sometimes you may find containers without them. Be sure to give the NMHU ID if it is present. If there is none, leave this item blank. If you have more than one container of the same item, you will need to list them separately, so that we have the NMHU ID for each container. This is important for inventory control.

Manufacturer is the company that sold the chemical. Occasionally chemicals have been locally repackaged and the original manufacturer is not known. In these cases put Unknown in this column. Finally, the **Comments** column is for additional information such as Fridge to indicate a chemical is kept in a refrigerator, or Carcinogen, Toxic, etc. to indicate a particularly dangerous compound. If you have any questions about how to conduct a chemical inventory, or about the information we require on the form, please do not hesitate to contact the Chemical Safety Officer: Mark Minton, room 401 Science Building, 454-3502, mminton@nmhu.edu for assistance. It will be much easier to conduct the inventory right the first time, rather than having to go back and fill in missing information later.

Pure Chemical Inventory Form

Room No. _____ Name ______________________________ Date __________ Page No. _____

Compound Name	Formula	Size	CAS Number	NMHU ID	Manufacturer	Comment
Example: Acetone	C_3H_6O	4 L	67-64-1	CO07484	Spectrum	

2.3. Formulated (Industrial) Chemical Inventory Form

Industrial Chemical Inventory Form Instructions

The following is a template for conducting a chemical inventory of your industrial chemicals. You may use as many sheets as necessary. Please be thorough and check every closet, cabinet, shelf, etc. for chemicals. Please print legibly! If you have any questions about how to conduct a chemical inventory, or about the information we require on the form, please do not hesitate to contact the Chemical Safety Officer: Mark Minton, room 401 Science Building, 454-3502, mminton@nmhu.edu for assistance. It will be much easier to conduct the inventory right the first time, rather than having to go back and fill in missing information later.

- **Room number**, **name** of the inventory taker, **date** of inventory, and **page number** should be filled in on every page.
- **Preparation name** should be exactly as it appears on the label, even if you routinely refer to it by a different name. Please include any specifiers that go along with the name, such as numbers, letters, etc. Sometimes similar preparations will have different names from different suppliers, but use the name as it appears on each label, whatever it is. Chemicals do not need to be listed in any particular order. (They will be alphabetized later.)
- **Size** refers to the size of the container, not how much is in it. You may give this in either English or metric units, or both. Even if you have a gallon bottle with only a few ounces left in it, put 1 gal as the size. This is so that we can more readily locate items based of the size of the container.
- **Ingredients** are the individual chemical compounds making up the preparation. Please list all of them if they are given, including seemingly trivial ones like water.
- **CAS Registry Numbers** for the ingredients are also often given on the label. These numbers sometimes appear in brackets, such as [67-64-1]. The number of digits in the first number varies, but the last two are always two and one digit, respectively. We can provide missing CAS numbers if they aren't given.
- **Manufacturer** is the company that sold the preparation. Occasionally chemicals have been locally repackaged and the original manufacturer is not known. In these cases put Unknown in this column.
- Under **MSDS** mark either yes or no to indicate whether or not a copy of the applicable MSDS sheets is on file in this location.

Industrial Chemical Inventory Form

Room No. _____ Name _____Date _____ Page No. _____

Preparation Name	Size	Ingredients	CAS Numbers	Manufacturer	MSDS
Example: QC31 Neutral Cleaner	1.3 L 44 oz	Water Linear Alcohol Ethoxylate Polyacrylate Emulsion Mixture Sodium Xylene Sulfonate Sodium Ethylenediamine Tetraacetate	7732-18-5 68551-12-2 None 1300-72-7 64-02-8	Ecolab Airkem	Yes

Section 3:
Material Safety Data Sheets, Hazard Determination, and Labeling

The University will rely on the hazard evaluation performed by the manufacturer or importer of the chemical as the official hazard assessment for commercially acquired chemicals.

NMHU employees who develop new chemical mixtures must perform a hazard assessment as outlined in Appendices A and B of the Standard (see Section 3.1.a). The hazard evaluation and procedures used in this process must be submitted to EHS.

3.1. Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) contain important information on chemicals or chemical formulations that employees use. The information required by law is:

1. Name(s) of substance(s) – These must include chemical names
2. Name and address of manufacturer
3. Physical properties of the substance
4. Physical Hazards
5. Health hazards and symptoms of exposure
6. Handling and use precautions – specifies use of personal protective equipment
7. Emergency response

Consequently, MSDSs are important training tools, because they contain the information on personal protection measures, handling precautions, symptoms of exposure, and emergency information.

Purchasing will request MSDSs when placing orders with vendors. Immediately upon receipt, purchasing, storerooms and supervisors who obtain MSDSs directly from vendors are to send a copy of the MSDS to EHS for inclusion in the MSDS master file.
If Departments order products through a retail distributor independently of Purchasing, the Department must request an MSDS from the distributor and send a copy to EHS. Please indicate your department name on the MSDS that is sent to EHS.

Each Department is required to maintain current MSDSs for each hazardous chemical and pharmaceutical* used or stored in its work area. MSDSs must be readily accessible to employees during all workshifts. It is the responsibility of area supervisors to ensure that employees review the MSDS prior to working with the chemical. The supervisors must notify employees of any changes in MSDSs.

> **Package inserts approved under FDA regulations and the Physicians' Desk Reference (PDR) will no longer be recognized as acceptable alternatives to MSDSs for pharmaceuticals. MSDSs must be maintained for all powder and liquid pharmaceuticals used in the workplace.* [What about gases, like anesthetics?]

EHS will maintain a MSDS master file, will coordinate the request for MSDSs from the manufacturer and will notify New Mexico OSHB if manufacturers fail to supply MSDSs. EHS will provide updated MSDSs to supervisors upon request.

3.1.a. Preparing MSDSs

NMHU employees who develop new chemicals or chemical mixtures must prepare a MSDS if someone else will use that chemical, or, it is to be shipped off-campus. A list of Particularly Hazardous Chemicals is available to assist departments with MSDS preparation (see Section 9.1), however, the list is not inclusive of newly created chemicals by laboratories. Novel chemicals may require chemical property and toxicity estimation prior to shipment off-campus. EHS can assist in this regard. See Section 9.2 for health hazard definitions.

3.2. Hazard Determination

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 the Hazard Communication Standard.

The NMHU policy is that the hazard assessment by the manufacturer of a commercially available chemical (as shown in the MSDS) shall be utilized in hazard determination.

A. Chemicals Synthesized On-Campus
Substances that are created on-campus do not need an MSDS, unless they are to be shipped to another destination. However, a hazard determination may be required for waste disposal. EHS can assist in hazard determination for this unique group of substances.

B. Process Hazards
The hazardous characteristics of processes must also be determined. Certain processes or operations may pose unique risks (e.g., high-pressure reactions, violent or potentially explosive reactions, heating flammable solvents, spraying liquids, etc.). Information on minimizing risks from hazardous processes is available from OSHA-Process Safety Management or EHS.

C. Hazards of Mixtures
The hazards of a mixture of substances shall be assessed on the basis of the most hazardous characteristic of any component that composes or constitutes 1% or more of the mixture or solution.

D. Particularly Hazardous Chemicals

Certain substances are considered particularly hazardous and are listed in Section 9.1. Some of the Chemicals used at NMHU are considered Particularly Hazardous. Particularly Hazardous Chemicals are chemicals that have been shown to be carcinogens, reproductive toxins or ones that have a high degree of acute toxicity. Work with Particularly Hazardous Chemicals or products that contain PHCs requires written Standard Operating Procedures that address the following:

- the hazards of the chemical;
- what containment devices (i.e., chemical fume hoods, glove boxes) will be used;
- what Personal Protective Equipment is required;
- designated storage and use areas;
- how to dispose of the chemical; and
- decontamination procedures.

