George Mason University
Hazard Communication Plan

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Environmental Health and Safety Office
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Acronyms

CFR	Code of Federal Regulations
EHS	Environmental Health and Safety Office
GHS	Globally Harmonized System
HCS	Hazard Communication Standard (29 CFR 1910.1200)
JSA	Job Safety Analysis
SDS	Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
VAC	Virginia Administrative Code
VOSH	Virginia Occupational Safety and Health

Foreword

George Mason University is required by U.S. Code of Federal Regulations (CFR) Section 29 1910.1200 and Virginia Administrative Code (VAC)16 VAC 25-60-160 to design a written hazard communication program that establishes the mechanisms and methods that George Mason University uses to minimize the risk of chemical exposure to employees.

The following document outlines George Mason University's *Hazard Communication Plan* and describes specific policies and procedures designed to satisfy federal and state safety requirements. The components and information required and contained within this document are consistent with the provisions of the Virginia Occupational Safety and Health Office (VOSH), the federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS), and the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS). Those key components include a written hazard communication program, hazard classification, safety data sheets (SDS), employee information and training, container labeling, and other forms of warning.

Document History

Version	Date	Comments
1	August 2008	Initial *Hazard Communication Program*
2	February 2013	Revised *Hazard Communication Plan* with the inclusion of the Globally Harmonized System

This *Hazard Communication Plan* is reviewed annually and amended as necessary and whenever:

- Applicable regulations are revised;
- An employee or contractor is exposed or injured while working with a hazardous chemical;
- A hazardous chemical is involved in a "near-miss" accident; or
- Property or the environment is negatively impacted by a hazardous chemical.

All revisions to this *Hazard Communication Plan* will be shared with the parties identified in this document.

1.0 Introduction

VOSH adopts, by statute, the OSHA Hazard Communication Standard (HCS) 29 CFR 1910.1200. OSHA requires that employers that possess hazardous chemicals in the work area maintain a written hazard communication program that provides for proper employee training, proper chemical container and vessel labeling, and maintenance and availability of SDS for employees who work with hazardous chemicals.

1.1 Purpose

The purpose of George Mason University's *Hazard Communication Plan* is to establish a workplace program that provides guidance on how to safely manage chemicals and communicate the hazards associated with chemicals used in the workplace through training employees on SDS, hazard classification, labels and other forms of warning.

1.2 Scope

George Mason University's *Hazard Communication Plan* applies to any chemical which is known to be present or used in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency. A hazardous chemical is defined as any chemical which presents a physical or health hazard. This program will be implemented for all nonlaboratory employees that routinely use (i.e., package, handle, react, or transfer) hazardous chemicals including those in sealed containers which are not opened under normal conditions. Laboratory activities are regulated by the Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450). For more information on chemical safety in George Mason University laboratories, contact the Environmental Health and Safety Office (EHS) or visit the EHS website (http://www.ehs.gmu.edu).

This program does not apply to the following substances:

- Hazardous waste as defined by the Resource Conservation and Recovery Act;
- Hazardous substances covered under the Comprehensive Environmental Response Compensation, and Liability Act;
- Tobacco or tobacco products;
- Wood or wood products;
- Food or alcoholic beverages;
- Drugs regulated by the Food and Drug Administration;
- Cosmetics;
- Consumer products as defined in the Consumer Product Safety Act and Federal Hazardous Substances Act;
- Ionizing and nonionizing radiation; and
- Biological hazards.

2.0 Roles and Responsibilities

Each employee who works with hazardous chemicals is responsible for following the guidance provided within this document. All employees are expected to adhere to information provided during *Hazard Communication Training*, information provided in SDS, or other safety information readily available and related to the hazardous chemical in use. The following entities have specific responsibilities for implementing the *Hazard Communication Plan*.

