MESSIAH UNIVERSITY

Hazard Communication Program: Chemical Safety Manual

OSHA 1910.1200

This manual serves as the Chemical Hazard Program for Messiah University's Grantham campus, Bowmansdale facility, and Winding Hill facility.

Annual Review June 2024; Last Updated June 2024

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Section 1, INTRODUCTION

The Occupational Safety and Health Administration (OSHA) enacted a standard (29 CFR 1910.1200 – Hazard Communication) for hazardous chemicals in the workplace. The intent is to ensure that the hazards of these chemicals are identified by the manufacturer and communicated to the employees who use them through chemical labeling, Safety Data Sheets (SDSs), workplace procedures and training.

The employer is to document the workplace programs for compliance in a written hazard communication program. As a minimum, the hazard communication program should describe how the requirements of this standard will be met for labels and other forms of warning, safety data sheets, employee information and training; should also include a list of hazardous chemicals known to be present in the workplace; and the methods to be used to inform employees of the hazards of non-routine tasks and the hazards of chemicals contained in unlabeled pipes.

Messiah University's written *Hazard Communication Program: Chemical Safety Manual* is available electronically on the University's website under Human Resources and Compliance. It is also available on FalconLink by checking the box next to "Employee, Health and Safety" under FILTER BY TOPIC; then click on the link to *Hazard Communication Program: Chemical Safety* in the list that appears; or do a search on FalconLink by typing "Hazard Communication Program" in the search box.

In order to bring standardization to the labels and SDSs provided by US chemical manufacturers, OSHA adopted the use of the Globally Harmonized System (GHS) for labeling chemicals and the 16-section format for SDSs; the labels and SDSs now required by US manufacturers and distributers align with worldwide systems. Training of employees was required by December 1, 2013. Compliance by all manufacturers, importers and distributers must be in effect by June 1, 2015. (Note: Messiah University completed the training for current employees by December 1, 2013 and continues to train new employees as part of the new employee orientation program.)

Most chemicals used in the workplace have some hazard potential and so are covered by the rule. **However, the following substances have been given an exemption from the requirements of this standard by OSHA:**

- Hazardous waste when subject to the regulations issued by the Environmental Protection Agency (EPA);
- Any hazardous substance that is the focus of remedial or removal action being conducted under CERCLA in accordance with the EPA regulations;
- Tobacco or tobacco products;
- Wood or wood products which will not be processed and where the only hazard they pose to employees is the flammability or combustibility. (Wood or wood products that have been treated with a hazardous chemical covered by this OSHA standard, and wood which may be subsequently sawed, cut or sanded thus generating dusts are not exempt.);
- Articles (as defined by OSHA);

- Food or alcoholic beverages which are sold, used or prepared in a retail establishment and foods intended for personal consumption by employees while in the workplace;
- Any drug as defined by the Food, Drug and Cosmetic Act, when it is in solid, final form for direct administration to the patient; drugs which are packaged by the chemical manufacturer for sale to consumers in a retail establishment, and drugs intended for personal consumption by employees in the workplace (e.g., first aid supplies);
- Cosmetics which are packaged for sale to consumers in a retail establishment, and cosmetics intended for personal use by employees while in the workplace;
- **Any consumer product or hazardous substance** (as defined in the Consumer Product Safety Act and the Federal Hazardous Substance Act) **where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended**; for example, White Out used in an office with normal exposure would be exempt; Windex used by a janitor would not be exempt as exposure would be expected to be greater than normal use in a home. (For further clarification, if the products are used as part of an employee's job, such as cleaning supplies by cleaning personnel, they do not qualify for the exemption and a safety data sheet (SDS), labeling, and HazCom training are required. The same applies if products are regularly used in a manner that results in a duration and frequency of exposure greater than what a normal consumer would experience. In these situations, workers have a right to know about the properties of those hazardous chemicals.);
- Nuisance particulates where the chemical manufacturer or importer can establish that they do not pose any physical or health hazard covered under this standard;
- Ionizing and nonionizing radiation; and
- Biological hazards.

This written *Hazard Communication Program: Chemical Safety Manual* outlines the policies used at Messiah University for compliance with this OSHA Standard. Individual areas may have policies and procedures that are more stringent than those contained in this program, but they cannot be less stringent.

Research and academic lab areas located in the School of Science, Engineering and Health have a *Chemical Hygiene Plan* that is in compliance with OSHA's Standard for laboratories and supersedes this written program. This document is found at the same location on the web as the *Hazard Communication Program*.

Section 2, DEFINITIONS

The following words and definitions are found in the OSHA Standard:

Article – a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical and does not pose a physical hazard or health risk to employees.

Chemical – any substance or mixture of substances that during use can give off vapors, fumes, dusts, gases, mists, particulates.

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 Services (CAS) rules of nomenclature, or a name that will clearly identify the chemical for the purpose of conducting a hazard classification.

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 its chemical name.

Dust – solid particles of a substance or mixture suspended in a gas (usually air).

Employee – a worker who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies. Workers such as office workers or bank tellers who encounter hazardous chemicals only in non-routine, isolated instances are not covered. Student workers may be included, depending on their job assignment.

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).

Flash point - the minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

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 a hazardous chemical into the workplace.

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.

Health hazard – a chemical which is classified as posting 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. Refer to Section 6 for more information on health hazards.

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 work and precautionary statement for each hazard class and category.

Mist – liquid droplets of a substance or mixture suspended in a gas (usually air).

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

Mutagenicity – a substance that may cause mutations in the germ cells of humans that can be transmitted to the progeny. It is recognized that genetic events are central in the overall process of cancer development. Therefore, evidence of mutagenic activity *in vivo* may indicate that a substance has a potential for carcinogenic effects.

Mutation – a permanent change in the amount or structure of the genetic material in a cell.

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. For more information on physical hazards, see Section 6.

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.

Produce – to manufacture, process, formulate, blend, extract, generate, emit or repackage.

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 shall permit cross-reference 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 at 130 degrees F or below.

Respiratory Sensitizer – a chemical that will lead to hypersensitivity of the airways following inhalation of the chemical.

Safety Data Sheet (SDS) – written or printed material concerning a hazardous chemical that is prepared in accordance with this standard.

Skin Sensitizer – a chemical that will lead to an allergic response following skin contact.

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.

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

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.

Use – to package, handle, react, emit, extract, generate as a byproduct, or transfer.

Vapor – gaseous form of a substance or mixture released from its liquid or solid state.

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

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

NOTE: For additional definitions related to chemical hazard communication, refer to Section 6, Chemical Hazards.

Section 3, LABELS AND OTHER FORMS OF WARNING

Globally Harmonized System (GHS) Label

In 2003, the United Nations adopted the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). OSHA incorporated this system into the Hazard Communication Standard; this is now the labeling system which must be used by chemical manufacturers, importers, and distributors.

The chemical manufacturer, importer, or distributor must ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged, or marked. Hazards not otherwise classified do not have to be addressed on the container. As a minimum, these manufacturer labels must include the following information:

- Product identifier used on the safety data sheet
- Name, address and telephone number of the chemical manufacture, importer, or other responsible party.
- Labels for each hazardous chemical that is classified shall also include the following:
    - Signal word (Danger, Warning)
    - Hazard statement(s)
    - Pictogram
    - Precautionary statement(s)

EXAMPLE OF A MANUFACTURER'S LABEL:

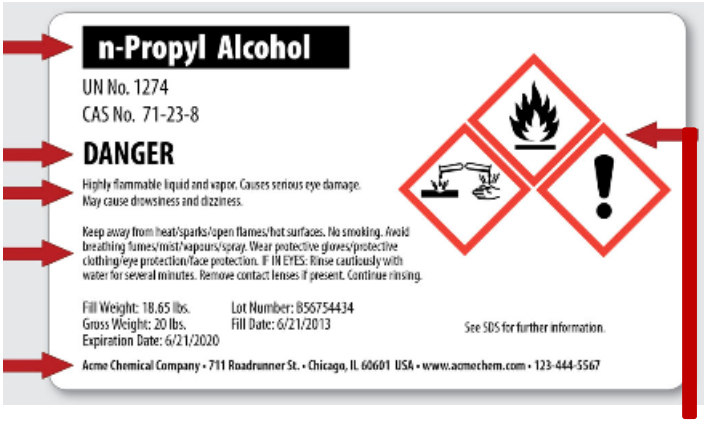
Product Identifier *– should match the name on the SDS*

Signal Word *– 'Danger' (severe) or 'Warning' (less severe)*

Hazard Statements *– a phrase assigned to a hazard class that describes the nature of the product's hazards*

Precautionary Statements *– describes recommended measures to minimize or prevent adverse effects from exposure*

Supplier Identification *– name, address, and telephone number of the manufacturer or supplier*



Pictogram *– graphic symbols intended to convey specific hazard information visually*

Messiah University employees should ensure that all containers of hazardous chemicals received are properly labeled. Any discrepancies should be reported immediately to area supervision and the chemicals should not be available for use until the problem is corrected.

It is illegal to deface, remove or in any way cover up these labels on containers until the container is considered empty and has been cleaned of residue.

Pictograms

Pictograms shall be in the shape of a square set at a point and shall include a black hazard symbol on a white background with a red frame sufficiently wide to be clearly visible. Under the GHS labeling system, eight standard hazard symbols are used in the pictograms. The symbols and hazards they represent are illustrated below:

Flame	Flame Over Circle	Exclamation Mark	Exploding Bomb
			
Flammables Self Reactives Pyrophorics Self-heating Emits Flammable Gas Organic Peroxides	Oxidizers	Irritant Dermal Sensitizer Acute Toxicity (harmful) Narcotic Effects Respiratory Tract Irritation	Explosives Self Reactives Organic Peroxides
Corrosion	**Gas Cylinder**	**Health Hazard**	**Skull and Crossbones**
			
Corrosives	Gases Under Pressure	Carcinogen Respiratory Sensitizer Reproductive Toxicity Target Organ Toxicity Mutagenicity Aspiration Toxicity	Acute Toxicity (severe)

Example of pictogram with proper border and orientation:

Secondary Labels

When a hazardous chemical is transferred to a secondary container from the original manufacturer's container, the secondary container must be appropriately labeled. At Messiah University, there are two approved ways to provide secondary labels:

- A copy/photocopy of the manufacturer's original label may be affixed to the secondary container;
- A "Messiah University" label may be used and should include:
    - The name of the chemical substance traceable to the SDS.
    - The name of the manufacturer.