Each supervisor must review the list, mark the chemicals that are used in the work area and send a copy of the list to EHS. If you have literature that indicates that a chemical you are using should be considered a Particularly Hazardous Chemical but is not included on the list, contact EHS. This list is not all-inclusive. It is a partial list of Particularly Hazardous Chemicals that EHS believes are likely to be used at NMHU.

Some chemicals on the list require prior approval from EHS for use. These chemicals have a high degree of acute toxicity and their use must be reviewed by EHS to ensure that proper control measures are available. Prior to ordering chemicals, supervisors must review the list to determine if the chemical they are purchasing requires prior approval.

3.3. Labeling

Every container of hazardous material delivered to, used at or shipped from NMHU must be labeled with the following information:

- name of the chemical, as it appears on the MSDS,
- name and address of the manufacturer, and
- appropriate hazard warnings such as physical hazards, health hazards, target organ effects.

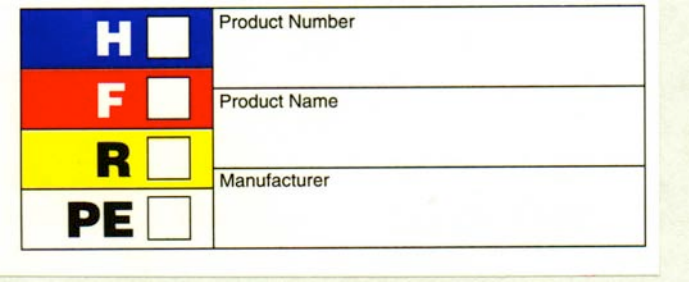
The labels must be maintained in a readable condition. Manufacturer labels must not be defaced or removed unless the container is immediately labeled with the required information. Any container without a label should be reported to the supervisor immediately.

If chemicals are transferred out of the original container, the secondary container must be labeled with the information listed above (see Section 3.2.a). Section 3.3.a outlines the color-coded labeling system that is used at NMHU. Labels are not required on secondary containers intended for the immediate use of the employee who performs the transfer as long as the container does not leave the possession of that employee.

Work Area Supervisors are responsible for ensuring that all chemical containers are labeled in accordance with this section.

a. Labeling System

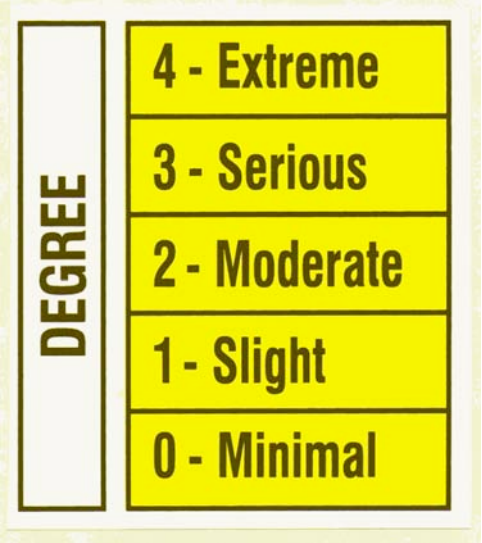
Most chemicals utilized at the University will be in the original container with the manufacturer's label intact. However, when a chemical is transferred from one container to another, the following color-coded label must be affixed to the container. The chemical name, manufacturer and date must be listed on the label.



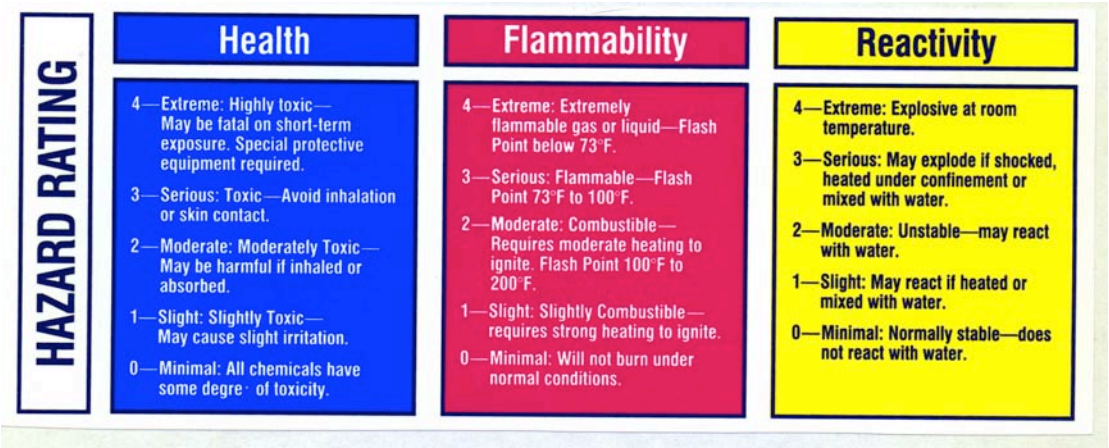
1. A color index is used to identify the hazard type:

   Health Hazard *(Blue Bar)* **Flammability** *(Red Bar)* **Reactivity** *(Yellow Bar)*

2. A sequential numbering system identifying the degree of hazard associated with each category must be placed in the appropriate colored square. Each color-coded bar is assigned a numerical rating.



3. The Safety, Health and Environmental Affairs Department is responsible for assigning the hazard rating for chemical labeling purposes. Using the Chemical Inventory form, please list all chemicals that are transferred out of their original container. Please send a copy of the completed Chemical Inventory form to the Safety, Health and Environmental Affairs Department. It is the responsibility of the employee who is transferring a chemical from one container to another to properly label it.

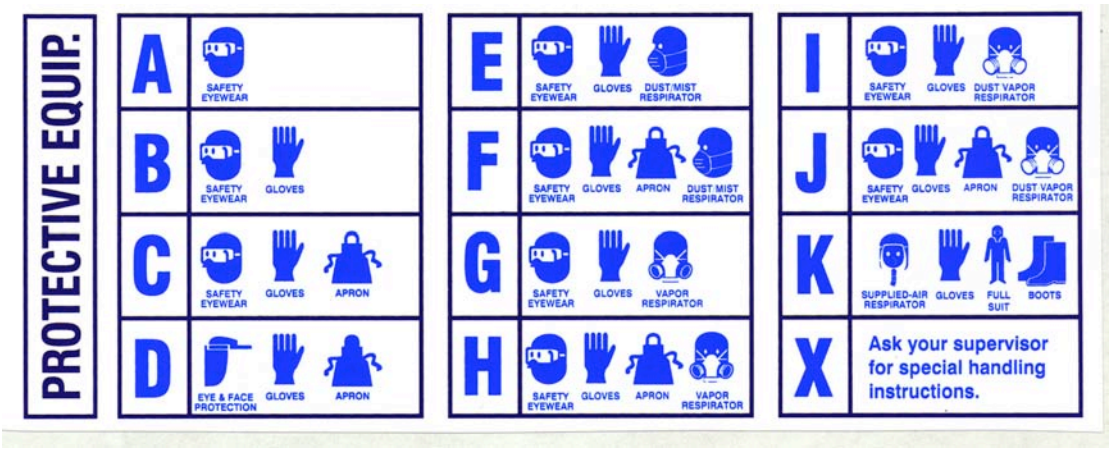


4. The Personal Protection section is assigned an alphabetical rating based on the Personal Protection Index and necessary Personal Protective Equipment. These personal protection items must be worn when working with chemicals which possess these ratings on the label. The following alphabetical codes will be assigned to most chemicals used at the University.