2.1 Environmental Health and Safety Office

EHS is responsible for designing, implementing, overseeing, and updating the *Hazard Communication Plan*. EHS works collaboratively with various departments and individuals to implement and maintain the *Hazard Communication Plan* as applicable. Specific responsibilities are to:

- Design and revise the *Hazard Communication Plan* as necessary.
- In conjunction with George Mason University supervisors, identify areas where hazardous chemicals are used.
- Serve as George Mason University's primary point of contact with local, state, and federal officials with regard to the *Hazard Communication Plan*.
- Design and provide training that satisfies HCS requirements and maintain *Hazard Communication Training* records.
- Inspect work areas to evaluate compliance with the *Hazard Communication Plan*.
- Provide technical assistance to employees to support the *Hazard Communication Plan* and George Mason University safety programs.
- Conduct JSA to define and control the usage of hazardous chemicals, and recommend appropriate engineering, administrative, or physical controls (e.g. PPE).
- Coordinate medical surveillance when deemed necessary.
- Work with supervisors to place a *Right-To-Know Station(s)* that contains chemical inventory lists, SDS, contact information, and other resources in an area that is conspicuous and convenient to employees.

2.2 Supervisors

Supervisors who oversee the daily operations and safety of personnel have specific responsibilities under the *Hazard Communication Plan*. For the work area(s) and employees for whom they are responsible, supervisor responsibilities are to:

- Identify all hazardous chemicals within the work area(s) that they oversee.
- Compile and maintain a current list of hazardous chemicals used or stored within the work area(s) that they oversee and ensure that it is available at *Right-To-Know Station(s)* and updated at http://www.msdsonline.com.
- Review chemical inventory at least annually.
- Work with EHS to place a *Right-To-Know Station(s)* that contains SDS, contact information, and other resources in an area that is conspicuous and readily accessible to

employees. Ensure that the information provided in the *Right-To-Know Station* is accurate and current.

- Collect and maintain SDS for each hazardous chemical used or stored within their work area(s) and ensure that it is available to employees at a *Right-To-Know Station*.
- Maintain all chemical inventory forms and SDS required by George Mason University's *Hazard Communication Plan* for their work area(s), ensure information is accurate, and keep these documents on file.
- Identify employees under their supervision that work with hazardous chemicals.
- Ensure all employees that work with hazardous chemicals receive *Hazard Communication Training* from EHS within 30 days of hire and have access to safety resources mandated by the *Hazard Communication Plan*.
- Ensure that all employees under their supervision have access to appropriate PPE and safety equipment that can be used to prevent or minimize exposure to hazardous chemicals.
- Review nonroutine tasks that involve hazardous chemicals with the employees, explain precautions and appropriate steps to take to eliminate or minimize hazards, ensure that the correct safety equipment and PPE are available, and monitor periodically to make sure it is used properly.
- Provide employees with chemical-specific information in their work area(s) at the time of their initial assignment, and whenever a new physical or health hazard which the employees have not previously been informed of is introduced into their work area.

2.3 Employees

George Mason University employees who work with hazardous chemicals on a routine and nonroutine basis are expected to comply with George Mason University's *Hazard Communication Plan*. Employees not directed by their supervisor to attend *Hazard Communication Training* but expect to work with hazardous chemicals should contact EHS to review their work activities and use of hazardous chemicals and receive training if necessary. Employee responsibilities are to:

- Attend *Hazard Communication Training* within 30 days of hire if their work involves the use, application, or storage of hazardous chemicals.
- Follow the directives and guidance provided in this *Hazard Communication Plan*.
- Review SDS prior to using hazardous chemicals and follow the recommendations provided.
- Notify their supervisor if SDS are unavailable, or retrieve them and place them on file.
- Ensure that hazardous chemical containers are properly labeled and that all immediate use containers (temporary containers) are used appropriately.
- Notify EHS if dangerous work conditions are observed, the *Hazard Communication Plan* is not followed, and following any accident or harmful exposure to a hazardous chemical(s) (after appropriate steps are taken to treat or eliminate the harmful situation).
- Know the location of the *Right-To-Know Station(s)* for their work area(s).
- Review nonroutine tasks that involve hazardous chemicals with their supervisor to ensure that appropriate safety equipment and PPE are available and used correctly.

2.4 Project Managers and Contract Administrators

George Mason University is required to make sure that contractors working on university property that have the potential to be exposed to hazardous chemicals:

- Have access to SDS for each hazardous chemical used in their work area;
- Are informed of precautionary measures that need to be taken to protect contractors during normal operations or emergencies in their work area; and
- Are informed of George Mason University's hazardous chemical labeling system.