- Both Health and Physical Hazard information should be included on the label by placing an "***X***" in the box above the appropriate hazard. This hazard information can be obtained from the manufacturer's original label or the SDS for the substance.
- "Health Hazard" information is noted in the blue area. Check all hazards that apply.
  - If the substance contains 0.1% or more of a carcinogen, the box above *Carcinogenic Toxin* should be checked.
  - The box above *Reproductive Toxin* should be checked if the substance contains 0.1% or more of a reproductive toxin.
  - The box above *Acutely Toxic* should be checked if the substance is acutely toxic; this is often denoted by a "Skull and Crossbones" on the manufacturer's label.
  - The box above *Harmful to Health* should be checked if the substance is an irritant or sensitizer (via skin contact, inhalation) or is harmful (but not acutely toxic) if ingested. These health effects are often denoted by an Exclamation Mark on a manufacturers' label.
  - However, even if no health hazards are checked, treat it as if it is hazardous as future tests may result in one of these classifications.
- "Physical Hazard" information is noted in the red area. Check all hazards that apply.
  - If the substance is flammable, then the box above *Flammable* should be checked; this is often denoted by flame symbol on a manufacturer's label.
  - The box above *Oxidizer* should be checked if the substance is an oxidizer; this is often denoted by the symbol with the flame over an **O** on manufacturers' labels.
  - The box above Explosive should be checked if the chemical substance is explosive or self-reactive or an organic peroxide. This is often noted by the Exploding Bomb symbol on a manufacturer's label.
  - The box above *Corrosive* should be checked if the substance is a corrosive; this is often denoted by the corrosive symbol on manufacturers' labels.
- Always refer to the SDS for additional information.
- The labels are available from Messiah Press in 1 x 2" and 2 x 4" sizes, in full sheet quantities. (Sheets of 1 x 2" labels contain 30 labels; sheets of 2 x 4" labels contain 10 labels.)
- Below is the Messiah University Label:

☐ Carcinogenic Toxin	☐ Reproductive Toxin	☐ Acutely Toxic	☐ Harmful to Health
☐ Flammable	☐ Oxidizer	☐ Explosive	☐ Corrosive
Chemical Name:			
Mfg's Name:			

All chemicals should be handled with respect and care.

Secondary containers of water or other non-hazardous chemicals should be labeled for identification purposes to avoid confusion. Containers of water in office areas are not included in this requirement.

Exceptions to Container Labeling:

Process Tanks, Storage Tanks

Whenever possible, process and storage tanks should be labeled by one of the methods noted above. However, signs, placards, process sheets, operating procedures, or other such written materials may be used in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required for labels. **The written materials must be readily accessible to the employees in their work area** at all times.

Pipes and Pipelines

Because pipes and pipelines are not always directly traceable to the source (ex., pipes running through buildings where the source of the contents is not visible or is located in another room); because the chemical contents may actually change (ex., change in additive used in water coolant); and because the University has miles and miles of pipes and pipelines throughout the campus buildings, it is a massive endeavor to try to label all piping. When exposure to the contents of piping may exist, facilities maintenance should be consulted at all times for their expertise in identifying the contents. Work should not be conducted by either Messiah University employees or by contractors before the contents is positively identified. Additionally, any leaks from pipes and pipelines should be reported to facilities maintenance for both repairs and to determine what chemical, if any, is being released and thus creating possible exposure.

Portable, Intermediary Containers

Labels are not required for portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.

Solid materials

OSHA has provided an exception to manufacturers for solid metal (such as a steel beam or a metal casting), solid wood, or plastic items that are not exempted as articles due to their downstream use. The required label may be transmitted to the customer at the time of the initial shipment, and need not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the safety data sheet that is to be provided prior to or at the time of the first shipment. **This exception** to requiring labels on every container of hazardous chemicals **is only for the solid material itself**, and does not apply to hazardous chemicals used in conjunction with, or known to be present with, the material and to which employees handling the items in transit may be exposed (for example, cutting fluids).

Storage Areas, Workshops

At Messiah University, storage areas for these solid materials should be labeled with hazard warnings so that users, as they pull the items for use, are aware of the potential hazards. (Ex., storage areas for metals which may be used in a manner that generate dust should display a sign which alerts the user that "Grinding, polishing of metal/metal alloys could generate dust which is a carcinogenic toxin. Refer to SDS for specific metal you are using.")

Similarly, work areas and workshops should display warning signs if chemicals used in these areas present significant physical and health hazards. (Ex., ceramic shops where hazardous glazes may be used.)

Exemptions

Items as noted in section 1 of this document, which have been given an exemption from the requirements of the OSHA Hazard Communication Standard, do not require labeling in compliance with this program. (Ex., hazardous waste)

Empty Containers

Containers that are empty should have the label crossed off or removed before final disposal. To be considered empty, the container should be drained using the practices commonly employed to remove materials from that type of container (e.g., pouring, pumping, and aspirating), and then, whenever possible, the container should be triple-rinsed (and rinse water properly disposed of) **or** air-dried (ex., alcohols).

Containers that held **hazardous wastes** are only considered empty if

- All wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, and aspirating, *and*
- No more than 2.5 centimeters (one inch) of residue remain on the bottom of the container or inner liner, *or*
- No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 119 gallons in size; *or*
- No more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 119 gallons in size.

A container or an inner liner removed from a container that has held an **acute hazardous waste** is empty if:

- The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;
- The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; *or*
- In the case of a container, the inner liner that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container has been removed.

DOT Labels

Gas cylinders and other containers of hazardous material which are required to be marked or labeled in accordance with the U.S. Department of Transportation's Hazardous Materials Regulations (49 CFR Parts 171 through 180) must retain those markings and labels until the packaging is sufficiently cleaned for residue and purged of vapors to remove any potential hazards.

NFPA Label

The National Fire Protection Association has developed a rating system to identify and rank hazards of materials. It uses a numbering system of 0-4 (0 is no hazard, 4 is highest hazard) and a color code system. The blue area on the diamond label is health hazard information; red is flammability hazard; yellow is reactivity or stability information; and white is for special hazards. A **W** in the white diamond denotes the material is water reactive. **OX** denotes an oxidizing agent.

At Messiah University, NFPA labels may be used in addition to manufacturer's label or secondary container labels, but not in lieu of these labels. **For containers greater than 55 gallons or storage areas that contain more than 55 gallons of the same chemical, the proper NFPA labels should be displayed** to assist emergency responders in an emergency situation.

For a list of NFPA codes for common chemicals, refer to Section 11.

NOTE: Be careful not to confuse the NFPA rating system with the GHS rating system. The GHS rating system classifies hazards into categories 1-5 (1 is the most hazardous and 5 is the least hazardous – just the opposite of the NFPA system). Use caution when reading a SDS.

Section 4: SAFETY DATA SHEET (SDS)

The OSHA standard requires employers to have a safety data sheet in the workplace for each hazardous chemical which is used. The safety data sheet (SDS) must be available in English, and readily available to employees at any time.

3E Company (Verisk 3E) SDS System

At Messiah University, we contract with the 3E Company (aka Verisk 3E) for SDS maintenance. Each phone on campus should display a sticker with the 24-7 phone number for 3E: **800-451-8346** or 760-602-8703. If a SDS is needed, 3E can email the SDS, fax the SDS, or read the contents of the SDS over the phone to the employee. **This method for accessing SDSs is to be used for emergencies, as a back-up to the online system, and for ADA compliance for individuals with sight impairment.**

For Routine Access of SDSs

For routine access of SDSs, the online access should be used. There are two ways to access it:

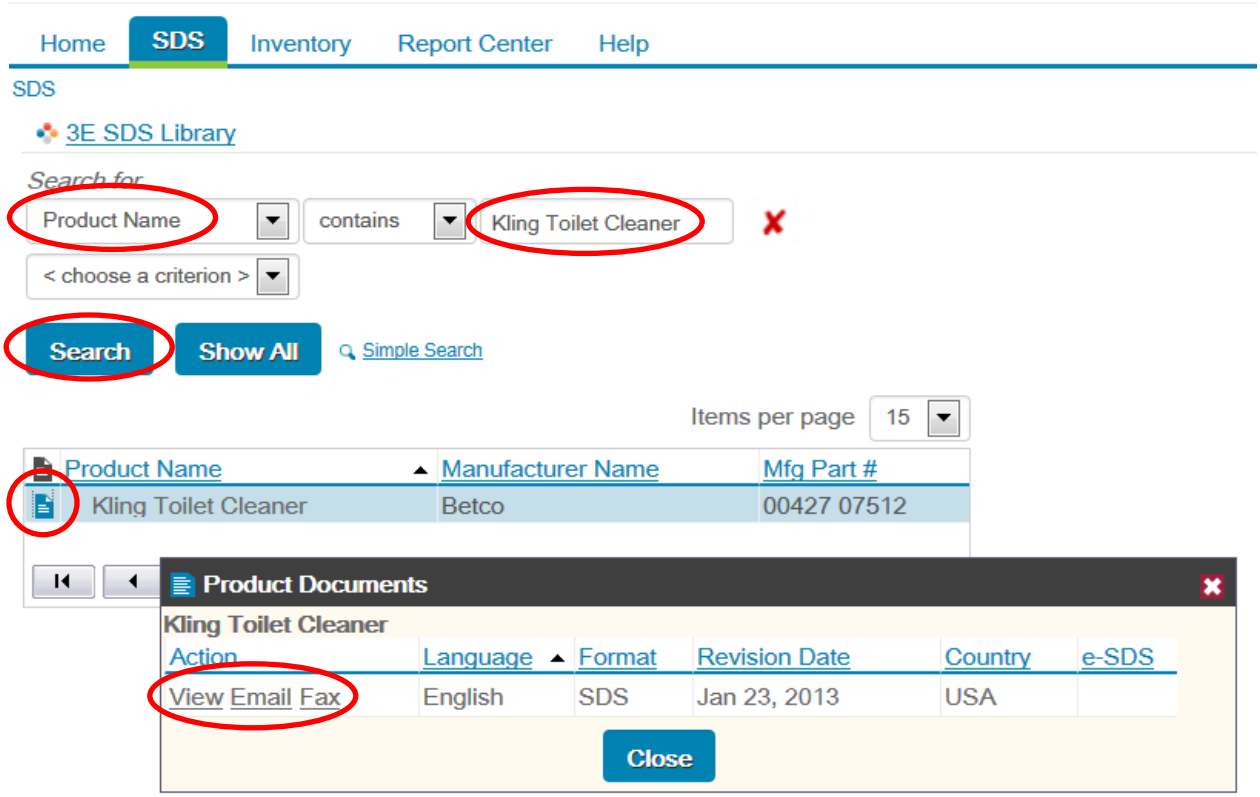
- You can access it on FalconLink by checking the box next to "Environmental, Health & Safety" under FILTER BY TOPIC. Then click on the link to "Safety Data Sheet (M)SDS Online System" from the list that appears. (Or type in the FalconLink search box "Safety Data Sheet" and click on the link that appears.)
- You can also access this link on the University website from the Human Resources and Compliance webpage.

Once you have opened the link, you will see:

1. There are five tabs at the top of your screen:
    a. **Home** – From this tab you can go to either of the other four tabs by clicking on the link under the appropriate icon
    b. **SDS** – On this tab you can search for a Safety Data Sheet.
        - Select from the drop down box the search criteria you wish to use (ex., Product Name, Manufacturer's Name, Part Number).
        - From the second drop down box, select *contains*, *equals* or *begins with*. Contains will get you any chemical that contains the character string you provide; equals will look for an exact match; begins will look for a chemical that starts with the character string you provide.
        - In the final box, enter the information (character string) for the chemical you want. As you begin to type, options will appear that match your criteria. You can select the option you want for the auto-populate list; simply click on the correct option when it appears or continue typing.
        - You can choose additional criteria by selecting from the next drop down box <choose a criterion>. This gives you a second qualifier to search by to narrow down the list of possible SDSs. For instance, if you know the name of the chemical and the name of the manufacturer, you can supply both criteria to narrow down the search.

If you decide you want to delete one of the search criterions, simply click the red ***X*** at the end of the line.