   A Goggles Only

   B Gloves and Goggles

Personal Protection ratings are assigned under the assumption that a chemical fume hood or local exhaust ventilation is available for volatile chemicals or fine powders that are easily inhaled. If you are using these types of chemicals without local exhaust ventilation, respiratory protection may be necessary. EHS can provide assistance in determining if respirators are necessary for your area.



b. Labeling pipes

All pipes must be labeled in accordance with NMHU's policy.

1. Pipes shall be wrapped with colored "Scotch" brand or comparable plastic tape in the color designated with a tape 12" minimum width at each point. Brady or comparable paste-on labels with the designated lettering shall be pasted on the above taped section in the color and size lettering designated. Colored bands of the size and color designated shall be placed around the pipe over the basic colored tape required. These will be located for maximum visibility from expected personnel approach. Distance apart shall be a maximum of twenty feet (20') with at least one label in each space or room.

2. Paste-on labels containing the lettering shall be sized as follows:

Outside Diameter of Pipe or Insulation	***Height of Lettering***
Over two inches (2")	Two inch (2")
Two inches (2") and under	One-half inch (½")

3. A typewritten schedule of all labels used, with identification, shall be framed, under glass, and posted in the mechanical equipment room.

4. Color schedule and label code:

SERVICE	BAND COLOR & SIZE	LETTERING	PLASTIC TAPE & LABEL COLOR
Steam	2” Black (2 required)	Steam (Blk)	Yellow
Condensate Return Hot Water Supply	1” Black 2” Orange &?	Return (Blk) Heating (Blk)	Yellow Yellow
(Heating) Hot Return (Heating)	1” Green 1” Orange &? 1” Green	Water Supply Heating (Blk) Water Return	Yellow
Chilled Water Supply	2” Black (2 required)	CHWS (Blk)	Green
Chilled Water Return	1” Black	CHWR (Blk)	Green
Domestic Hot Water Supply	1” Purple	DHWS (Blk)	Green
Domestic Hot Water Return	1” Purple	DHWR (Blk)	Green
Domestic Cold Water	None	CW (Blk)	Green
Soft Cold Water	1½” Blue Strips	SCW (Blk)	Green
Distilled Water	1” Blue (2 required)	DW (Blk)	Green
Compressed Air	2” Orange	AIR (Blk)	Green
Natural Gas	2” Black	GAS (Blk)	Orange

SERVICE	BAND COLOR & SIZE	LETTERING	PLASTIC TAPE & LABEL COLOR
Vacuum	1” White	VAC (Blk)	Green
Freon Liquid	1” Green (2 required)	RL (Blk)	Orange
Freon Suction	1” Green	RS (Blk)	Orange
Freon Hot Gas	2” Green	RG (Blk)	Orange
Ammonia Liquid	None	AML (Blk)	Yellow
Ammonia Suction	None	AMS (Blk)	Yellow
Ammonia Hot Gas	None	AMG (Blk)	Yellow
Sanitary Sewer	1” Black	SS (Blk)	White
Acid Sewer	1” Purple	AS (Blk)	White
Equipment Drains	2” Black	D (Blk)	White
All other Drains			Black
Wet Standpipe or Fire Main System	No Bands	Fire (White)	Black
Water Sprinkler	No Bands	SPR (White)	Red
Dry Standpipe	No Bands	SP (White)	Red
Electric Conduit	No Bands	E (white)	Blue
Fire Alarm Conduit	No Bands	FA (White)	Red
Telephone Conduit	1” White	TEL (White)	Blue
Oxygen	No Bands	OX	Black
Nitrogen	No Bands	NIT	Black
Vent	Brown	V	White

5. Equipment shall be identified with Brady tape type labels or engraved plates made of 3/32” thick laminated black bakelite with white core and include proper engraving.

Section 4: Exposure Reduction Practices

Exposure reduction practices are the set of techniques utilized in minimization of worker exposure. Techniques are selected on the basis of processes and substances in tasks. Exposure reduction practices are important elements in training employees for specific tasks and preparation of chemical hygiene plans.

1. Chemical Substitution

When possible, substitution of a less hazardous chemical or process will be used to reduce or eliminate chemical exposures.

2. Engineering Controls

Engineering controls are systems built into a facility for the purpose of fire and worker exposure prevention. Engineered controls of exposure are more desirable than Personal Protective Equipment (PPE). Whenever possible, chemical fume hoods and/or local exhaust ventilation will be used to reduce employee chemical exposures. Local exhaust ventilation is used to capture and exhaust chemical vapors or particles, preventing high exposures in the employee's breathing zone.

3. Administrative Controls

If engineering controls cannot be implemented, alteration of work practices will be used to reduce chemical exposures. This could include limiting the amount of time employees spend working in high exposure areas by rotating personnel.

4. Personal Protective Equipment (PPE)

Contact of the eyes or skin with chemicals will be prevented by the use of protective garments and equipment which are impervious to the chemicals used. The type of Personal Protective Equipment necessary will vary depending on the concentration, amount used, and the potential for splashing or violent reaction. It may include goggles, face shields, gloves, gowns, lab coats, aprons and arm sleeves. EHS can provide your area with guidance on the appropriate PPE. The NMHU Personal Protective Equipment Plan is available for guidance on selection of PPE.

Respirators. If employee chemical exposures are found to exceed the Permissible Exposure Limits, respirators will be provided until feasible engineering or administrative controls can be implemented. Respirator use and type will be determined by EHS, based on air monitoring results. If respirator use is necessary, employees must be medically cleared by the Environmental Health and Safety Committee to wear a respirator, and fit-tested and trained by EHS before using a respirator.

Employees, prior to each use, shall inspect all Personal Protective Equipment. Personal Protective Equipment must be stored in a clean and sanitary manner. Supervisors should inspect respirators each month to ensure they are being used, stored and cleaned properly.

5. Hygiene

To prevent the accidental ingestion of chemicals, eating, drinking and smoking are prohibited in areas where chemicals are used. In addition, employees must wash their hands after using chemicals.

6. Emergency Eyewash and Shower

If there is a possibility that chemicals may splash employees' eyes or skin, an emergency shower/drench hose and plumbed emergency eyewash should be provided in the work area. Employees must be instructed on the proper use of the eyewash and emergency showers. If employees' eyes or skin are splashed, the employee must flush them immediately and continue for 15 minutes. Employees should then seek medical attention. See Appendix B of the Chemical Hygiene Plan.

Section 5: Required Training Elements

Every University employee will receive a basic orientation to the Hazard Communication program. This training will be provided by EHS during New Employee Orientation and annually thereafter. It will include the following:

- requirements of the Standard;
- explanation of NMHU's Hazard Communication program, including labeling system, MSDSs and how employees can obtain hazard information;
- description of the various methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area;
- general guidance on the selection of protective measures to reduce chemical exposure;
- information on safety resources; and
- emergency procedures to be used in the event of accidental exposure to hazardous chemicals, including emergency phone numbers.

The general Hazard Communication training will be conducted at the time of the employee's initial assignment and annually thereafter.