In order to comply with this requirement, specific responsibilities of Project Managers and Contract Administrators (when applicable) are to:

- Inform contractors of the presence of hazardous chemicals in the work area.
- Provide a copy of the *Hazard Communication Plan* to all contractors to inform them of George Mason University's hazardous chemical labeling system and location of SDS and other relevant hazard communication information.
- Inform contractors of the *Right-To-Know Station(s)* in their work area(s).
- Inform contractors of any precautionary measures that need to be taken to protect employees during normal operating conditions and in foreseeable emergencies.
- Verify contractors have copies of SDS onsite prior to performing jobs that call for the handling and use of hazardous chemicals/products.

Contract end users responsible for overseeing contract employees or projects must also ensure that all relevant health and safety regulations and George Mason University safety policies are followed. For assistance or additional information contact EHS.

2.5 Contractors

Contractors who use hazardous chemicals on George Mason University premises are required to operate under a hazard communication program designed and implemented by their employer pursuant with the HCS. Contractors must inform or provide to the George Mason University Project Manager, Contract Administrator, or end user the following:

- The presence of hazardous chemicals that will be brought to and used within George Mason University employee work areas;
- A copy of the contractor's chemical inventory or list of the hazardous chemicals they will bring on-site (prior to chemicals being brought on site);
- Hard copies of SDS associated with hazardous chemicals/products they will be using onsite; and
- Any precautionary measures that need to be taken, with respect to the hazardous chemicals brought to the work area, to protect George Mason University employees during normal operating conditions and foreseeable emergencies.

In addition, the contractor will maintain SDS at the work site(s) for all hazardous chemicals that they use during the course of their work at George Mason University. The contractor will also

manage, label, or otherwise mark containers that contain hazardous chemicals in a manner that is consistent with HCS regulations 29 CFR 1910.1200.

3.0 Hazard Communication Training

In accordance with OSHA regulations, George Mason University's *Hazard Communication Training* addresses the following subjects:

- The requirements of the HCS, 29 CFR 1910.1200;
- A method for identifying operations or activities in the work area that are subject to HCS regulations;
- The location and availability of George Mason University's written *Hazard Communication Plan*;
- Methods that can be used to detect the presence or release of hazardous chemicals in the work area;
- Methods for identifying chemical hazards and familiarizing employees with the physical and health hazards associated with chemicals in the work area;
- Measures and actions employees can take to protect themselves from chemical hazards.
- Conditions under which contractors must be involved or participate in George Mason University's *Hazard Communication Plan*; and
- Details specific to the *Hazard Communication Plan* developed by George Mason University that serve to enhance protection including container labeling, warning signage, and work practices.

3.1 Employee Information and Training

Employees must attend *Hazard Communication Training* provided by EHS within 30 days of employment. EHS will provide *Hazard Communication Training* on a routine basis and/or upon request. In addition, employees that use hazardous chemicals during the course of their work must receive chemical-specific information from their supervisors in relation to their job function for their work area(s) at the time of their initial assignment, and whenever a new hazardous chemical is introduced into their work area(s).

3.2 Nonroutine Tasks

Before employees begin a nonroutine work task that involves a hazardous chemical(s), the supervisor must review the associated hazards with the employees and ensure that appropriate safety equipment and PPE are available and used correctly. Each review of a nonroutine work task that involves hazardous chemicals must be documented using the *Non-Routine Work Task Review Form* (attached). If additional PPE, safety information, or technical guidance is required please contact EHS to schedule an appointment prior to beginning work if assistance is required.

Supervisors must observe the following steps before employees begin a nonroutine work task that involves hazardous chemicals:

- Obtain and review the SDS for all chemicals that will be used during the work task. If possible, substitute nonhazardous substances for hazardous chemicals.
- Explain to employees the hazardous chemicals that may be encountered during the task.

- Explain precautions to take to reduce hazards, ensure that the appropriate PPE is available, and that employees know how to use it properly.
- Explain emergency procedures of what to do in the event that an incident occurs.
- Ensure that safety equipment is present and operating correctly, if required.
- Contact EHS for assistance in interpreting and evaluating exposure data, determining its applicability to a work task, or to test an environment for exposure levels.
- Document the chemical review on the *Non-Routine Work Task Review Form*. EHS provides a *Safety Records* binder to assist supervisors in filing and maintaining required safety records.