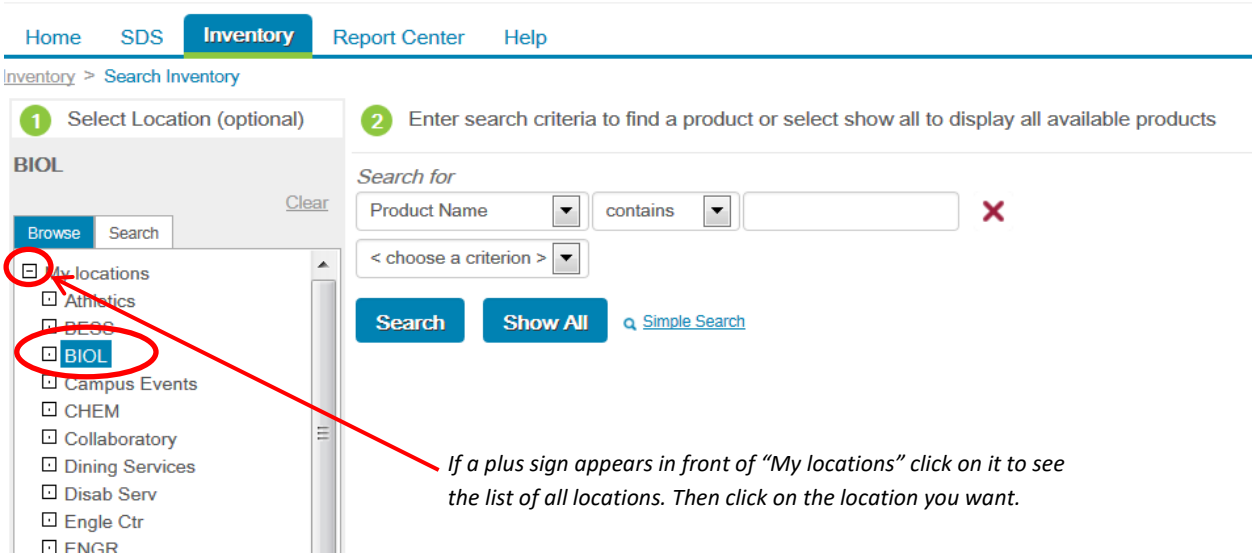
- When you've entered all the criteria you wish to enter, click the 'Search' button. (NOTE: 'Show All' button will get you a list of all 4000+ SDSs in the system for Messiah University.)
- The SDS will appear in a list at the bottom of the screen. Click on the blue document icon for the SDS you want to view and it will open.
- You will then be given the option to **View, Email or Fax** the SDS. Click on your preference.



Inventory – This tab allows you to Search Inventory – search for a SDS **by the inventory location**. You can either search by a department/area or search the entire Messiah University inventory.

- To use this option to find a SDS, you must first select the location by clicking on it from the list at the left of the screen. If no list is shown, click on the + sign in front of "My locations." The list of locations for Messiah University will then display.
- The SDS will appear in a list at the bottom of the screen. Click on the Action drop down arrow in front of the SDS you want.

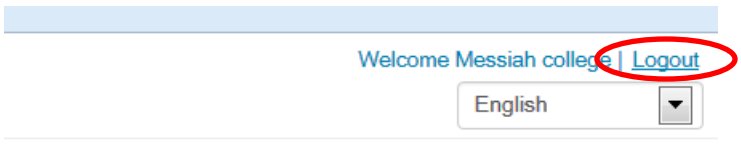
- You will then be given the option to **View, Email or Fax** the SDS. Click on your preference.
- You can also select the "Show All" button without providing any chemical criteria. This will give you a complete inventory list of SDSs assigned to that location. If you click on this button without selecting a location, you will see the complete inventory for Messiah University.



c. **Report Center** – this tab is a centralized location for reports
Inventory Reports – allows you to obtain an inventory list of SDSs for a specific department/area on campus. For more information on area inventory lists, see Section 10 of this manual.
   - To use this option, you must first expand the list of locations by clicking on the "+" box in front of *My locations* at the left of the screen (1).
   - Then highlight the location for which you want an inventory list.
   - Then select the report you wish to run from the list in the center of the screen (2).
   - Click the "Run Report" button.
   - If there are multiple pages, simply click on the forward or backward arrows at the top of the screen by the page numbers.

d. **Help** – This tab provides some additional information about the 3E system and includes a "Glossary of Terms" which may be helpful in reading a SDS.

To exit your 3E Online session, click on Logout in the top right corner of the 3E Online toolbar.



Archived SDSs

In addition, because SDSs represent employee exposure and can be important in determining an employee's exposure history, employers must retain SDSs for hazardous chemicals that are no longer in use or for substance that have undergone a formulation change. 3E maintains an archive of all SDSs for Messiah University.

Format of a Safety Data Sheet

The SDS is a standard format that is internationally recognized. It must contain the following information in the order listed:

Section 1, Identification; this section should include the name of the chemical as it appears on the GHS label and any other common names or synonyms. It should include the name, address, and phone number of the manufacturer or importer as well as an emergency phone number. It should also include recommended use of the chemical or any restrictions in its use.

Section 2, Hazard(s) identification; this area should include the hazard classification, signal word, hazard statement, pictograms, precautionary statements, and hazards not otherwise classified. For mixtures, if the hazards of an ingredient are not known, there should be a description of the percent of the ingredient in the mixture.

Section 3, Composition/information on ingredients; identifies the ingredient(s) including the chemical name (and synonyms), Chemical Abstract Service (CAS) number, and any impurities or stabilizers. If component(s) are trade secrets, a statement indicating that the chemical identity is being withheld for this reason is required.

Section 4, First-aid measures; this should include initial care required for employees exposed to the chemical. It should also include the symptoms or effects of exposure, including acute and delayed effects. Any special treatment needed should also be included in this section.

Section 5, Fire-fighting measures; should include information on how to fight a fire caused by or involving the chemical. Extinguishing agents, specific hazards, precautions and special protective equipment should be included.

Section 6, Accidental release measures; identifies responses to spills, leaks, and other releases. This section should include PPE, emergency procedures, precautions, evacuation guidance, and instructions for containment and clean-up.

Section 7, Handling and storage; this section should communicate how to safely handle and store the chemical. This should include handling and storage practices for incompatible chemicals.

Section 8, Exposure controls/personal protection; this should list exposure control limits, engineering controls to maintain safe exposure in the workplace (ex., ventilation), and PPE recommendations.

Section 9, Physical and chemical properties; this should include appearance, flammability/explosive limits, odor, vapor pressure and density, pH, flash point, melting point, viscosity, etc.

Section 10, Stability and reactivity; this section is for defining the chemical stability and the reactivity hazards. It should include stability under ambient temperature and normal conditions for storage and handling; safety issues if the chemical changes its physical appearance, and information if the chemical will react or polymerize.

Section 11, Toxicological information; this section should include toxicology and health effects, including specific routes of exposure, chronic and acute effects, LD50 data, description of symptoms from a range or exposures, if the substance is a carcinogen, and medical conditions aggravated from exposure to the chemical.

Section 12, Ecological information; includes information regarding the environmental impact of the chemical if released to the environment.

Section 13, Disposal considerations; this includes information on proper disposal practices. Although this may reference EPA requirements, it may not include specific state or local requirements.

Section 14, Transport information; DOT information is included in this section for proper shipping.

Section 15, Regulatory information; this includes safety, health and environmental regulations that may not appear elsewhere on the SDS.

Section 16, Other information; includes date of preparation or last revision.

If no relevant information is available for the section, the safety data sheet should be marked to indicate that no applicable information was found.

Manufacturer Requirements for Providing SDSs

Chemical manufacturers, importers and/or distributers shall ensure that employers are provided an appropriate safety data sheet with the initial shipment and with the first shipment after a safety data sheet is updated. The safety data sheet must either be provided with the shipped containers or sent to the employer prior to or at the time of shipment. If for any reason, we do not receive the appropriate SDS, we must contact the supplier as soon as possible and request one. A SDS should also be requested from a retailer if the purchase is made over-the-counter.

Keeping the SDSs System Updated

A copy of all safety data sheets received must be forwarded to the following individuals to ensure inclusion in the Verisk 3E SDS system:

- Manager of the Natural Sciences Laboratory Program – all SDSs received for the department of chemistry and biochemistry
- Biological Sciences Lab Coordinator – all SDSs received for the department of biology
- Compliance Coordinator – all SDSs received for all other areas

In addition, these same individuals must also be notified if a chemical substance is no longer present on campus and there is no intention for future use so that the chemical substance can be removed from the active inventory in the system and the SDS archived.

SDSs for Toner Cartridges

Toner cartridges in copiers throughout the University which are used for intermittent or occasional use are considered articles under the Hazard communication standard (see OSHA's letter of interpretation found at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=19769. However, for emergency situations, hard copies of SDSs for these toners are maintained and available by contacting the office of Human Resources & Compliance, the Safety Department, or Messiah Press.

SDSs for toners and ink cartridges used at University Press where more significant exposure can occur do not qualify for the article exemption and are maintained in the 3E online system.

Section 5: METHODS TO INFORM EMPLOYEES OF HAZARDS OF CHEMICALS

Area Procedures

For many tasks, area procedures will exist that include information regarding the potential hazards associated with the task and what precautions should be taken to protect against such hazards. Area leadership should be familiar with the hazards of routine tasks conducted in their areas and should ensure that new employee training includes information regarding such hazards for any tasks they will perform.

Non-routine Tasks

OSHA requires that employers inform employees of the hazards of non-routine tasks. Non-routine tasks (those that are not a normal or routine part of an employee's job function and for which a procedure does not exist) should be explained to the employee by his/her supervisor. The explanation should include any hazards related to chemicals that may be present in the work area or used in the task. Prior to assigning a non-routine task, area leadership should ensure that the potential hazards have been appropriately identified.

For example, if a storage or process tank needs to be cleaned, it should be confirmed that it is not a permit required confined space. The previous contents should be identified, the chemicals to be used for cleaning should be determined along with any possible hazardous reactions which may occur with the residue in the tank, the proper PPE required should be identified, and a method for waste collection and disposal should be determined. First aid procedures should also be determined in case of an emergency. This information should be communicated to all employees involved and, whenever possible, should be in writing.

Pipelines

When the need exists to breach pipelines, only employees knowledgeable with the contents of the pipeline or whose supervision is knowledgeable with the contents should be involved in the tasks. Often outside contractors may be called in to perform such functions. When this is the case, they should be informed by knowledgeable University personnel of the contents and potential hazards involved with the work.

Section 6: CHEMICAL HAZARDS

Chemicals may present a physical hazard, a health hazard, or both.