5.1. Area-specific On-the-Job Training

In addition to the general Hazard Communication training, employees must be provided with area-specific on-the-job training. This training is to be conducted by the supervisor and will inform employees of the following:

- the location of NMHU's written Hazard Communication Program, the chemical inventory list and MSDSs for their work area;
- the specific physical and health hazards present in their work area;
- the operations in their work area where hazardous chemicals are used;
- the specific protective measures required when using the chemicals in their work area, including the procedures that have been implemented to protect them from exposure to hazardous chemicals;
- the specific methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area; and
- the location of eye washes and safety showers, to be used in the event of a chemical exposure.

Area-specific training will be conducted whenever a new hazard is introduced into the work area, when the employee transfers to another job and whenever the employee

demonstrates behavior that indicates a lack of understanding of the safe handling of chemicals.

Supervisors are responsible for ensuring that employees with potential exposure to hazardous chemicals receive the appropriate training before working with those chemicals. To ensure that supervisors are knowledgeable of their training responsibilities, EHS will conduct train-the-trainer courses and provide training templates for all supervisors.

5.2. Non-Routine Tasks

Supervisors must provide employees with the hazard information for non-routine tasks before they are performed. This includes reviewing the MSDSs and explaining the appropriate work practices to be followed. Standard Operating Procedures should be developed for hazardous activities that are not included in Appendix B of the Chemical Hygiene Plan

All training must be documented by the individual presenting the training session, and a copy of the training records shall be submitted to EHS.

Section 6: Special Requirements

6.1. Contractors

Contractors must show evidence of personnel training and that they follow environmental health and safety practices and regulations. Contractors must notify EHS when they plan to use paints, glues or similar chemicals in the vicinity of University employees. Upon request, the contractor is to provide EHS with a list of the hazardous chemicals and MSDSs for those chemicals that they are bringing into the University. The contractor may also be asked for a copy of their Hazard Communication Program and training documentation.

6.2 NMHU Notification to Contractors and their Employees

If chemicals are to be used by NMHU personnel in the same area that contractor employees are assigned, EHS and the appropriate NMHU Supervisor have the responsibility of informing the contractor employees of the potential hazards in the work area. EHS and/or the NMHU Supervisor will inform the contractor of:

- the hazardous chemicals to which they may be exposed while working in the area;
- precautionary measures the contractor employees should take to lessen the risk of exposure and the steps NMHU has taken to lessen the risks;
- the location of MSDSs for the products used by NMHU personnel;
- NMHU's written Hazard Communication program; and
- NMHU's chemical labeling system.

Section 7: Recordkeeping

7.1 Training

Individual employee training will be recorded. The record will be kept in the individual's departmental file for 5 years. A copy of the record will be held by EHS for 5 years. EHS records will be kept in lockable, fireproof filing cabinets.

7.2 Equipment Inspections

Records of inspections of equipment will be maintained for 5 years. NMHU EHS will keep data on annual fume hood monitoring. Fume hood monitoring data are considered maintenance records; as such, raw data will be kept for one year, and summary data for 5 years.

Section 8: References

In development

Section 9: Appendices

Appendix A: Particularly Hazardous Chemical List

Codes: CAR= CARCINOGEN **INH=**ACUTELY TOXIC WHEN INHALED **SKIN=**ACUTELY TOXIC WHEN ABSORBED **RT=**PEPRODUCTIVE TOXIN

Ö ?	CHEMICAL	CAS #	HAZARD	PRIOR APPROVAL
	ACENAPHTHENE, 5-NITRO-	602-87-9	CAR	
	ACETAMIDE, N-(4-(5-NITRO-2-FURYL)-2-THIAZOLYL)-	531-82-8	CAR	
	ACETAMIDE, THIO-	62-55-5	CAR	
	ACETIC ACID, CHLORO-	79-11-8	INH	YES
	ACETIC ACID, METHOXY((l-OXO-2-PROPENYL)AMINO)-, METHYL ESTER	77402-03-0	INH	YES
	ACETIC ACID, NITRILOTRI-	139-13-9	CAR	
	ACETONITRILE, HYDROXY-	107-16-4	SKIN	YES
	ACETONITRILE, PHENYL-	140-29-4	INH	YES
	ACETOPHENETIDIDE, p-	62-44-2	CAR	
	ACETYLAMINOFLURENE, 2-	53-96-3	CAR	
	ACROLEIN	107-02-8	INH	YES
	ACRYLAMIDE	79-06-1	CAR	
	ACRYLIC ACID, 2-(DIMETHYLAMINO)ETHYL ESTER	2439-35-2	INH	YES
	ACRYLIC ACID, ETHYL ESTER	140-88-5	CAR	
	ACRYLONITRILE	107-13-1	CAR	
	ALLYLAMINE	107-11-9	SKIN	YES
	ALUMINUM, CHLORODIISOBUTYL-	1779-25-5	INH	YES
	AMINODIPHENYL,4-	92-67-1	CAR	
	AMMONIUM SULFATE [Is this correct? Not so listed in catalogs. Perhaps sulfide?]	7783-20-2	INH	YES
	ANALINE,((5-CHLORO-8-HYDROXY-3-METHYL-l-OXO-7-ISOCHROMANYL)CARBONYL)-3-PHENYL-,	303-47-9	CAR	
	ANILINE, 4,4'-OXYDI-	101-80-4	CAR	
	ANILINE, 4,4'-THIODI-	139-65-1	CAR	

	ANILINE, N,N-DIMETHYL-p-PHENYLAZO-	60-11-7	CAR	
	ANILINE, P-CHLORO	106-47-8	CAR	
	ANISIDINE, 5-METHYL-,o-	120-71-8	CAR	
	ANTHRACENEDIONE, 1,4,5,8-TETRAAMINO-, 9,10-	2475-45-8	CAR	
	ANTHRAQUINONE, 1,8-DIHYDROXY-	117-10-2	CAR	
	ANTHRAQUINONE, 2-METHYL-1-NITRO-	129-15-7	CAR	
	ANTIMONY OXIDE	1309-64-4	CAR	
	ARSENIC	7440-38-2	CAR/RT	
	AZEPIN-2-ONE, HEXAHYDRO-, 2H-	105-60-2	INH	YES
	AZIRINO(2',3'3,4)PYRROLO(1,2-a)INDOLE-4,7-DIONE,CARBAMATE (ESTER)	50-07-7	CAR	
	AZOBENZENE	1103-33-3	CAR	
	BENZ(A)ANTHRACENE	56-55-3	CAR	
	BENZENAMINE, 4-((4-AMINOPHENYL)(4-IMINO-2,5-CYCLOHEXADIEN-1-YLIDENE)METHYL),MONOHYDROCHLORIDE	569-61-9	CAR	YES
	BENZENE	71-43-2	CAR/RT	
	BENZENE, (DICHLOROMETHYL)-	98-87-3	INH	YES
	BENZENE, 1,3-BIS(l-METHYLETHYL)-2-ISOCYANATO-	28178-42-9	INH	YES
	BENZENE, 2,4-DIISOCYANATO-1-METHYL-	584-84-9	INH	YES
	BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-	94-59-7	CAR	
	BENZENE,HEXACHLORO-	118-74-1	CAR	
	BENZENETHIOL	108-98-5	INH	YES
	BENZIDINE	92-87-5	CAR	
	BENZIDINE, 3,3'-DICHLORO-	91-94-1	CAR	
	BENZIDINE, 3,3'-DIMETHOXY-, DIHYDROCHLORIDE	20325-40-0	CAR	
	BERYLLIUM SULFATE, TETRAHYDRATE (114)	7787-56-6	CAR	
	BIPHENYLOL, 2-	90-43-7	CAR	
	BLEOMYCIN	11116-32-8	CAR	
	BLEOMYCIN, SULFATE	9041-93-4	CAR	
	BORON	7440-42-8	RT	