4.0 Right-To-Know Stations

OSHA regulations require employers to maintain the following documentation: a written hazard communication program, SDS, and chemical inventories in work areas where hazardous chemicals are used or stored. To assist departments with this requirement, EHS provides supplies for *Right-to-Know Station(s)* for each relevant work area. Supervisors should work with EHS to place a *Right-To-Know Station(s)* in areas that are conspicuous and convenient to the employees under their supervision. Each *Right-To-Know Station* will contain SDS binders which contains a written copy of this *Hazard Communication Plan*. Specific components of the *Right-To-Know Station* are outlined in the following sections.

4.1 Safety Data Sheet (SDS) and Storage Binders

SDS binders are provided for storage of SDS for all hazardous chemicals used or stored within a work area. SDS should accompany each chemical delivered to George Mason University. If a SDS is not provided by the manufacturer or shipper, the supervisor must make a reasonable effort to obtain the SDS as soon as possible. The manufacturer's name and address is located on the chemical container label. SDS may be downloaded, requested from the manufacturer, received by fax, or copied so long as they accurately match the chemical. For assistance obtaining SDS, contact EHS.

The following rules must be observed when filing SDS:

- SDS binders must be located at the *Right-To-Know Station*.
- SDS must be placed in a binder that is clearly marked "Safety Data Sheets" or "SDS."
- SDS must be in English; additional copies in other languages may be on file.
- SDS must be filed alphabetically by chemical or common name.
- All employees, both George Mason University employees and contract employees, must be provided with unrestricted access to SDS whenever or wherever they work with hazardous chemicals.

For additional assistance interpreting SDS health and safety information please refer to the Glossary of Safety Data Sheet Terms (attached).

4.2 *Hazard Communication Plan*

A copy of the *Hazard Communication Plan* is provided in the SDS binder. George Mason University's written *Hazard Communication Plan* can be found on the EHS website (http://www.ehs.gmu.edu).

4.2.1 Hazardous Chemical Inventories

Each work area, unit, or building is required to maintain an inventory of the hazardous chemicals in storage and use. Supervisors or designated persons are responsible for ensuring that hazardous chemical inventories are completed, accurate, updated annually, and are on file and

available to employees and EHS. The hazardous chemical inventory must contain at least the following information:

- Chemical name, trade name, or the common name used on the SDS and/or container label;
- The chemical manufacturer's name;
- Location of the chemical; and
- Date that the chemical was placed in inventory.

OSHA regulation 29 CFR 1910.1020(d)(1)(ii)(B) requires that employers maintain a list of chemicals that includes the chemical name, location, and time period when the chemical was used for 30 years from the date of use. Chemical inventories must be routinely updated to capture changes in inventory. Procedures for maintaining hazardous chemical inventories may vary by department based on activities, structure, and personnel. Please contact EHS for guidance or assistance with maintaining a hazardous chemical inventory.

4.2.2 Non-Routine Work Task Review Form

Before employees begin a work task that involves a hazardous chemical(s) that has not been used before or that employee has not been previously trained on, the supervisor must review the chemical hazards with the employees and ensure that appropriate safety equipment and PPE are available and used correctly. Each review of a nonroutine work task that involves hazardous chemicals must be documented using the *Non-Routine Work Task Review Form* (attached). This form shall be maintained and kept on file by the supervisor.

4.2.3 Hazardous Chemical Container Labels

Self-adhesive hazardous chemical container labels for use as described in Section 4.2.4 are provided by EHS and can be requested by emailing safety@gmu.edu.

4.2.4 Hazardous Waste Labels

Hazardous waste labels are provided by EHS and should be requested by emailing safety@gmu.edu. These labels must be filled out completely and affixed to the hazardous chemical container to be disposed. All hazardous waste must meet the following conditions:

- Containers must be in good condition, free of damage, with a tight cap or lid.
- Each container must be labeled with a label that has the following information:
    - "Hazardous Waste" imprinted on the label;
    - The complete chemical name(s) of the chemical(s) within the container. No abbreviations or acronyms; and
    - The date the container was determined to be hazardous waste.

Once the waste is properly labeled it must be moved to a satellite accumulation area or central storage area where it will be managed by EHS staff in accordance with federal and state hazardous waste regulations. For additional information regarding hazardous waste, contact EHS or visit

http://www.ehs.gmu.eduC:\Users\loreill1\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\3JE0PKR5\www.ehs.gmu.edu.

5.0 Labeling and Warnings

OSHA requires that manufacturers, distributors, employers, and employees observe specific requirements for container labeling and posting warning signage.