Physical Hazard

A physical hazard poses one of the following hazardous effects:

- **Corrosive to metal** – a chemical which by chemical action will materially damage, or even destroy, metals.
- **Emits flammable gas when in contact with water** – solid or liquid chemicals which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.
- **Explosive** – a solid or liquid chemical which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic chemicals are included even when they do not evolve gases.
- **Flammable (gases, aerosols, liquids or solids)**
    - **Flammable gas** – a gas having a flammable range with air at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi).
    - **Flammable aerosol** – any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, and fitted with a release device allowing the contents to be ejected as particles in suspension in a gas, or as a foam, paste, powder, liquid or gas.
    - **Flammable liquid** – a liquid having a flash point of not more than 93°C (199.4°F).
    - **Flammable solid** – a solid which is a readily combustible solid, or which may cause or contribute to fire through friction.
    - **Readily combustible solids** – powdered, granular, or pasty chemicals which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly.
- **Gas under pressure** – gases which are contained in a receptacle at a pressure of 200 kPa (29 psi) (gauge) or more, or which are liquefied or liquefied and refrigerated.
- **Organic peroxide** – a liquid or solid organic chemical which contains the bivalent -0-0- structure and as such is considered a derivative of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term organic peroxide includes organic peroxide mixtures containing at least one organic peroxide. Organic peroxides are thermally unstable chemicals, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties:
  (a) Be liable to explosive decomposition;
  (b) Burn rapidly;
  (c) Be sensitive to impact or friction;
  (d) React dangerously with other substances.
- **Oxidizer (liquid, solid, or gas)**
    - **Oxidizing gas** – any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

    - **Oxidizing liquid** – a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
    - **Oxidizing solid** – a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.
- **Pyrophoric (liquid or solid)**
    - **Pyrophoric liquid** means a liquid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.
    - **Pyrophoric solid** means a solid which, even in small quantities, is liable to ignite within five minutes after coming into contact with air.
- **Self-heating** – a solid or liquid chemical, other than a pyrophoric liquid or solid, which, by reaction with air and without energy supply, is liable to self-heat; this chemical differs from a pyrophoric liquid or solid in that it will ignite only when in large amounts (kilograms) and after long periods of time (hours or days).
  NOTE: Self-heating of a substance or mixture is a process where the gradual reaction of that substance or mixture with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance or mixture will rise which, after an induction time, may lead to self-ignition and combustion.
- **Self-reactive** – thermally unstable liquid or solid chemicals liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes chemicals classified under this section as explosives, organic peroxides, oxidizing liquids or oxidizing solids.

Health Hazard

Health hazards are not as quantifiable as physical hazards. Data may be conflicting. Evidence may not exist that is directly related to human exposure. Not all routes of exposure may be tested. And interaction with other chemicals, whether in a mixture or in the workplace, may not be available. OSHA has identified protocol for the chemical manufacturer/importer to use when identifying health hazard information on the SDS, but keep in mind that **all chemicals** should be handled with respect and in a manner that minimizes exposure.

Chemicals enter your body by four routes:

- Breathing (inhalation)
- Swallowing (ingestion)
- Skin (absorption)
- Cuts (injection)

The harm to your health caused by chemicals depends on:

- Strength or potency of the chemical
- Amount of the chemical that is present
- How long you are exposed to the chemical
- Part of your body that is exposed

There are various types of health effects:

- **Acute:** the effect shows up right away
- **Chronic:** problems show up after a long period of exposure and/or long after the exposure ends
- **Local:** only the part of the body that was exposed is affected
- **Systemic:** an agent enters the body and affects other parts of the body
- **Sensitization:** you may become allergic or sensitive to some chemicals; this can develop over time (ex., health care worker may develop a serious allergic reaction to latex used in gloves)

Here are some terms/definitions related to the health hazards from exposure to chemicals:

Aspiration – the entry of a liquid or solid chemical directly through the oral or nasal cavity, or indirectly from vomiting, into the trachea and lower respiratory system. Aspiration toxicity includes severe acute effects such as chemical pneumonia, varying degrees of pulmonary injury or death following aspiration. Aspiration is initiated at the moment of inspiration, in the time required to take one breath, as the causative material lodges at the crossroad of the upper respiratory and digestive tracts in the laryngopharyngeal region. Aspiration of a substance or mixture can occur as it is vomited following ingestion. This may have consequences for labeling, particularly where, due to acute toxicity, a recommendation may be considered to induce vomiting after ingestion. However, if the substance/mixture also presents an aspiration toxicity hazard, the recommendation to induce vomiting may need to be modified.

Acute toxicity – those adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

Eye hazards

- **Serious eye damage** – the production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible within 21 days of application.
- **Eye irritation** – the production of changes in the eye following the application of test substance to the anterior surface of the eye, which are fully reversible within 21 days of application.

Genotoxic and **genotoxicity** – agents or processes which alter the structure, information content, or segregation of DNA, including those which cause DNA damage by interfering with normal replication processes, or which in a non-physiological manner (temporarily) alter its replication. Genotoxicity test results are usually taken as indicators for mutagenic effects.

Mutation – a permanent change in the amount or structure of the genetic material in a cell. The term *mutation* applies both to heritable genetic changes that may be manifested at the phenotypic level and to the underlying DNA modifications when known (including, for example, specific base pair changes and chromosomal translocations). The term *mutagenic* and *mutagen* will be used for agents giving rise to an increased occurrence of mutations in populations of cells and/or organisms.

Respiratory sensitizer – a chemical that will lead to hypersensitivity of the airways following inhalation of the chemical.

Skin hazards

- **Skin corrosion** – the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia, and scars. Histopathology should be considered to evaluate questionable lesions.
- **Skin irritation** – the production of reversible damage to the skin following the application of a test substance for up to 4 hours.
- **Skin sensitizer** – a chemical that will lead to an allergic response following skin contact.

There are three categories of health hazards that will be addressed individually: carcinogens, reproductive toxins and target organ toxins.

Carcinogens - a substance or a mixture of substances which induce cancer or increase its incidence. Substances and mixtures which have induced benign and malignant tumors in well-performed experimental studies on animals are considered also to be presumed or suspected human carcinogens unless there is strong evidence that the mechanism of tumor formation is not relevant for humans. Some important factors which may be taken into consideration, when assessing the overall level of concern are:

- Tumor type and background incidence;
- Multisite responses;
- Progression of lesions to malignancy;
- Reduced tumor latency;
- Whether responses are in single or both sexes;
- Whether responses are in a single species or several species;
- Structural similarity or not to a substance(s) for which there is good evidence of carcinogenicity;
- Routes of exposure;
- Comparison of absorption, distribution, metabolism and excretion between test animals and humans;
- The possibility of a confounding effect of excessive toxicity at test doses; and,
- Mode of action and its relevance for humans, such as mutagenicity, cytotoxicity with growth stimulation, mitogenesis, immunosuppression.

Categories of Carcinogens - For the purpose of classification for carcinogenicity, substances are allocated to one of two categories based on strength of evidence and additional weight of evidence considerations. In certain instances, route-specific classification may be warranted.

Category 1: Known or presumed human carcinogens

The classification of a substance as a Category 1 carcinogen is done on the basis of epidemiological and/or animal data. This classification is further distinguished on the basis of whether the evidence for classification is largely from human data (Category 1A) or from animal data (Category 1B):

Category 1A: Known to have carcinogenic potential for humans. Classification in this category is largely based on human evidence.

Category 1B: Presumed to have carcinogenic potential for humans. Classification in this category is largely based on animal evidence.

Category 2: Suspected human carcinogens

The classification of a substance in Category 2 is done on the basis of evidence obtained from human and/or animal studies, but which is not sufficiently convincing to place the substance in Category 1A or B. This classification is based on strength of evidence together with weight of evidence considerations (See paragraph A.6.2.5). Such evidence may be from either limited evidence of carcinogenicity in human studies or from limited evidence of carcinogenicity in animal studies.

A mixture shall be classified as a carcinogen when at least one ingredient has been classified as a Category 1 or Category 2 carcinogen and is present at or above the appropriate cut-off value/concentration limit as shown in the following table:

Ingredient classified as:	Category 1 carcinogen	Category 2 carcinogen
Category 1 carcinogen	≥ 0.1 %	
Category 2 carcinogen		≥ 0.1% (note 1)

Note: If a Category 2 carcinogen ingredient is present in the mixture at a concentration between 0.1% and 1%, information is required on the SDS for a product. However, a label warning is optional. If a Category 2 carcinogen ingredient is present in the mixture at a concentration of ≥ 1%, both an SDS and a label is required and the information must be included on each.

The following are recognized sources for establishing a substance as a carcinogen or potential carcinogen for hazard communication purposes:

- National Toxicology Program (NTP), "Report on Carcinogens" (latest edition);
- International Agency for Research on Cancer (IARC) "Monographs on the Evaluation of Carcinogenic Risks to Humans" (latest editions)
- Where OSHA has included cancer as a health hazard to be considered by classifiers for a chemical covered by 29 CFR part 1910, Subpart Z, Toxic and Hazardous Substances, chemical manufacturers, importers, and employers shall classify the chemical as a carcinogen.

The following table may be used to perform hazard classifications for carcinogenicity under the HCS (§ 1910.1200). It relates the approximated GHS hazard categories for carcinogenicity to the classifications provided by IARC and NTP:

IARC	GHS	NTP RoC
Group 1..... Group 2A..... Group 2B.....	Category 1A..... Category 1B..... Category 2.....	Known. Reasonably Anticipated (See Note 1). Reasonably Anticipated (See Note 1).

Partial List of Common Carcinogens

Many metals are carcinogenic toxins if present in forms that can enter your body. For example, certain metals in dust form where they can be inhaled are carcinogens. **Metals that have been recognized as carcinogens include:**

Beryllium and beryllium compounds

Cadmium and cadmium compounds
Chromium hexavalent compounds
Cobalt-tungsten carbide
Lead and lead compounds
Nickel and nickel compounds

Other more common carcinogens include:

Acetaldehyde
Acrylonitrile
Alcoholic beverage consumption
Arsenic and inorganic arsenic compounds
Asbestos
Benzene
Ceramic fibers (respirable size)
Chloroform
Chloroprene
Estrogens, steroidal
Formaldehyde
Certain Glass wool fibers (inhalable)
Ionizing radiation
Polybrominated biphenyls and polychlorinated biphenyl
Silica, crystalline (respirable size)
Soots
Styrene
Tobacco-related exposures (smoking tobacco, environmental "second-hand" tobacco smoke, smokeless tobacco)
Ultraviolet radiation
Welding fumes and UV radiation from welding
Wood dust

Reproductive Toxins

Reproductive toxicity includes *adverse effects on sexual function and fertility* in adult males and females, as well as *adverse effects on development of the offspring*. Some reproductive toxic effects cannot be clearly assigned to either impairment of sexual function and fertility or to developmental toxicity. Nonetheless, chemicals with these effects shall be classified as reproductive toxicants.

- **Adverse effects on sexual function and fertility** – any effect of chemicals that interferes with reproductive ability or sexual capacity. This includes, but is not limited to, alterations to the female and male reproductive system, adverse effects or onset of puberty, gamete production and transport, reproductive cycle normality, sexual behavior, fertility, parturition, pregnancy outcomes, premature reproductive senescence, or modifications in other functions that are dependent on the integrity of the reproductive systems.

- **Adverse effects on development of the offspring** – any effect of chemicals which interferes with normal development of the conceptus either before or after birth, which is induced during pregnancy or results from parental exposure. These effects can be manifested at any point in the life span of the organism. The major manifestations of developmental toxicity include death of the developing organism, structural abnormality, altered growth and functional deficiency.

Categories of Reproductive Toxicity:

Category 1 – Known or presumed human reproductive toxicant

Substance shall be classified in Category 1 for reproductive toxicity when they are known to have produced an adverse effect on sexual function and fertility or on development in humans or when there is evidence from animal studies, possibly supplemented with other information, to provide a strong presumption that the substance has the capacity to interfere with reproduction in humans. The classification of a substance is further distinguished on the basis of whether the evidence for classification is primarily from human data (Category 1A) or from animal data (Category 1B).

Category 1A – Known human reproductive toxicant

The classification of a substance in this category is largely based on evidence from humans.