	BORON TRICHLORIDE	10294-34-5	INH	YES
	BROMIC ACID, POTASSIUM SALT	7758-01-2	CAR	
	BROMINE	7726-95-6	CAR	
	BUTADIENE, 1,3-	106-99-0	INH	YES
	BUTYL-N-NITROSO-1-BUTAMINE, N-	924-16-3	CAR/RT	
	BUTANE, (+-)-1,2,3,4-DIEPOXY-	298-18-0	CAR/INH	YES
	BUTANE, 1,2-EPOXY-	106-88-7	CAR	
	BUTANEDIOL, DIMETHANESULFONATE, 1,4-	55-98-1	CAR	
	BUTEN-2-ONE, 3-	78-94-4	INH	YES
	BUTENE, 1,4-DICHLORO-, (E)-,2-	110-57-6	INH	YES
	BUTENE, 2,3-DICHLOROHEXAFLUORO-, 2-	303-04-8	INH	YES
	BUTYRIC ACID	305-03-3	CAR	
	CADMIUM	7440-43-9	INH/RT	YES
	CADMIUM CHLORIDE	10108-64-2	CAR	
	CADMIUM OXIDE	1306-19-0	INH	YES
	CARBAMIC ACID, METHYL-, 2,3-DIHYDRO-2,2-DIMETHYL-7-BENZOFURANYLESTER	1563-66-2	INH	YES
	CARBAMOYL CHLORIDE, DIMETHYL-	79-44-7	CAR	
	CARBON TETRACHLORIDE	56-23-5	CAR/RT	
	CARBONOCHLORIDIC ACID, METHYL ESTER	79-22-1	INH	YES
	CARBOXYLIC ACID,3-beta,20-alpha-YOHIMBAN-16-beta-	50-55-5	CAR	
	CARRAGEENAN,DEGRADED	9000-07-1	CAR	
	CHLOROFORM	67-66-3	CAR	
	CHLOROMETHYL, METHYL ETHER	107-30-2	CAR/INH	YES
	CHLOROPRENE	126-99-8	RT/SKIN	YES
	CHOROETHYLENE (VINYL CHLORIDE)	75-01-4	CAR/RT	
	CHROMIC ACID, DIPOTASSIUM SALT	7789-00-6	CAR	
	CHROMIC SULFATE	10101-53-8	INH	YES
	CHROMIUM(VI) OXIDE (13)	1333-82-0	CAR	
	CHRYSENE, 5-METHYL-	3697-24-3	CAR	

	CHRYSENE, 6-NITRO-	7496-02-8	CAR	
	CINNAMIC ACID, 3,4-DIHYDROXY-	331-39-5	CAR	
	COBALT(2+) OXIDE	1307-96-6	CAR	
	COBALT(II) CHLORIDE	7646-79-9	CAR	
	COBALT, Dl-mu-CARBONYLHEXACARBONYLDI- , (Co-Co)	10210-68-1	INH	YES
	COUMARIN, 3-(alpha-ACETONYLBENZYL)-4-HYDROXY-	81-81-2	INH	YES
	CYANOGEN BROMIDE	506-68-3	INH	YES
	CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, GAMMA ISOMER	58-89-9	SKIN	YES
	CYCLOHEXANE, NITRO-	1122-60-7	INH	YES
	CYCLOHEXENE, 4-VINYL-1-	100-40-3	CAR	
	CYCLOPENTA©?FURO(3',2'4,5)FURO(2,3-h)(I)BENZOPYRAN- 1,11-DIONE	1162-65-8	CAR	
	CYCLOPENTADIENE, 1,2,3,4,5,5-HEXACHLORO-, 1,3-	77-47-4	INH	YES
	CYCLOSPORIN A	59865-13-3	CAR	
	DECABORANE(14)	17702-41-9	INH	YES
	DECYL ALCOHOL	112-30-1	INH	YES
	DIBENZ(a,h)ANTHRACENE	53-70-3	CAR	
	DIBENZO-p-DIOXIN, 2,3,7,8-TETRACHLORO-	1746-01-6	CAR	
	DIBROMO-3-CHLOROPROPANE,1,2-	96-12-8	CAR/RT	
	DIETHYLAMINE, HYDROCHLORIDE	55-86-7	CAR	
	DIMETHYLAMINE, N-NITROSO-	62-75-9	CAR/INH	YES
	DIMETHYLAMINOAZOBENZENE, 4-	60-11-7	CAR	
	DINITROGEN TETROXIDE	10544-72-6	INH	YES
	DIOXANE, p-	123-91-1	CAR	
	DIOXIN, 2,4,5-T- (TCDD)	1746-01-6	RT	
	DIPROPIONATE, 9-'CHLORO-1 6-beta-METHYL-11 -beta, 17,21-TRIHYDROXY-, 17,21-	5534-09-8	INH	YES
	DIPROPYLAMINE, N-NITROSO-	621-64-7	CAR	
	DISULFIDE, DIMETHYL	624-92-0	INH	YES
	ETHANE, 1,1,1-TRICHLORO-2,2-BIS(p- CHLOROPHENYL)-	50-29-3	CAR/RT	

	ETHANE, 1,1,1-TRICHLORO-2,2-BIS(p-METHOXYPHENYL)-	72-43-5	CAR	
	ETHANE, 1,1,2,2-TETRACHLORO-	79-34-5	CAR	
	ETHANE, 1,1,2-TRICHLORO-	79-00-5	CAR	
	ETHANE, 1,2-DIBROMO-	106-93-4	CAR/RT	
	ETHANE, 1,2-DICHLORO-	107-06-2	CAR	
	ETHANE,HEXACHLORO-	67-72-1	CAR	
	ETHANE, IODO-	75-03-6	INH	YES
	ETHANEDIAMINE, 1,2-	107-15-3	INH	YES
	ETHANOL, 2-CHLORO-	107-07-3	INH	YES
	ETHANOL, 2-FLUORO-	371-62-0	INH	YES
	ETHANOL, N-NITROSOIMINODI-	1116-54-7	CAR	
	ETHER, BIS(2-CHLOROETHYL)	111-44-4	CAR	
	ETHER, METHYL CHLOROMETHYL	107-30-2	CAR	
	ETHYL ISOCYANATE	109-90-0	INH	YES
	ETHYLAMINE,N-METHYL-N-NITROSO-	10595-95-6	CAR	
	ETHYLENE OXIDE	75-21-8	CAR/RT	
	ETHYLENE, 1,1-DICHLORO-2,2-BIS(p-CHLOROPHENYL)-	72-55-9	CAR	
	ETHYLENE, BROMO-	593-60-2	CAR	
	ETHYLENE, TETRACHLORO-	127-18-4	CAR	
	ETHYLENE, TRICHLORO-	79-01-6	CAR/RT	
	ETHYLENEIMINE	151-56-4	CAR	
	FLUORANTHENE, 3-NITRO-	892-21-7	CAR	
	FORMALDEHYDE	50-00-0	INH/CAR/RT	YES ?!
	FORMIC ACID, CHLORO-, ALLYL ESTER	2937-50-0	INH	YES
	FORMIC ACID, CHLORO-, ETHYL ESTER	541-41-3	INH	YES
	FURALDEHYDE, 5-NITRO-, SEMICARBAZONE, 2-	59-87-0	CAR	
	GLUCOPYRANOSE, 2-DEOXY-2-(3-METHYL-3-NITROSOUREIDO)-, D-	18883-66-4	CAR	
	GLUCOPYRANOSIDE, (METHYL-ONN-	14901-08-7	CAR	