5.1 Manufacturer's Container Labels

All containers delivered to George Mason University that contain hazardous chemicals should be labeled and marked with the manufacturer's labels and warnings. Manufacturer's labels and warnings must contain the following:

- Signal words;
- Hazard statements;
- Precautionary statements ;
- Pictograms;
- Product identifier; and
- Supplier identification.

Under no conditions may the manufacturer's label be defaced, removed, covered up, or otherwise obstructed so long as the container contains the corresponding hazardous chemical. Once the container is empty, the label should be removed or otherwise obstructed to prevent the false representation of a hazard.

5.2 Container Labeling and Labels

Hazardous chemicals should remain in the manufacturer's container throughout the use of that container. However, if this is not feasible and the hazardous chemical must be transferred to another container, or if one or more hazardous chemicals are mixed in a container, the container must be labeled with the following:

- Complete chemical name, trade name, or common name found on the SDS;
- The chemical name written in English and clearly legible;
- Appropriate hazard warning, or alternatively, words, pictures, symbols, or combination thereof which provides at least general information regarding the hazards of the chemicals; and
- If an employee who is expected to use the hazardous chemical does not speak English, additional labels provided in the appropriate language that accurately reflects the hazards associated with the chemical.

All chemical containers must have a label attached to them that communicates the hazards of that chemical to the user. Hazardous chemical container labels can only be printed by supervisors, safety liaisons, or employees who possess manager privileges to the MSDSOnline.com George Mason account. For assistance with this process, please refer to the instructions at http://www.ehs.gmu.edu or contact EHS.

5.3 Containers for Immediate Use (Temporary Containers)

Portable containers to which hazardous chemicals are transferred for immediate use by the employee who performed the transfer are not required to be labeled. However, these containers may not be used by any employee other than the employee who transferred the material and may not remain filled after use. All portable unmarked containers must be emptied back into the original container, disposed of accordingly, or labeled in accordance with the *Hazard Communication Plan* when the contents are no longer in use.

6.0 Personal Protection

George Mason University uses three different methods to control employee exposure to hazardous chemicals: engineering controls, administrative controls, and PPE. Supervisors, with the assistance of EHS, are expected to implement engineering controls and administrative controls before relying upon physical controls to protect employees from exposure to hazardous chemicals.

6.1 Engineering Controls

Engineering controls are mechanical solutions that eliminate or reduce exposure to chemical hazards through the use or substitution of engineered machinery or equipment such as ventilation, screens, intrinsically-safe applicators, guards, and automated safety equipment. Engineering controls will be used wherever possible to reduce exposure to hazardous chemicals.

6.2 Administrative Controls

Administrative controls are work procedures, such as written safety policies, rules, supervision, and training, with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations. *Hazard Communication Training* is the most fundamental administrative control used to prevent employee exposure to hazardous chemicals. All employees that use hazardous chemicals during the course of their work are required to attend *Hazard Communication Training*. This training program is designed to educate employees on how to identify chemical hazards and protect themselves from harmful exposure.

6.3 Personal Protective Equipment (PPE)

PPE is safety equipment used to protect an individual in the event that administrative controls or engineering controls are insufficient. PPE serves as a physical control to prevent or minimize the exposure to hazardous chemicals. Examples of PPE are safety gloves, eye protection, respiratory protection, protective clothing, and uniforms. Any employee expected to work with hazardous chemicals must review the SDS to determine what PPE is required to be worn. Supervisors must review nonroutine and routine work tasks to ensure that employees are provided with and use appropriate PPE.

7.0 Recordkeeping

The maintenance of documentation, both mandatory and nonmandatory, should be of great importance to employers. Supervisors must ensure that all records are kept for the specified time period and destroyed according to schedule as well.

7.1 Safety Data Sheets (SDS)

SDS for current chemicals in the workplace shall be maintained by the supervisor for as long as that chemical is in use. Once SDS have become obsolete, modified, or no longer in use, SDS will be retained by the supervisor for a period of 30 years. When transferring obsolete or modified SDS out of your active files, be sure to date the SDS to document when the product was no longer used and when your employees were no longer exposed to the product.

7.2 Non-routine Work Task Review Forms

Non-routine Work Task Review Forms will be documented and retained on file by the supervisor for no more than one year from the date the form was completed. A copy must be forwarded to EHS Department at the following address: safety@gmu.edu.