Category 1B – Presumed human reproductive toxicant

The classification of a substance in this category is largely based on evidence from experimental animals. Data from animal studies shall provide sufficient evidence of an adverse effect on sexual function and fertility or on development in the absence of other toxic effects, or if occurring together with other toxic effects the adverse effect on reproduction is considered not to be a secondary non-specific consequence of other toxic effects. However, when there is mechanistic information that raises doubt about the relevance of the effect for humans, classification in Category 2 may be more appropriate.

Category 2 – Suspected human reproductive toxicant

Substances shall be classified in Category 2 for reproductive toxicity when there is some evidence from humans or experimental animals, possibly supplemented with other information, of an adverse effect on sexual function and fertility, or on development, in the absence of other toxic effects, or if occurring together with other toxic effects the adverse effect on reproduction is considered not to be a secondary non-specific consequence of the other toxic effects, and where the evidence is not sufficiently convincing to place the substance in Category 1. For instance, deficiencies in the study may make the quality of evidence less convincing, and in view of this, Category 2 would be the more appropriate classification.

Effects on or via lactation shall be classified in a separate single category. Chemicals that are absorbed by women and have been shown to interfere with lactation or that may be present (including metabolites) in breast milk in amounts sufficient to cause concern for the health of a breastfed child, shall be classified to indicate this property hazardous to breastfed babies. This classification shall be assigned on the basis of:

(a) absorption, metabolism, distribution and excretion studies that indicate the likelihood the substance would be present in potentially toxic levels in breast milk; and/or

(b) results of one or two generation studies in animals which provide clear evidence of adverse effect in the offspring due to transfer in the milk or adverse effect on the quality of the milk; and/or
(c) human evidence indicating a hazard to babies during the lactation period.

Specific Target Organ Toxicity

Specific target organ toxicity – single exposure, (STOT-SE) – specific, non-lethal target organ toxicity arising from a single exposure to a chemical. All significant health effects that can impair function, both reversible and irreversible, immediate and/or delayed.

Hazard categories for specific target organ toxicity following a single exposure:

Category 1 – Substances that have produced significant toxicity in humans, or that, on the basis of evidence from studies in experimental animals can be presumed to have the potential to produce significant toxicity in humans following single exposure.

Category 2 – Substances that, on the basis of evidence from studies in experimental animals, can be presumed to have the potential to be harmful to human health following single exposure.

Category 3 – Transient target organ effects

There are target organ effects for which a substance does not meet the criteria to be classified in Categories 1 or 2 indicated above. These are effects which adversely alter human function for a short duration after exposure and from which humans may recover in a reasonable period without leaving significant alteration of structure or function. *This category only includes narcotic effects and respiratory tract irritation.*

Specific target organ toxicity – repeated exposure (STOT-RE) means specific target organ toxicity arising from repeated exposure to a substance or mixture. All significant health effects that can impair function, both reversible and irreversible, immediate and/or delayed.

Hazard categories for specific target organ toxicity following repeated exposure

Category 1 – Substances that have produced significant toxicity in humans, or that, on the basis of evidence from studies in experimental animals can be presumed to have the potential to produce significant toxicity in humans following repeated or prolonged exposure

Category 2 – Substances that, on the basis of evidence from studies in experimental animals can be presumed to have the potential to be harmful to human health following repeated or prolonged exposure.

Environmental Hazards

Environmental hazards refer to a chemical's ability to cause harm in the environment. The GHS labeling system uses the following classifications for environmental hazards:

- Acute (short-term) aquatic hazards
- Long-term aquatic hazards
- Hazardous to the ozone layer

OSHA does not address environmental hazards in the Hazard Communication Standard but you may still see an environmental hazard pictogram on labels:

Hazard Not Otherwise Classified

There are chemicals for which there is evidence of adverse physical or health effects, but which do not fit into one of the established GHS hazard classes or into a hazard category adopted by OSHA. These chemicals are referred to as a "hazard not otherwise classified (HNOC)." Classification as an HNOC does not mean the chemical is not hazardous. Even though a label will not identify the chemical as an HNOC, SDSs must identify the chemical as such. Remember, regardless of information provided on a label or SDS, **treat all chemicals with respect and as if a hazard exists**.

Section 7: MEASURES TO PROTECT AGAINST CHEMICAL EXPOSURES AND GENERAL WORKSITE SAFETY PRACTICES

NOTE: Specific **Area Safety Rules** may be found in the *Safety Manual*, Section 1, or in documents maintained by the areas.

General Safety Guidelines

- Keep beverages and food at least five (5) feet away from chemicals.
- After handling chemicals, wash hands thoroughly before eating, applying make-up, or handling contact lenses. Wash arms, face and other exposed areas.
- Know the location of the nearest safety shower and/or eye wash station.
- Make sure PPE is clean and in good condition before use.
- Messiah University is a smoke free and vape free campus. It is understood that **smoking it NOT permitted anywhere on University property.** However, it should also be reiterated in this document that smoking and vaping should not occur when handling or using chemicals.

Methods of Detection of Hazardous Chemicals

There are various methods of detection for hazardous chemicals. One method is by continuous monitoring by devices designed to detect either the presence of specific chemicals or malfunctions in specific systems which contain chemicals. Some examples of such detection methods are:

- Gas sensors in lab areas of Kline and Jordan that will alarm and send a signal to dispatch and local detector panels. If the gas levels become too high, a fire alarm will also be activated.
- Panic buttons at either end of the halls by the labs in Kline and Jordan that will shut off the gas flow to these areas but will not sound the fire alarm.
- Chemical fume hoods in Kline and Jordan have audible and/or visible alarms if the flow drops off significantly.
- Main ventilation system to hoods in Kline and Jordan is alarmed if problems occur with the motor or control to this system.
- Gas detection system for NMR in Kline/Jordan.

Supervisors should train new employees on any chemical detection methods in their specific areas. In addition, employees should react if they are in an unfamiliar area and an alarm sounds (other than the fire alarm); they should immediately leave the area and contact someone familiar with the area or campus safety to report the alarm. (If a fire alarm sounds employees should **leave the building** immediately.)

Another method of detecting the uncontrolled presence of a hazardous chemical is by odor. Some chemicals have additives specifically for this purpose (ex., natural gas has an odorant additive that smells like sulfur or rotten eggs). In general, any unusual odors should be reported immediately to area supervision. Leave areas where odors are present that make it uncomfortable to breathe. Also, it is

important to note that some chemicals may be odorless, even at dangerous levels (ex., carbon monoxide). Therefore, odor should not be used to ensure safe exposure levels.

A visual appearance of a chemical substance (a cloud or mist in the atmosphere) is also a sign of an uncontrolled presence of a chemical. Such situations should be reported immediately and the area evacuated until it can be determined safe to re-enter.

Chemical Purchases

Each area/department on campus shall designate an individual(s) who is authorized to place orders for chemicals (other than office supplies). This individual shall ensure that a SDS is available for each chemical purchased.

If the chemical is new to the department/area, a SDS must be obtained and reviewed prior to placing the order. If a less hazardous chemical can be used in lieu of this new chemical, a substitution should be considered. Thought should be given to the proper storage of this new chemical (ex., will it need to be stored in a flammable storage cabinet?). Thought should also be given to any waste that might be generated from the use of this new chemical and the proper disposal method for the waste. Additionally, **a copy of the SDS should be forwarded to the VP for Human Resources & Compliance to ensure its inclusion in the 3E access system. The VP for Human Resources & Compliance is also available to help with the issues mentioned previously regarding new chemicals (ex., storage, waste disposal, etc.).**

It is also recommended that the individual authorized to purchase chemicals be the same individual who maintains the area's inventory list as s/he should be aware of the chemicals present and the new chemicals being added.

Chemical Deliveries and Chemical Shipments

Chemical deliveries for most campus areas should be received at the Shipping and Receiving Area by the Inventory Control and Receiving Coordinator. Occasionally, because FedEx delivers to the campus post office and not to Shipping and Receiving, chemical deliveries may be received by the campus postal employees. After receipt, the chemicals must be delivered to the appropriate areas/personnel across campus. Cleaning chemicals for Campus and Building Services are received at the Bowmansdale storage area. Chemicals substances used at the Winding Hill facility are delivered directly to that facility. The Inventory Control and Receiving Coordinator, the postal employees, and individuals who receive chemical substances at Bowmansdale and Winding Hill have been given the proper D.O.T. training for hazardous materials.

Chemical shipments (wastes) should be coordinated with Facility Services. Certain individuals in Campus and Building Services, Grounds and Facilities Maintenance have received training in hazardous, residual and universal waste regulations and will coordinate shipments for all wastes except those non-universal wastes for University Press. (Refer to the Waste Manual for specific responsibilities/contacts.) The Director of Printing and Mailing Services or the Production Technician will arrange for pickup of the

University Press wastes. Chemical wastes generated at the Winding Hill facility are under the control of the Cadaver Lab Coordinator who arranges for waste pick-up at that location.

Non-waste chemical shipments are very minimal. If there is a need for a chemical shipment of non-waste material, contact the VP for Human Resources & Compliance or the Natural Sciences Laboratory Program Manager.

Distribution/Transport

The following guidelines should be adhered to for chemical distribution/transport, whenever possible:

- Chemicals **for lab use** may not be transported throughout a building without secondary containment.
- It is recommended that chemicals **for lab use** are transported using a cart with secure secondary containment to hold any spills.
- Small quantities of chemicals being transported **for lab use** may be placed in a plastic bucket for transport.

Chemical Storage

The following guidelines should be adhered to for chemical storage, whenever possible:

- Glass containers of chemicals should be safety coated.
- Drip trays or secondary containment should be used for storage areas.
- Chemical storage shelves should have a one inch lip.
- Always keep lids tightly closed except when adding to containers or removing from containers.
- Do not store incompatibles together.
- Only approved employees and students should be granted access to chemical storage areas. Particular caution should be taken to limit and monitor access to areas where especially toxic, radioactive, explosive or carcinogenic chemicals are stored.
- Small quantities of chemicals may be stored in designated areas in fume hoods, laboratory shelves, or designated bench tops.
- Store chemicals/chemical wastes in appropriate containers that are compatible with the chemical.
- Containers should be in good condition.
- See section below for storage of flammable chemicals.

Chemical Lab Hood Use

Chemical lab hoods are used in various departments throughout the campus. The following are general safety precautions to be taken with these hoods:

- Lab hoods should be marked with tape approximately 6 inches from the front of the hood (sash). All work conducted in the hood should be kept behind this line while the employee's face/body (except for arms/hands) should be kept in front of this line.
- When work is not being done at the hood, the hood sash should be kept closed to minimize draw on the unit, limit the strain to the room's HVAC system, and ensure the hood is closed if power to the unit is interrupted.

- The hood sash should not be opened beyond the stop point or point indicated on inspection sticker to ensure effective exhaust draw.
- If a power failure occurs, employees/students should immediately close the hood sashes in the lab areas to prevent fumes from escaping.
- No PPE should be stored in lab hoods.
- Equipment and chemicals should not be placed in the hoods in a manner that might interfere with or block the exhaust. In most hoods, the exhaust opening is located at the bottom rear of the hood; nothing should be placed in a manner that blocks off these openings.
- Lab hoods should be inspected a minimum of annually for proper flow, capture, etc.
- All chemical spills, residues, etc. in hoods should be cleaned up immediately.
- If odors are detected coming from a lab hood, close the hood and immediately contact the individual in charge of the area.