	AZOXY)METHYL-, beta-D-			
	GLUTAMIC ACID	59-05-2	CAR	
	GOLD, (1-THIO-D-GLUCOPYRANOSATO)-	12192-57-3	CAR	
	GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-	70-25-7	CAR	
	HYDANTOIN, 1-((5-NITROFURFURYLIDENE)AMINO)-	67-20-9	CAR	
	HYDANTOIN, 5,5-DIPHENYL-	57-41-0	CAR	
	HYDRAZINE	302-01-2	CAR	
	HYDRAZINE, 1,1-DIMETHYL-	57-14-7	CAR	
	HYDRAZINE, METHYL-	60-34-4	INH	YES
	HYDROGEN PEROXIDE, 30%	7722-84-1	CAR	
	HYDROQUINONE	123-31-9	CAR	
	IMFERON	9004-66-4	CAR	
	IMIDAZOLE-4-CARBOXAMIDE, 5-(3,3-DIMETHYL-1-TRIAZENO)-	4342-03-4	CAR	
	IMIDAZOLIDINETHIONE, 2-	96-45-7	CAR/RT	
	IMIDAZOLIDINONE, 1-((5-NITROFURFURYLIDENE)AMINO)-, 2-	555-84-0	CAR	
	IOSYANATE, T-BUTYL	7188-38-7	INH	YES
	IRON PENTACARBONYL	13463-40-6	INH	YES
	ISOCYANATE, N-BUTYL	111-36-4	INH	YES
	ISOCYANIC ACID, 3,4-DICHLOROPHENYL ESTER	102-36-3	INH	YES
	ISOCYANIC ACID, METHYL ESTER	624-83-9	INH	YES
	ISOCYANIC ACID, METHYLENE(3,5,5-TRIMETHYL-3,1-CYCLOHEXYLENE)ESTER	4098-71-9	INH	YES
	ISOCYANIC ACID, METHYLENEDI-4,1-CYCLOHEXYLENE ESTER	5124-30-1	INH	YES
	ISOCYANIC ACID, METHYLENEDI-P-PHENYLENE ESTER	101-68-8	INH	YES
	ISONICOTINIC ACID HYDRAZIDE	54-85-3	CAR	
	ISOPROPYL ETHANE FLUOROPHOSPHONATE	1943-83-5	INH	YES
	LACTONITRILE	78-97-7	SKIN	YES
	LACTONITRILE, 2-METHYL-	75-86-5	SKIN	YES

	LEAD	7439-92-1	RT	
	MALEIMIDE, N,N'-(m-PHENYLENE)DI-	3006-93-7	CAR	
	MANGANESE	7439-96-5	RT	
	MANGANESE, (ETHYLENEBIS(DITHIOCARBAMATO))-	12427-38-2	CAR	
	MANGANESE, TRICARBONYL METHYLCYCLOPENTADIENYL	12108-13-3	INH	YES
	MELAMINE	108-78-1	CAR	
	MENTHA-6,8-DIEN-2-ONE, (S)-(+)-, p-	2244-16-8	SKIN	YES
	MERCURY	7439-97-6	RT	
	MERCURY, CHLOROMETHYL-	115-09-3	CAR	
	METHANE, BROMO-	74-83-9	CAR	
	METHANE, BROMODICHLORO-	75-27-4	CAR	
	METHANE, CHLORODIBROMO-	124-48-1	CAR	
	METHANE,CHLOROFLUORO-	593-70-4	CAR	
	METHANE, DICHLORO-	75-09-2	CAR	
	METHANE, TETRANITRO-	509-14-8	CAR/INH	YES
	METHANE, TRIBROMO-	75-25-2	CAR	
	METHANE, TRICHLORONITRO-	76-06-2	CAR	
	METHANESULFENYL CHLORIDE, TRICHLORO-	594-42-3	INH	YES
	METHANESULFONIC ACID, ETHYL ESTER	62-50-0	CAR	
	METHANESULFONIC ACID, METHYL ESTER	66-27-3	CAR	
	METHANOINDAN, 1,2,4,5,6,7,8,8-OCTACHLORO-3a,4,7,7a-TETRAHYDRO-, 4,7-	57-74-9	CAR	
	METHANOL, (METHYL-ONN-AZOXY)-, ACETATE (ester)	592-62-1	CAR	
	METHYL ISOTHIOCYANATE	556-61-6	INH/SKIN	YES
	METHYL SULFIDE	75-18-3	INH	YES
	MONOCROTALINE	315-22-0	CAR	
	MORPHOLINE	110-91-8	CAR	
	MORPHOLINE, N-NITROSO-	59-89-2	CAR	
	N-PROPYL ISOCYANATE	110-78-1	INH	YES
	NAPHTHALENEDIAMINE, 1,5-	2243-62-1	CAR	

	NAPHTHALENEDISULFONIC ACID, 1,3-	6459-94-5	CAR	
	NAPHTHALENEDISULFONIC ACID, 2,7-	2429-74-5	CAR	
	NAPHTHALENEDISULFONIC ACID, 3-HYDROXY-4-((4-SULFO-1-NAPHTHYL)AZO)-, TRISODIUM SALT, 2,7-	915-67-3	CAR	
	NAPHTHALENEDISULFONIC ACID, 3-HYDROXY-4-(2,4-XYLYLAZO)-DISODIUM SALT, 2,7-	3761-53-3	CAR	
	NAPHTHOL, 1-(2,4-XYLYLAZO)-, 2-	3118-97-6	CAR	
	NAPHTHOL, 1-(o-TOLYLAZO)-, 2-	2646-17-5	CAR	
	NAPHTHOL, 1-(PHENYLAZO)-, 2-	842-07-9	CAR	
	NAPHTHYLAMINE, 2-	91-59-8	CAR	
	.NAPHTHYLAMINE, alpha-	134-32-7	CAR	
	NAPHTHYLAMINE, beta-	91-59-8	CAR	
	NAPHTHYLAMINE, N-PHENYL-, 2-	135-88-6	CAR	
	NAPHTHYLAMINE,L-	134-32-7	CAR	
	NICKEL	7440-02-0	CAR	
	NICOTINE	54-11-5	SKIN	YES
	NICOTINE, SULFATE (21)	65-30-5	INH	YES
	NITRIC ACID	7697-37-2	INH	YES ?!
	NITRIC OXIDE	10102-43-9	INH	YES
	NITROBIPHENYL, 4-	92-93-3	CAR	
	NITROGEN DIOXIDE	10102-44-0	INH	YES
	NITROSODIMETHYLAMINE, N-	62-75-9	CAR	
	NITROUS ACID, SODIUM SALT	7632-00-0	INH	YES ?!
	NORBORNENE-2,3-DICARBOXYLIC ACID, 1,4,5,6,7,7-HEXACHLORO-,5-	115-28-6	CAR	
	OXABICYCLO(4.1.0)HEPTANE, 3-(EPOXYETHYL)-, 7-	106-87-6	CAR	
	OXETANONE, 2-	57-57-8	CAR/INH	YES
	PEROXYACETIC ACID	79-21-0	INH	YES
	PHENOL	108-95-2	CAR/INH	YES
	PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-	25013-16-5	CAR	
	PHENOL, 2,2'-METHYLENEBIS(3,4,6-TRICHLORO-	70-30-4	INH	YES