8.0 Program Evaluation

This plan will be reviewed by EHS, incorporating feedback from the supervisors and employees enrolled in the program. Revisions will be made as necessary to reflect changes in George Mason University policies, industry standards, and government regulations.

Appendix A
Definitions

Chemical: Any substance, or mixture of substances.

Chemical name: 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 that will clearly identify the chemical for the purpose of conducting a hazard classification.

Classification: To identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this section. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

Common name: 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.

Container: 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, engines, fuel tanks, or other operating systems in a vehicle, are not considered to be containers.

Employee: A person who works for the university full-time or part-time and is paid through the university's payroll system or receives compensation in any form from the university.

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

Exposure or exposed: An employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g. accidental or possible) exposure. "Subjected" in terms of health hazards includes any route of entry (e.g. inhalation, ingestion, skin contact, or absorption.)

Hazard category: The division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard not otherwise classified (HNOC): An adverse physical or health effect identified through evaluation of scientific evidence during the classification process that does not meet the specified criteria for the physical and health hazard classes addressed in this document. This does not extend coverage to adverse physical and health effects for which there is a hazard class, but the effect either falls below the cut-off value/concentration limit of the hazard class or is under a GHS hazard category that has not been adopted by OSHA (e.g., acute toxicity Category 5).

Hazardous chemical: Any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Hazard class: The nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.

Hazard statement: A statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

Hazard warning: Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s). (See the definitions for "physical hazard" and "health hazard" to determine the hazards which must be covered.)

Health hazard: A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in Appendix A to §1910.1200 – Health Hazard Criteria.

Immediate use: 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.

Label: An appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

Label elements: The specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.

Mixture: A combination or a solution composed of two or more substances in which they do not react.

Nonroutine work task: A task that the employee does not normally perform and for which the employee has not previously been trained. Examples of nonroutine work tasks are confined space entry and removing chemical residue from floors after a spill.

Physical hazard: A chemical that is classified as posing one of the following hazardous effects: explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid, or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. See Appendix B to §1910.1200 – Physical Hazard Criteria.

Pictogram: A composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

Precautionary statement: A phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Product identifier: The name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used must permit cross-references to be made among the list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

Pyrophoric gas: A chemical in a gaseous state that will ignite spontaneously in air at a temperature of 130 degrees F (54.4 degrees C) or below.

Safety data sheet: Written or printed material concerning a hazardous chemical that is prepared in accordance with §1910.1200 paragraph (g) of the HCS.

Signal word: A word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are “danger” and “warning.” “Danger” is used for the more severe hazards, while “warning” is used for the less severe.

Simple asphyxiant: A substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.

Substance: Chemical elements and their compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurities deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.

Supervisor: The individual responsible for managing, directing, and evaluating the work of another.

Use: To package, handle, react, emit, extract, generate as a byproduct, or transfer.

Unit: An organizational entity (e.g., office, department, college, center, institute, school, or affiliate organization) at the George Mason University.

Work area: A room or defined space in a work area where hazardous chemicals are produced or used, and where employees are present. This term also includes the OSHA definition of “Work area” which means an establishment, job site, or project, at one geographical location containing one or more work areas to include field work sites.

Appendix B
Glossary of Common Safety Data Sheet Terms

Acute Effect: Health effects that usually occur rapidly, as a result of short-term exposure.

Acute Toxicity: Acute effects resulting from a single dose of, or exposure to, a substance.

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

Appearance: A description of a substance (including color, size, and consistency) at normal room temperature and normal atmospheric conditions.

Asphyxiant: A gas or vapor which can take up space in the air and reduce the concentration of oxygen available for breathing. Examples include acetylene, methane, and carbon dioxide.
Auto-Ignition Temperature: The temperature at which a material will ignite spontaneously or burn.

Boiling Point: Temperature at which a liquid changes to a vapor state at a given pressure (usually sea level pressure = 760 mmHg).

"C" or Ceiling: The maximum allowable human exposure limit for an airborne substance, not to be exceeded even momentarily.

Carcinogen: A material that causes cancer. A chemical is considered to be a carcinogen, if:

1. It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen.
2. It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP).
3. It is regulated by OSHA as a carcinogen.
4. There is valid scientific evidence in man or animals demonstrating a cancer-causing potential.