Gas Cylinders

Gas cylinders are used in various locations across campus; some of these gases are inert and others are highly dangerous. The following are general safety precautions to be taken with gas cylinders:

- Cylinders should be secured in a manner that prevents them from falling. Chains or cylinder rack systems should be used, even for storage of empty cylinders.
- Cylinder carts should be used to move large cylinders from one area to another.
- When in storage, cylinder safety caps should be kept on cylinders. Safety caps should be hand-tight. If they cannot be removed by hand, a special tool for this purpose should be used or the vendor contacted to replace the cylinder. Hammers, screw drivers and similar tools should never be used for this purpose.
- Gas cylinders not in use should be stored in a storage location designated for cylinder storage.
- The changing of regulators should only be performed by trained personnel.
- Refer to Section 23 of the *Safety Manual* for more information on the transport, storage and use of compressed gas cylinders on campus.

Flammable Chemicals/Flammable Storage Cabinets

- For all containers of flammable chemicals not in use, regardless of quantity, it is recommended that the container be stored in a flammable storage cabinet. However, flammable materials in quantities less than five liters (1.3 gallons) may be stored on bench tops or designated chemical storage hoods. The storage of flammable materials in quantities greater than five liters requires an approved flammable storage cabinet.
- Flammable storage cabinets should be grounded to afford the best protection.
- Flammable storage cabinets should close properly.
- Flammable storage cabinets should be free of chemical spills/residues.
- If not exhausted, exhaust ports to the flammable storage cabinets should be kept closed. In general, it is not recommended that flammable storage cabinets be exhausted.
- Nothing should be placed on tops of flammable storage cabinets.

- Whenever possible, large quantities of flammable liquids (ex. gasoline) should be stored in approved flammable storage containers with flash screens. Such containers should be self-closing. Flammable storage containers should be inspected routinely to ensure the presence of the flash screen and the proper function of the self-closing feature.

Storage of Explosives and Peroxide Formers

- All explosive materials and materials with the potential to degrade into explosive materials should be stored in flammable storage cabinets.
- The University has explosion proof refrigerators in the Chemistry Department. Other refrigerators are not constructed in such a way as to eliminate possible ignition sources and should not be used for the storage of flammable materials.

Cryogenic Liquids

The University uses cryogenic liquids in limited quantities. Special care should be given to the handling and transport of liquid nitrogen and other cryogenic liquids as they can cause severe burns if they contact skin.

- Persons transporting or dispensing liquid nitrogen should wear goggles and specially insulated gloves designed for the extremely low temperatures of cryogenics.
- Liquid nitrogen should only be transported using a dewar and a cart.
- Dewars are not to be carried by hand except to move it to and from the cart.
- Cryogenic liquids may only be stored in an approved vacuum container.

Ethanol

- In accordance with the Commonwealth of Pennsylvania regulations, large quantities of ethanol should be stored in a doubly locked flammable storage cabinet.
- Access to such a cabinet should be extremely restricted. Only designated individuals in areas where it is used should have keys to an ethanol cabinet.
- Small quantities of ethanol (up to five liters) may be stored in laboratories where ethanol is needed for laboratory procedures.
- Ethanol is used in the School of Science, Engineering and Health laboratories and is controlled by the Naturals Sciences Lab Manager.

Methanol

- Small quantities of methanol must be stored in a flammable storage cabinet in the manufacturer's container or in a flammable storage container.
- Experiments using methanol in labs should be approved by the manager of the Natural Sciences Laboratory Program.

Water Reactive Substances

- Water reactive chemicals used in lab areas, such as alkali metals, are stored in a polypropylene water proof storage container in the flammable storage cabinets. This is the only approved storage area for water reactive chemicals.

- These materials should be distributed in limited quantities**.**
- These materials must be kept in sealed, water proof containers at all times. Storage containers may only be opened to remove the amount needed to carry out the current procedure.

Personal Protective Equipment (PPE)

Personal protective equipment and area owned protective equipment is available for employee use. Detailed information on the proper use of personal protective equipment and area owned protective equipment at Messiah University is outlined in Section 25 of the University's *Safety Manual*.

Fire Blankets

Fire blankets are available in several labs throughout campus. However, they should be used with caution – do NOT wrap yourself in one to try to extinguish a clothing fire. **The first thing anyone should do if their clothing is on fire is STOP! DROP! AND ROLL!** The fire blanket can trap the heat and create a chimney effect that directs the hot, toxic gases and flames into the face, breathing zone and lungs of the victim. If others are present, they can use the blanket to smother the flames once the victim has DROPPED AND ROLLED! The blankets can also be used for (1) shower modesty curtains, (2) wraps for after the shower, (3) temporary stretcher, (4) to keep someone warm to avoid shock, (5) a pillow if the victim needs to be on the floor, and (6) to smother other fires.

Section 8: SPILL PROCEDURE

If a chemical spill is observed or chemical odors are noticed, contact area leadership immediately. If the spill is a large quantity or significant odors are being generated, evacuate the immediate area until the area can be determined to be safe. Contact Dispatch at ext. 6005. (At Winding Hill, contact the Cadaver Lab Coordinator.)

There are three classifications for chemical spills: minor spill, conditional spill, and major (emergency response) spill.

Minor Spill – can be absorbed, neutralized or controlled at the time of the release. It will not quickly become an emergency. It does not require the use of a respirator. The spill can be cleaned up by the people involved using the training and personal protective equipment they have immediately available. Minor spills include most spills and clean-up of a routine nature. The training and personal protection should be the same that is used with the chemical during normal use.

Conditional Spill – includes those of mercury and other chemicals for which employees are trained in clean-up, and have specific spill kits. The limiting factor is that these spills are predictable in volume and hazard, and employees are specifically trained in handling these spills. It is essential that the appropriate personal protective equipment is used for this type of spill and that the appropriate spill containment kits are available.

Major (Emergency Response) Spill – cannot be absorbed, neutralized or controlled at the time of the release. It poses an immediate safety (physical) or health hazard to anyone in the area. A spill may be deemed major due to the volume of the spill and/or the potential hazards associated with the chemical substance. It may require the use of a respirator or other personal protective equipment not available to Messiah University employees. Special training is required for anyone involved in control or cleanup of these types of spills. At Messiah University, employees should not be involved with these spills; we have third party contractors who will respond to these situations. Contact Dispatch immediately when an emergency response spill occurs.

Spill Procedure

A LIST OF ALL PHONE NUMBERS OF CONTACTS REFERENCED IN THIS PROCEDURE CAN BE FOUND IN *Attachment A* OF THIS SECTION.

A hazardous material spill response is divided into several phases:

- Discovery, identification and decision making
- Response to spill
- Cleanup operations

Discovery, identification and decision-making:
When a hazardous materials spill (a spill of hazardous or unknown chemical or infectious waste) is discovered, it should be classified: **Minor Spill, Conditional Spill, or Major Spill** based on the definitions provided previously**.**

Response to a Minor Spill

The person discovering it can clean-up a minor spill without any special equipment beyond what they normally use. These types of spills should be cleaned up promptly; and no further action is needed.

EXAMPLE: A few drops of normally used chemical.

A. **Personal Protection:** The personal protective equipment indicated is that normally used for handling of these materials or waste and is available for general use in that area of the facility, or normally used by the person who handles such materials (e.g., Gloves, Apron, Eye Protection, etc.).
B. **Waste Disposal:** The Facilities Assistant should be contacted to pick up the waste and arrange for proper disposal. At Winding Hill, the Cadaver Lab Coordinator will arrange for proper disposal. *NOTE:* Materials contaminated with a hazardous waste are a hazardous waste. In some instances, rags or other items contaminated during spill clean-up may be a hazardous waste under RCRA (Resource, Conservation and Recovery Act) and must be handled accordingly. If uncertain of the type of waste, contact the Compliance Coordinator or the Natural Sciences Lab Program Manager.
C. **Incident Report:** If there is a potential for risk to students, employees or visitors at the Grantham Campus or Bowmansdale facility, the Department of Safety is to be notified to complete an incident report; contact Dispatch. At Winding Hill, the Cadaver Lab Coordinator should be involved and will make any necessary reports to leadership.

Response to a Conditional Spill

A. If you caused the spill or discover the spill:
1. Isolate the area to prevent tracking and disturbing the spill. Close doors as you leave area.
2. Contact Dispatch at x6005 to report the incident or the Cadaver Lab Coordinator at Winding Hill.
3. Stay nearby but out of the danger zone so you are available to answer question for the responders including size of spill, location of spill, chemicals involved, etc.
4. The individual who caused the spill is to write up an explanation of what happened and submit it to the Department of Safety within 12 hours (or the Cadaver Lab Coordinator at Winding Hill). If the cause is unknown, the person who discovered the spill should write up a description of the events for the Department of Safety.

B. Dispatch at Grantham and Bowmansdale will:
1. Contact Facility Services to shut off return air handling units, when available, to prevent air contamination.

2. Contact the Department of Safety so they can send someone to aid in restricting access to the affected area.
3. During regular business hours, contact the Natural Sciences Laboratory Program Manager to evaluate the situation. If he is not available, contact the Director of Facility Services, the VP for Human Resources & Compliance, or the Facility Maintenance Service Manager. During other hours, or if the above employees cannot be reached, dispatch has the cell/home phone numbers for these individuals.
4. Also, after regular hours, call 911 for emergency response. During regular hours, individual(s) in B.3 will contact 911, if deemed necessary.
5. Notify the VP for Operations of the situation.

C. The individuals in B.3. at Grantham and the Cadaver Lab Coordinator at Winding Hill will:

1. Obtain a MSDS/SDS for the chemical substance, if the substance involved is known. The MSDS/SDS will provide additional spill clean-up and emergency response information for dealing with the chemical.
2. Where a **spill kit** is available, contact an employee who is trained to use it; the spill may be cleaned up with the spill kit. (See *Attachment B* for list of employees trained to use these kits.)
3. If a spill kit is not available, the spill is more than can be handled by the kit, or no employee is available who has been trained in its use, contact one of the following contractors for proper clean-up:
    - Environmental Hazards Control at 1-800-338-3424
    - Cocciardi Associates at 717-766-4500
4. Call 911 if deemed necessary.

D. Department of Safety at Grantham locations and the Cadaver Lab Coordinator at Winding Hill will:

1. Monitor entry and restrict access to the affected area.
2. When the spill is cleaned up and the area is deemed safe for re-entry, Department of Safety will remove all constraints that were put in place to restrict access.
3. The Department of Safety will complete an incident report that will be forwarded to the Workplace Safety Committee for review.

Response to a Major Spill

A major spill is a significant spill that is greater in quantity or risk than the staff has been trained to contain and clean-up; or a spill that exceeds the limits of the personal protective equipment that is available.

NOTE: At the Winding Hill facility, the Cadaver Lab Manager should be contacted in lieu of Dispatch and will assume the responsibilities of Dispatch in this procedure.

A. If you caused the spill or discover the spill:

1. Immediately evacuate the area, and close all of the doors as you go. This will help to contain the vapors and odors.

2. Call Dispatch.
3. Stay nearby but out of the danger zone so you are available to answer question for the responders including size of spill, location of spill, chemicals involved, etc.
4. The individual who caused the spill is to write up an explanation of what happened and submit it to the Department of Safety within 12 hours. If the cause is unknown, the person who discovered the spill should write up a description of the events for the Department of Safety.