	PHENOL, 4,4'-ISOPROPYLIDENEDI-	80-05-7	INH	YES
	PHENOL, 4-AMINO-2-NITRO-	119-34-6	CAR	
	PHENOL, P-CHLORO-	106-48-9	INH	YES
	PHENOL, PENTACHLORO-	87-86-5	CAR/INH/ SKIN/EYES	
	PHENOTHIAZINE, 2-CHLORO-10-(3-(DIMETHYLAMINO)PROPYL)-,MONOHYDROCHLORIDE	69-09-0	INH	YES
	PHENYLENEDIAMINE, 4-CHLORO-, m	5131-60-2	CAR	
	PHENYLENEDIAMINE, 4-CHLORO-,o-	95-83-0	CAR	
	PHOSPHINE, PHENYL-	638-21-1	INH	YES
	PHOSPHONIC ACID, (2,2,2-TRICHLORO-1-HYDROXYETHYL)-DIMETHYL ESTER	52-68-6	CAR	
	PHOSPHONIC ACID, (2-CHLOROETHYL)-	16672-87-0	INH	YES
	PHOSPHONIC ACID, DIMETHYL ESTER	868-85-9	CAR	
	PHOSPHONIC DICHLORIDE, METHYL-	676-97-1	INH	YES
	PHOSPHONIUM, TETRABUTYL-, BROMIDE	3115-68-2	INH	YES
	PHOSPHONIUM, TETRABUTYL-, CHLORIDE	2304-30-5	INH	YES
	PHOSPHORANE, PENTACHLORO-	10026-13-8	INH	YES
	PHOSPHORIC ACID	7664-38-2	INH	YES ?!
	PHOSPHORIC TRIAMIDE, HEXAMETHYL-	680-31-9	CAR	
	PHOSPHOROCHLORIDIC ACID, DIETHYL ESTER	814-49-3	SKIN	YES
	PHOSPHOROCHLORIDOTHIOIC ACID, O,O-DIETHYL ESTER	2524-04-1	INH	YES
	PHOSPHORODICHLORIDOTHIOIC ACID, O-ETHYL ESTER	1498-64-2	INH	YES
	PHOSPHOROFLUORIDIC ACID, BIS(l-METHYLETHYL) ESTER	55-91-4	INH	YES
	PHOSPHORUS CHLORIDE	7719-12-2	INH	YES
	PHOSPHORUS OXIDE	1314-56-3	INH	YES
	PHOSPHORYL CHLORIDE	10025-87-3	INH	YES
	PHTHALIC ACID, BENZYL BUTYL ESTER	85-68-7	CAR	
	PICOLINIC ACID, 4-AMINO-3,5,6-TRICHLORO-	1918-02-1	CAR	
	PIPERIDINE, 1-NITROSO-	100-75-4	CAR	

	PLATINUM(II), DIAMMINEDICHLORO-, cis-	15663-27-1	CAR	
	PLUMBANE, TETRAETHYL-	78-00-2	CAR	
	POLYCHLORINATED BIPHENYLS	1336-36-3	CAR	
	POLYVINYL ALCOHOL	9002-89-5	CAR	
	PROPANE, 1,2-DICHLORO-	78-87-5	CAR	
	PROPANE, 1,2-EPOXY-	75-56-9	CAR	
	PROPANE, 1,2-EPOXY-3-PHENOXY-	122-60-1	CAR	
	PROPANE, 1-CHLORO-2,3-EPOXY-	106-89-8	CAR	
	PROPANE, 2-NITRO-	79-46-9	CAR	
	PROPANOL, 2,3-EPOXY-1-	556-52-5	CAR	
	PROPANONE, 1,1,3-TRICHLORO-, 2-	921-03-9	INH	YES
	PROPANONE, 1,3-DICHLORO-, 2-	534-07-6	INH	YES
	PROPANONE, 1-CHLORO-, 2-	78-95-5	INH	YES
	PROPENE, 1,3-DICHLORO-	542-75-6	CAR	
	PROPENE, 1-CHLORO-2-METHYL-	513-37-1	CAR	
	PROPENE, 3-CHLORO-2-METHYL-	563-47-3	CAR	
	PROPENE-1,1-DIOL, 2-METHYL-, DIACETATE, 2-	10476-95-6	SKIN	YES
	PROPYN-1-OL, 2-	107-19-7	SKIN	YES
	PURINE, 6-((l-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-	446-86-6	CAR	
	PYRAZ0LIDINEDIONE, 4-BUTYL-1,2-DIPHENYL-, 3,5-	50-33-9	CAR	
	PYRENE	129-00-0	INH	YES
	PYRENE, 1,3-DINITRO-	75321-20-9	CAR	
	PYRENE, 1,6-DINITRO-	42397-64-8	CAR	
	PYRENE, 1-NITRO-	5522-43-0	CAR	
	PYRIDINE, 2,6-DIAMINO-3-(PHENYLAZO)-, MONOHYDROCHLORIDE	136-40-3	CAR	
	PYROCATECHOL	120-80-9	CAR	
	PYRROLE-2,5-DIONE, 1,1'-(4-METHYL-1,3-PHENYLENE)BIS-, 1H-	6422-83-9	INH	YES
	PYRROLIDINE, 1-NITROSO-	930-55-2	CAR	

	PYRROLIDINONE, 1-CYCLOHEXYL-, 2-	6837-24-7	INH	YES
	QUINOLINE, 2-AMINO-3-METHYL-3H-IMIDAZO(4,5-f)	76180-96-6	CAR	
	QUINOLINOL, 8-	148-24-3	CAR	
	RESORCINOL, DIGLYCIDYL-	101-90-6	CAR	
	SELENIC ACID, DISODIUM SALT	13410-01-0	CAR	
	SERINE, DIAZOACETATE (ESTER)	115-02-6	CAR	
	SILANETRIAMINE, N,N,N',N',N",N"-HEXAMETHYL-	15112-89-7	INH	YES
	SILICA, AMORPHOUS FUMED	112945-52-5	CAR	
	SILICA, CRYSTALLINE – QUARTZ	14808-60-7	CAR	
	SODIUM AZIDE	26628-22-8	SKIN	YES
	SODIUM CHLORITE	7758-19-2	CAR	
	STILBENEDIOL, alpha,alpha'-DIETHYL-, 4,4-	56-53-1	CAR	
	STYRENE	100-42-5	CAR/RT	
	SULFONE, METHYL VINYL	3680-02-2	SKIN	YES
	SULFURIC ACID, DIETHYL ESTER	64-67-5	CAR	
	SULFURIC ACID, DIMETHYL ESTER	77-78-1	INH	YES
	SULFURYL CHLORIDE	7791-25-5	INH	YES
	TANNIC ACID	1401-55-4	CAR	
	TECRAETHYL DITHIOPYROPHOSPHATE	3689-24-5	INH	YES
	TETRETHYL PYROPHOSPHATE	107-49-3	INH	YES
	THIAZOLE, 2-AMINO-5-NITRO-	121-66-4	CAR	
	THIOPHENE, 2,3,4,5-TETRACHLORO-	6012-97-1	INH	YES
	THIOPHOSPHORYL CHLORIDE	3982-91-0	INH	YES
	THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER	3689-24-5	INH	YES
	TITANIUM CHLORIDE (TiCl4)	7550-45-0	INH	YES
	TOLUENE, alpha,alpha,alpha-TRICHLORO-	98-07-7	INH	YES
	TOLUENE, alpha-CHLORO-	100-44-7	INH	YES
	TOLUENE-2,4-DIAMINE	95-80-7	INH	YES
	TOLUIDINE, 4-(o-TOLYLAZO)-, o-	97-56-3	CAR	