Chronic Health Effects: Either adverse health effects resulting from long-term exposure or persistent adverse health effects resulting from short-term exposure.

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

Combustible Liquid: Any liquid having a flash point at or above 100 °F (37.8 °C), but below 200 °F (93.3 °C), except any mixture having components with flash points 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.

Conditions To Avoid: Conditions encountered during handling or storage that could cause a substance to become unstable.

Corrosive Material: A liquid or solid that causes visible destruction or irreversible alteration in human skin tissue at the site of contact.

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

Decomposition Products: Describes hazardous materials produced during heated operations.
Density: The mass of a substance per unit volume. The density of a substance is usually compared to water, which has a density of 1. Substances which float on water have densities less than 1; substances which sink have densities greater than 1.

Dermal: Used on or applied to the skin.

Dermal Toxicity: Adverse effects resulting from skin exposure to a substance.

Dry Chemical: A powdered, fire-extinguishing agent usually composed of sodium bicarbonate, potassium bicarbonate, etc.

Explosion Limits: The range of concentration of a flammable gas or vapor (% by volume in air) in which explosion can occur upon ignition in a confined area.

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

Exposure: A person's contact with a hazardous chemical in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.).

Extinguishing Media: Specifies the fire-fighting agents that should be used to extinguish fires.

Flammable: A chemical that includes one of the following categories:

1. Liquid, flammable--Any liquid having a flash point below 100 °F (37.8 °C), except any mixture having components with flash points of 100 °F (37.8 °C) or higher, the total of which make up 99 percent or more of the total mixture volume.
2. Solid, flammable--A solid, other than an explosive, that can cause fire through friction, absorption of mixture, spontaneous chemical change, or retained heat from manufacturing or processing, or that can be readily ignited and, when ignited, will continue to burn or be consumed after removal from the source of ignition.

Flash Point: The temperature at which a liquid will give off enough flammable vapor to ignite. The lower the flash point, the more dangerous the product. A "flammable liquid" is a solution with a flash point below 100 °F (37.8 °C). The flash point of a material may vary depending on the method used, so the test method is indicated when the flash point is given.

Foreseeable Emergency: 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 hazardous chemical into the testing environment.

Hazardous Material: In a broad sense, any substance or mixture of substances having properties capable of producing adverse effects on the health or safety of a human being.

Hazard Rating: Material ratings of one to four which indicate the severity of hazard with respect to health, flammability, and reactivity.

Hazard Warning: means any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the specific physical and health hazard(s), including target organ effects, of the chemical(s) in the container(s). (See the definitions for "physical hazard" and "health hazard" to determine the hazards which must be covered.)

Incompatible: Materials that could cause dangerous reactions from direct contact with one another. These types of chemicals should never be stored together.

Ingestion: The taking in of a substance through the mouth.

Inhalation: The breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.
Irritant: A substance which, by contact in sufficient concentration for a sufficient period of time, will cause an inflammatory response or reaction of the eye, skin, or respiratory system. The contact may be a single exposure or multiple exposures.

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

Lethal Concentration 50 (LC50): The concentration of a material in air which, on the basis of laboratory tests, is expected to kill 50 percent of a group of test animals when administered as a single exposure (usually 1 to 4 hours).

Lethal Dose 50 (LD50): A single dose of a material expected to kill 50 percent of a group of test animals. The dose is expressed as the amount per unit of body weight, the most common expression being milligrams of material per kilogram of body weight (mg/kg of body weight). Usually refers to oral or skin exposure.

Melting Point: The temperature at which a solid substance changes to a liquid state. For mixtures, the melting range may be given.

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

Mutagen: Those chemicals or physical effects that can alter genetic material in an organism and result in physical or functional changes in all subsequent generations.

NFPA: National Fire Protection Association is an international membership organization which promotes/ improves fire protection and prevention and establishes safeguards against loss of life and property by fire. Best known on the industrial scene for the National Fire Codes (16 volumes of codes, standards, recommended practices and manuals developed and periodically updated by NFPA technical committees). Among these is NFPA 704M, the code for showing hazards of materials as they might be encountered under fire or related emergency conditions, using the familiar diamond-shaped labels or placards with appropriate numbers and symbols.