B. Dispatch will:

1. Contact Facility Services to shut down recirculating ventilation of the affected area. At Winding Hill, contact CRA (Danielle Rutherford, 717-756-3022).
2. Notify the Department of Safety to assist to secure the area.
3. Notify the Vice President for Operations or the Vice President for Human Resources and Compliance (Crisis Controllers) to assess the situation; they will contact the appropriate members of the crisis response team to meet. In the absence of both Crisis Controllers, contact the Director of Facility Services, or Director of Safety; they will follow-up with the appropriate members of the crisis management team.
4. At Grantham campus locations, during regular business hours contact the Natural Sciences Laboratory Program Manager to evaluate the situation. The Director of Safety, the Director of Facility Services, the VP for Human Resources & Compliance, the Facility Maintenance Service Manager and the Facilities Assistant should also be notified.
5. During other hours, or if the above employees cannot be reached, Dispatch has the cell/home phone numbers for these individuals.
6. Also, after regular hours call 911 for emergency response.

C. Facilities Services at Grantham and Bowmansdale will:

1. Control the ventilation in the area and isolate HVAC Systems. This will minimize the spread of fumes throughout the facility. (Turn off all make up air and leave on only exhaust air, with no recirculation.)
2. Obtain a copy of the floor plan to show access points to the contaminated space for the emergency responders. Provide to individuals in B.4 above or to emergency responders when they arrive.

D. Individuals contacted in B. 4 above and the Cadaver Lab Coordinator at Winding Hill will:

1. Obtain a MSDS/SDS for the chemical substance, if the substance involved is known. The MSDS/SDS will provide additional spill clean-up and emergency response information for dealing with the chemical.
2. **Messiah University employees must not try to clean-up spills for which they have not been trained, or are not equipped**. In most instances involving major spills, respirators (or even self-contained breathing apparatus) must be used. **No Messiah employees are authorized to use such equipment for chemical spill clean-ups.** Furthermore, Campus and Building Services, Facility Services and Department of Safety employees are not trained to control or clean-up a major spill. For that reason it is essential that one of the following contractors be contacted for spill response:

- Environmental Hazard Control at 1-800-338-3424 (emergency cell phone number 717-278-8398)
- Cocciardi Associates at 717-766-4500

3. When Environmental Hazard Control or Cocciardi Associates arrive provide them with MSDS/SDS information for the chemical that was spilled. Facility Services should have the building drawings available to show access points to the contaminated space.
4. Call 911 if deemed necessary.

E. The Department of Safety will:

1. Evacuate anyone in the affected area to a nearby triage area for medical attention and decontamination, if necessary.
2. Alert the Engle Center personnel. At Winding Hill, call 911 for medical assistance.
3. Continue to restrict access to the affected area to authorized personnel only.
4. The Department of Safety will complete an incident report that will be forwarded to the Workplace Safety Committee for review.

F. The Engle Center will:

1. Monitor persons who have had a chemical exposure for immediate care and evaluation.
2. **If necessary or if the Engle Center is not open**, employees should be taken to a local hospital, Concentra Medical Center or WorkNET Occupational Medicine.
3. A MSDS/SDS should be provided to the attending physician along with a description of the employee's exposure (incident) and a description of any signs/symptoms the employee is experiencing.

G. For all locations, the VP for Operations, the VP for Human Resources and Compliance, the Facility Maintenance Director or the VP for Human Resources & Compliance must:

1. Contact OSHA by phone within 8 hours if there is an employee fatality or within 24 hours if an employee is hospitalized as in-patient. (See Section 9 of the *Safety Manual* for more information.)
2. DEP Emergency Spill Reporting: Contact PA DEP if the spill requires notification.

Spill Post Recovery

Once the affected area has been declared "safe" by Environmental Hazard Control or Cocciardi Associates, Campus and Building Services employees can enter the area to clean-up the remainder of the incident. This process may involve spent neutralizer, absorbent, packaging, and other materials. The Environmental Contractor's employees will instruct Campus and Building Services employees on what may be discarded as ordinary trash, and what will need to be removed as hazardous waste or segregated for special waste disposal. Campus and Building Services employees may only conduct clean-up that does not require respiratory protection and must wear all other appropriate personal protective equipment during the clean-up operation.

The area should not be reoccupied for normal use until the Director of Facility Services, Facility Maintenance Service Manager, the Vice President for Operations, the Natural Sciences Laboratory Program Manager or the VP for Human Resources & Compliance determines that there are no remaining hazards from the clean-up process. At Winding Hill, this determination should be made by the

Cadaver Lab Coordinator, the Vice President for Operations, or the VP for Human Resources & Compliance.

All significant chemical incidents should be documented in writing by the Department of Safety and should include the report given by the individual who caused the spill and/or the person who discovered the spill, what was known to have happened, action taken, etc.

All significant incidents are to be reported to the Workplace Safety Committee and evaluated for the potential for improving the process.

Emergency Procedures for Mercury Spills

At Messiah University, mercury may be found in, but is not limited to, the following locations:

- Kline/Jordan – thermometers, manometers, bulk mercury in K308
- Possibility of old thermostats throughout campus

Mercury should not be present at Winding Hill.

Definitions

Mercury: a silver metallic liquid, which is easily vaporized under normal room temperatures. It is toxic by contact, and by inhalation, and should be handled with great care. Spills should **never** be handled with bare hands or with latex gloves, as they offer minimal protection to mercury's effects.

Small Mercury Spill: A small spill (less than 5ml - about the amount of mercury in a small thermometer) in an area with hard surfaces, which will allow the mercury to be accessed by an aspirator. Clean-up is provided by trained employees.

Large Mercury Spill: A spill of more than 5ml **or** a spill which occurs on a soft surface such as carpet or furniture that cannot be completely cleaned.

Procedure for Mercury Spills

Only employees that are trained to work with the materials can handle Mercury spills. All spills should be reported to the Department of Safety/ Dispatch and Campus and Building Services. When possible, mercury spills should be covered with water, either in a puddle, or by wet towels and sheets, to minimize vaporization. (Mercury will evaporate much faster than water when exposed to air).

Spill Cleanup for Small Quantities (up to 5ml) of Mercury

Small mercury spills may be cleaned up by trained on-site faculty or staff.

A. If you caused the spill or discover a spill:

1. The area should be closed and all occupants should be asked to leave the immediate area. If possible close all room doors to keep vapors within the room. Keep everyone away from the contaminated area.

2. If the spill is uncontained, cover with a wet towel as quickly as possible. If the spill is contained in a vessel it can be covered with water.
3. Contact Dispatch. They will contact members of the Department of Safety to help secure the area.
4. Any contaminated clothing and or footwear is to be removed. Any leather that the mercury has contacted is contaminated and cannot be decontaminated. Uncleanable clothing is to be collected and disposed of with the mercury waste. Give to trained responder.
5. Write out a description of the incident (within 12 hours) and give to a Safety Officer to include with the Department of Safety's Incident Report.

B. Department of Safety should:

1. Help secure the area.
2. Contact an employee trained in using the Mercury Spill Cleanup Kit (either Natural Sciences Laboratory Program Manager or someone else on list, see *Attachment B*).

C. **Personnel trained in using the Mercury Spill Cleanup Kit** (see *Attachment B*) should bring a Mercury Spill Cleanup Kit to the area. (See *Attachment C* for locations of kits.) Clean-up of the mercury should be accomplished as directed with the instructions in the Mercury Spill Kit. In addition, the following guidelines should be followed:

1. The spill site should be cleared to at least a minimum of a 2-meter (approximately 6-foot) containment area.
2. Put on the protective equipment located inside of the spill kit that includes eyewear, gloves, shoe covers and a disposable jump suit.
3. Use wet paper towels to cover the visible mercury beads until clean-up can occur.
4. Use the Mercury Aspirator that is located in the Mercury Spill Kit to pick up the Mercury beads and deposit those into a closed container partly filled with water. Ensure the tip of the aspirator is below the water in the container (a syringe with a blunt canula may also be used). The closed container can be reused provided it is less than ½ full.
5. Decontaminate surfaces with material provided in kit.
6. Wipe shoes and other contaminated items. Give special attention to cracks, crevices and other areas where mercury beads may have fallen or been entrapped.
7. Label all contaminated items after placing them in a Hazardous Waste bag; seal the bag well. Contact the Facilities Assistant for proper disposal of contaminated items.

D. Because the incident involved use of a spill cleanup kit, an incident report will be completed by the Department of Safety and reviewed by the Workplace Safety Committee.

E. Replace items used in the spill cleanup kit as soon as possible.

Spill Clean-up for Large Spills of Mercury

Any spill of a large amount of metallic mercury (more than 5ml), or any spill on a soft material including carpet, furniture or similar surface should be handled as and considered a Large Spill.

A. If you cause a large spill of mercury or discover a large spill of mercury:

1. Isolate the area.
2. Contact Dispatch. They will contact the Department of Safety to help secure the area.
3. Contact Facility Services.

4. Write out a description of the incident (within 12 hours) and give to a Safety Officer to include with **the Department of Safety's Incident Report.**

B. **Dispatch should:**
   1. Contact the Department of Safety to secure the area.
   2. Verify that Facility Services has been contacted.
   3. During regular business hours contact the Natural Sciences Laboratory Program Manager, the Director of Safety, the Director of Facility Services, the VP for Human Resources & Compliance, the Facility Maintenance Service Manager and the Facilities Assistant should also be notified.
   4. During other hours, or if the above employees cannot be reached, Dispatch has the cell/home phone numbers for these individuals.
   5. Also, after regular hours, call 911 for emergency response.

C. The Department of Safety should:
   1. Secure the area. Entry to the affected area is prohibited. Only appropriate contracted or emergency response personal will be permitted to enter affected areas. Department of Safety will monitor entry and restrict access to the affected area.
   2. If a fire occurs in the affected area, notify the responding fire company on arrival as hazardous materials response may be required.
   3. Complete an Incident Report and forward it to the Workplace Safety Committee for review.

D. Facility Services should:
   1. Control the ventilation in the area and isolate HVAC Systems. This will minimize the spread of fumes throughout the facility. Turn off all make up air and leave on only exhaust air, with no recirculation.
   2. Obtain a copy of the floor plan/building drawing to show access points to the contaminated space for the emergency responders. Provide to individuals in B.4 above or to emergency responders when they arrive.

E. Individuals noted in B.3 above should:
   1. Call 911.
   2. Contact a licensed Chemical Response Company to do the cleanup and remediation:
      - Environmental Hazard Control
      - Cocciardi Associates

      (NOTE: If the area is isolated, the cleanup can be delayed for several days, until arrangements may be made. If this occurs, seal doors with tape and post signs warning of danger of entry.)

F. **Campus and Building Services will** provide the final cleaning of the area after it is determined to be safe by the licensed Chemical Response Company.

Disposal of Spilled Mercury Materials

A. All materials involved with the spill will be placed in an appropriate container and sealed. The container will be brought to the Lenhert Building and placed in the central collection room for hazardous waste. The Facilities Assistant will schedule the removal of such waste by a licensed hazardous waste hauler.

B. Notify the Facilities Assistant to pick up the spilled materials as part of the normal chemical waste removal.
C. Disposal manifest and all related documentation will be filed in the Facility Service Office Resource Room.