	TOLUIDINE, 5-NITRO-, o-	99-55-8	CAR	
	TOXAPHENE	8001-35-2	CAR	
	TRIAZIN-2(lH)-ONE, 4-AMINO-1-beta-D-RIBOFURANOSYL-, s-	320-67-2	CAR	
	TRIAZINE, 2,4,6-TRIFLUORO-,s-	675-14-9	INH	YES
	TRIAZINE, 2,4,6-TRIS(ALLYLOXY)-, s-	101-37-1	INH	YES
	TRIAZINE, 2-CHLORO-4-ETHYLAMINO-6-ISOPROPYLAMINO-, s-	1912-24-9	CAR	
	TRIAZOLE, 3-AMINO-, s-	61-82-5	CAR	
	TRICHLOROACETYL CHLORIDE	76-02-8	CAR	
	TRICHOTHEC-9-ENE-3-alpha,4-beta,8-alpha,15-TETROL,12,13-EPOXY-	21259-20-1	INH	YES
	TRIETHYLAMINE, 2,2',2"-TRICHLORO-, HYDROCHLORIDE	817-09-4	CAR	
	UCON 50-HB-5100	9038-95-3	INH	YES
	UNDECANOIC ACID, 11 –AMINO-	2432-99-7	CAR	
	URACIL, 5-(BIS(2-CHLOROETHYL)AMINO)-	66-75-1	CAR	
	URACIL, 5-FLUORO-	51-21-8	CAR	
	URACIL, 6-PROPYL-2-THIO-	51-52-5	CAR	
	UREA, 1,1-DIMETHYL-3-(alpha,alpha,alpha-TRIFLUORO-m-TOLYL)-	2164-17-2	CAR	
	UREA, 1-(2-CHLOROETHYL)-3-(4-METHYLCYCLOHEXYL)-l-NITROSO-	13909-09-6	CAR	
	UREA, 1-(2-CHLOROETHYL)-3-CYCLOHEXYL-1-NITROSO-	13010-47-4	CAR	
	UREA, l-ETHYL-1-NITROSO-	759-73-9	CAR	
	UREA, 2-THIO-	62-56-6	CAR	
	UREA, 3-(p-CHLOROPHENYL)-1,1-DIMETHYL-	150-68-5	CAR	
	UREA, N-METHYL-N-NITROSO-	684-93-5	CAR	
	VALINOMYCIN	2001-95-8	SKIN	YES
	XANTHEN-7-ONE, 7H-FURO(3',2'4,5)FURO(2,3-c)	10048-13-2	CAR	
	XYLIDINE, 2,6	87-62-7	CAR	
	ZINC, BIS(DIMETHYLDITHIOCARBAMATO)-	137-30-4	CAR/INH	YES

Criteria Used To Develop The PHC List

A chemical is considered to be a carcinogen if:

- it has been evaluated by the International Agency for Research on Cancer (IARC) and found to be a carcinogen or potential carcinogen or:
- it is listed as a carcinogen or potential carcinogen in the *Annual Report on Carcinogens* by the National Toxicology Program (NTP) or:
- it is regulated by OSHA as a carcinogen

A chemical is considered to be acutely toxic by inhalation if it has a median lethal concentrated (LC50) in air of 200 parts per million by volume or less of gas or vapor or two milligrams per liter when administered by continuous inhalation for one hour to albino rats weighing between 200 and 300 grams.

A chemical is considered to be acutely toxic when absorbed through the skin if it has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours with bare skin of albino rabbits weighing between two and three kilograms each.

A chemical is considered to be a reproductive toxin if it appears on the Florida State University Reproductive Toxin List (1995).

Note: If the literature indicates that a chemical which your are working with should be considered a PHC, but is not included on this PHC list, contact EHS. This list is not all inclusive.

Appendix B: Health Hazard Definitions

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, which is 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, such as irritation, corrosivity, sensitization and lethal dose, referred to most frequently are those defined by the American National Standards Institute (ANSI) standard for Precautionary Labeling of Hazardous Industrial Chemicals (Z129.1-1988). 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 narcosis.

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

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 to be protected from them.

For purposes of this section, any chemicals which meet any of the following definitions, as determined by the criteria set forth in (see Section 3.1.b), are health hazards. However, this is not intended to be an exclusive categorization scheme. If there are available

scientific data that involve other animal species or test methods, it must also be evaluated to determine the applicability of the HCS.

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 is found to be a carcinogen or potential carcinogen; or

b. It is listed as a carcinogen or potential carcinogen in the latest edition of the *Annual Report on Carcinogens* published by the National Toxicology Program (NTP); 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 Attachment 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 (4) hours. This term shall not refer to action on inanimate surfaces.

3. Highly Toxic

A chemical is considered to be highly toxic if it falls 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 (2) and three (3)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 two (2) milligrams per liter or less of mist, fume or dust when administered by continuous inhalation for one (1) hour (or less if death occurs within one (1) 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 is considered an irritant. 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 (4) hours exposure or by other

appropriate techniques, it results in an empirical score of five (5) 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 is considered a sensitizer.

6. Toxic

A chemical is considered toxic if it falls 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 (2) and three (3) 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 (2) milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for one (1) hour (or less if death occurs within one (1) 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, symptoms and chemicals which have been found to cause such effects. These examples are presented to illustrate the range and diversity of effects and hazards found in the workplace, and the broad scope employers must consider in this area, but are not intended to be all-inclusive.

a. *Hepatotoxins:* Chemicals which produce liver damage *Signs and Symptoms:* Jaundice; liver enlargement *Chemicals:* Carbon tetrachloride; nitrosamines

b. *Nephrotoxins:* Chemicals which produce kidney damage *Signs and Symptoms:* Edema; proteinuria *Chemicals:* Halogenated hydrocarbons; uranium

c. *Neurotoxins:* Chemicals which produce primary toxic effects on the nervous system *Signs and Symptoms:* Narcosis; behavioral changes; decrease in motor functions *Chemicals:* Mercury; carbon disulfide

d. *Agents which act on the blood or hematopoietic system:* Chemicals which 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 pulmonary tissue *Signs and Symptoms:* Cough; tightness in chest; shortness of breath *Chemicals:* Silica; asbestos

f. *Reproductive Toxins:* Chemicals which affect the reproductive capabilities, including chromosomal damage (mutations) and effects on fetuses (teratogenesis) *Signs and Symptoms:* Birth defects; sterility *Chemicals:* Lead; DBCP

g. *Cutaneous Hazards:* Chemicals which affect the dermal layer of the body *Signs and Symptoms:* Defatting of the skin; rashes; irritation *Chemicals:* Ketones; chlorinated compounds

h. *Eye Hazards:* Chemicals which affect the eye or visual capacity *Signs and Symptoms:* Conjunctivitis; corneal damage *Chemicals:* Organic solvents; acids

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

1. Carcinogenicity: As determined by the National Toxicology Program, the International Agency for Research on Cancer, and OSHA. In addition, all available scientific data on carcinogenicity must be evaluated in accordance with provisions set by the university.

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.

4. Adequacy and reporting of data: The results of any studies, that 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 (MSDS). In vitro studies alone generally do not form the basis for a definitive finding of hazard under the HCS since they have a positive or negative result rather than a statistically significant finding. The chemical manufacturer, importer or employer may also report the results of other scientifically valid studies that tend to refute the findings of hazard.