NTP: National Toxicology Program. The NTP publishes an Annual Report on Carcinogens which identifies substances that have been studied and found to be carcinogens in animal or human evaluations.

Oral Toxicity: Adverse effects resulting from taking a substance into the body via the mouth. Ordinarily used to denote effects in experimental animals.

OSHA: Occupational Safety and Health Administration, U.S. Department of Labor, the agency that regulates work area conditions.

Oxidizer: A chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Permissible Exposure Limits (PEL's): PEL's are OSHA's legal exposure limits.

pH: A symbol relating the hydrogen ion (H+) concentration of that of a given standard solution. A pH of 7 is neutral. Numbers from 7 to 14 indicate greater alkalinity. Numbers from 7 to 0 indicate greater acidity.

Polymerization: A chemical reaction in which one or more small molecules combine to form larger molecules at a rate that releases large amounts of energy. If hazardous polymerization can occur with a given material, the SDS will usually list conditions which could start the reaction. In most cases the material contains a polymerization inhibitor, which if used up, is no longer capable of preventing a reaction.

PPM (Parts Per Million): Parts of vapor or gas per million parts of contaminated air by volume.

PPB (Parts Per Billion): Parts of vapor or gas per billion parts of contaminated air by volume.

RCRA: Resource Conservation and Recovery Act, administered by the EPA.

Reactivity: A description of the tendency of a substance to undergo chemical reaction with the release of energy. Undesirable effects such as pressure build-up, temperature increase, and

formation of noxious, toxic or corrosive byproducts may occur because of the reactivity of a substance by heating, burning, direct contact with other materials, or other conditions in use or in storage.

Sensitizer: A substance which on first exposure causes little or no reaction, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization to a few chemicals is also known to occur.

Shipping Information: The appropriate name(s), hazard class(es), and identification number(s) as determined by the United States Department of Transportation, International Regulations, and the International Civil Aviation Organization.

Specific Gravity: The weight of a material compared to the weight of an equal volume of water is an expression of the density (or heaviness) of a material. Insoluble materials with specific gravity of less than 1.0 will float in or on water. Insoluble materials with specific gravity greater than 1.0 will sink in water. Most (but not all) flammable liquids have specific gravity less than 1.0 and, if not soluble, will float on water an important consideration for fire suppression.

Teratogen: Any substance that causes growth abnormalities in embryos, genetic modifications in cells, etc.

Threshold Limit Values (TLV's): Expresses the airborne concentration of a material to which nearly all persons can be exposed, day after day, without adverse effects. TLV's are expressed three ways:

1. TLV-TWA: The allowable Time Weighted Average concentration for a normal 8-hour workday (40-hour work week).
2. TLV-STEL: The short-term exposure limit or maximum concentration for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposure periods) and provided the TLV-TWA is not exceeded.
3. TLV-C: The ceiling exposure limit is the concentration that should never be exceeded, even instantaneously.

Toxic: Refers to a chemical falling within any of the following toxic categories:

1. A chemical that has a median lethal dose (LD50) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to test animals weighing between 200 and 300 milligrams each.
2. A chemical that has a median lethal dose (LD50) of more than 200 milligrams per kilogram, but not more than 1000 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 test animals weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC50) in air of more than 200 parts per million, but not more than 2000 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 test animals weighing between 200 and 300 grams each.

Toxicity: The sum of adverse effects resulting from exposure to a material, generally by the mouth, skin, or respiratory tract.

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

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

Unstable: Tending toward decomposition or another state, or as produced or transported, will vigorously polymerize, decompose, condense, or become self-reactive under condition of shocks, pressure, or temperature.

Vapor Density: The density of a material's vapor compared to the density of the air. If a vapor density is greater than one, it is more dense than air and will drop to the floor or the lowest point available. If the density is less than one, it is lighter than air and will float upwards like helium.

Vapor Pressure: The pressure exerted at a given temperature of a vapor in equilibrium with its liquid or solid form. The higher the vapor pressure, the more easily a liquid will evaporate. Liquid materials that evaporate easily are termed volatile, and this means that air concentrations can build up quickly when working with the material in liquid form. Materials with high vapor pressures may be particularly hazardous if you are working in enclosed or confined areas, or if the air circulation is poor. Materials with low vapor pressure still may pose an inhalation hazard.

VOC: Volatile Organic Content.

Water Reactive: A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.