Illness or Injury from Mercury Exposure

A. Employees that are concerned about exposure to the vapors should contact the Department of Human Resources & Compliance or be transported immediately to the hospital as noted on the selected workers compensation panel.
B. Emergency illness should be reported to 911 and transported to the nearest hospital.
C. If an employee is hospitalized as an in-patient, OSHA must be contacted by phone within 24 hours of the occurrence. This contact should be made by the VP for Human Resources & Compliance, the VP for Operations or the VP for Human Resources and Compliance. (See Section 9 of the *Safety Manual* for more information.) If these individuals are not on campus, contact Dispatch to have them alerted.

Training for Employees Involved in Spill Response

This procedure should be communicated at least annually with all personnel who have a responsibility in spill containment or clean-up as outlined in the procedure. The VP for Human Resources & Compliance will send this procedure to all such employees (or to their supervision who should then forward to employees); employees will be responsible to familiarize themselves with the contents. These employees include but are not limited to anyone in the following positions and their leadership:

- All personnel and leadership in the Department of Safety
- All personnel and leadership in Facility Maintenance
- All personnel and leadership in Campus and Building Services
- All personnel and leadership in Grounds
- All personnel and leadership in the Engle Center
- VP for Operations
- VP for Human Resources and Compliance
- Lab managers and personnel working in **any SEH lab areas where chemicals are present**, including but not limited to Chemistry, Biology, Engineering, etc.
- Personnel working with Collaboratory projects where chemicals are present
- Technicians and personnel working in **any ART studio where chemicals are present**, including but not limited to Visual Arts and Theater & Dance
- Employees in the press room of University Press
- Employees who manage chemical wastes
- Lab managers and personnel **at Winding Hill working in any lab area where chemicals are present**
- Employees at Winding Hill manage chemical wastes

CONTACTS REFERENCED IN PROCEDURE AND APPLICABLE PHONE NUMBERS

Title	Name	Extension
Cadaver Lab Coordinator, *Winding Hill*	Don Zhao	2115
Campus and Building Services		7145
Director of Facility Services		3500
Director of Safety		2467
Dispatch		6005
Facility Services Administrative Assistant	Scott Zeigler	2940
Facility Maintenance Service Manager	Brian Miller	7151
Facility Services	Mark Graybill	6011
Natural Sciences Laboratory Program Manager	Lauri Norbeck	2165
VP for Human Resources & Compliance	Amanda Coffey	3320
VP for Operations	Kathie Shafer	6003
Workplace Safety Committee Chair:	Jennifer Smithmyer	7085

NOTE: If employee cannot be reached or incident does not occur during regular hours, contact Dispatch. They have a list of home phone and cell phone numbers for key employees. To contact dispatch using a cell phone, dial 717-691-6005.

Company	Contact Info
3E for SDSs if online system is down	1-800-451-8346
Cocciardi Associates	717-766-4500
Environmental Hazard Control (EHC)	1-800-338-3424 Emergency Cell: 717-278-8398
OSHA*	Harrisburg Area Office Phone Number: (717) 782-3902 Central Phone Number: 1-800-321-OSHA (1-800-321-6742)
PA DEP Emergency Spill Reporting*	Regular business hours: 717-705-4741 After hours: 877-333-1904 Emergency state hotline: 1-800-541-2050

* Contact with these regulatory agencies should only be made with the involvement of the VP of Operations, the VP of Human Resources and Compliance, or the Director of Facility Services. For Winding Hill, the VP of Human Resources and Compliance should be involved.

EMPLOYEES TRAINED TO USE MERCURY SPILL CLEANUP KITS

Name	Title	Ext.
Lauri Norbeck	Natural Sciences Laboratory Program Manager	2165
Sarah Crone	Natural Sciences Assistant Laboratory Program Manager	2189
John Meyer	Engineering Technician/Lab Assistant	7101

EMPLOYEES TRAINED TO USE CHEMICAL SPILL CLEANUP KITS

Name	Title	Ext.
Lauri Norbeck	Natural Sciences Laboratory Program Manager	2165
Laurie de la Riva	Natural Sciences Assistant Laboratory Program Manager	2189
John Meyer	Engineering Technician/Lab Assistant	7101
Don Zhao	Cadaver Lab Coordinator, *Winding Hill*	2115

LOCATION OF MERCURY SPILL CLEANUP KITS

Location of Kit	Person Responsible for Maintaining Contents
Kline/Jordon: room K301	Natural Sciences Laboratory Program Manager
Lenhert Facility Services Office	Facility Services

LOCATION OF CHEMICAL SPILL CLEANUP KITS

Location of Kit	Person Responsible for Maintaining Contents
ECC Loading Dock	Campus and Building Services/Facilities
Falcon Hut, Upper Storage Area	Campus and Building Services/Facilities
Kline/Jordan: room K301	Natural Sciences Laboratory Program Manager
Larsen 114 inside exterior door	Campus and Building Services/Facilities
Lenhert Facility Services Office	Facility Services
Miscellaneous supplies available from Chemistry	Natural Sciences Laboratory Program Manager
Security/Safety Office and Patrol Vehicles	Department of Safety
Winding Hill: Cadaver Lab Area	Cadaver Lab Coordinator

NOTE: It is the responsibility of the areas where these kits are located to audit/maintain their contents.

Section 9: EMPLOYEE INFORMATION AND TRAINING

All employees who may be exposed to hazardous chemicals under normal operating conditions or in foreseeable emergencies must be given training **prior to the start of their job assignments**. Workers such as office workers who encounter hazardous chemicals only in non-routine, isolated instances do not need to be included in this training. Student workers may be included, depending on their job assignment.

Portions of the training may be given as part of online orientation for all new employees (full-time, part-time, faculty, administration, staff, and student employees). However, area specific training must be given by leadership of the area (or a designee authorized to provide the training).

Re-training or additional training is required if the contents of the *Written Hazard Communication Program* changes in a manner that would impact employee knowledge, safety or work procedures; if new hazardous chemicals are added to the work area; or if new tasks are added to the job function which could result in a change to exposure to hazardous chemicals.

All Hazard Communication training must be documented to show, as a minimum:

- Date training was given
- Name and title of trainer
- Name of trainee
- Summary of contents of training

A copy of this documentation should be forwarded to the office of Human Resources & Compliance (Suite 3015) for record retention; for student employees a copy should be forward to the Student Employment Coordinator.

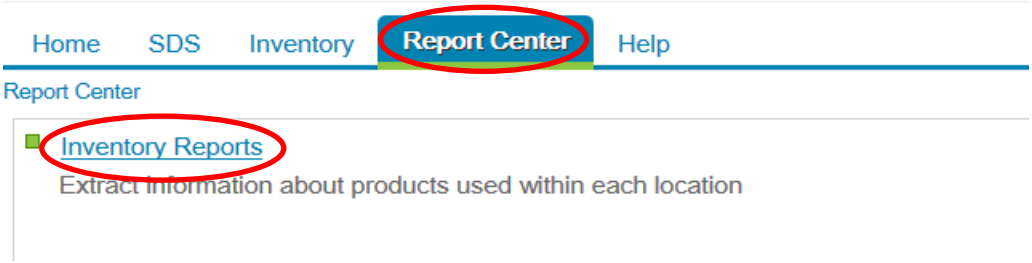
The training should include:

a) Location of the *Written Hazard Communication Program* and description of its contents
b) Safety Data Sheets – how to read them (contents); how to access them
c) Labels and other forms of warning – explanation of GHS labels; labeling requirements; secondary container labels; signs used in work areas and bulk storage areas; specific area signs should be reviewed by leadership
d) Chemical Hazards – physical hazards; health hazards including carcinogens, reproductive toxins and target organ toxins; specific lists should be covered by area leadership
e) Operations in work area where hazardous chemicals may be present – this should be covered by specific work area leadership
f) Methods to inform employees of hazards of chemicals including hazards of non-routine tasks – this should be covered by the specific work area leadership
g) Measures used to protect against chemical exposures – these should be covered by specific work area leadership
h) Inventory list –where they can access the area inventory list (3E system)
i) Purchasing of chemicals – this should be covered by the specific work area leadership: who may purchase chemicals for the specific area
j) Contractors – this should be covered by the specific work area, if applicable

Section 10: INVENTORY LIST(S) OF HAZARDOUS CHEMICALS

Each area should maintain an inventory list of all chemicals used/stored in their area(s). These lists should be readily available for all employees to view; they are available electronically via the Verisk 3E SDS access program. To access the 3E/Verisk inventory lists, go to FalconLink, then check the box next to "Environmental, Health & Safety" under FILTER BY TOPIC. Click on the link called "Safety Data Sheet (M)SDS Online System" from the list that appears. (Or type "Safety Data Sheet" in the FalconLink search box.)

Once in the 3E system, you will see five tabs at the top of your screen. Select the Report Center tab. Then select *Inventory Reports*.



This allows you to obtain an inventory list of SDSs for a specific department/area on campus.

1. To use this option, you must first select the area from the list at the left of the screen (1). If a list of locations is not displayed, click on the + sign next to "My locations." This will open the list of locations/departments.
2. Then select the type of report you wish to run (2).
3. Click the "Run Report" button.
4. If there are multiple pages, simply click on the forward or backward arrows at the top of the screen by the page numbers.

The list should be kept current. It is best that the individual who has been designated to purchase chemicals for the area also maintain the inventory list.

All new chemicals should be added as they are ordered. When additions are made to the chemical inventory for an area, the office of Human Resources & Compliance should be notified immediately (Suite 3015); either a copy of the SDS or the chemical name and manufacturer information should be forwarded. The Compliance Coordinator is then responsible for notifying the 3E Company so the SDS can be added to the database of SDSs for Messiah University and so the electronic inventory list maintained by 3E can be updated.

If a chemical is no longer present/used in the area and there is no intention to reorder it, it should be removed from the inventory list. Notify the Compliance Coordinator who will have it removed from the 3E inventory for the specific area. If it is not used anywhere else on campus, the SDS will be archived at that time.

Section 11: CONTRACTORS

All items of this section are the responsibility of the Messiah University individuals/areas that oversee contractors who are working on campus or at Messiah owned/rented properties.

Individuals/areas of Messiah University that oversee contractors on campus are responsible to ensure that the contract supervisor is aware of any potential hazards his/her employees may be exposed to while performing their work on the Messiah University property. It is then the contract supervisor's responsibility to communicate this information to all contract employees who might be impacted. (Ex., chemicals that might be in or were previously in pipelines or plumbing being worked on.)

It is also the responsibility of the Messiah individual/area that is overseeing the contractor to obtain from the contractor representative copies of safety data sheets for any chemicals the contractor will be bringing on campus if there is the potential that Messiah University employees could be exposed to these chemicals. For example, a contractor working in a new building in which Messiah University employees are not present would not need to provide the SDSs; a contractor working in an existing building and in areas that are occupied by Messiah employees should provide SDSs. These SDSs should be maintained by the Messiah individual/area that is overseeing the work as they are the immediate point of contact in an emergency.

Messiah University's policy is for contractors to take all containers of **unused chemicals** with them at the end of their work unless otherwise agreed upon. It should be determined **prior to the start** of any contracted work who will be responsible and what the proper disposal will be for any **waste** generated as a result of the work. If it is decided that Messiah University will handle the proper disposal of any waste, the contractor must provide SDSs of any chemicals present in the waste.

Section 12: NFPA LABEL CODES FOR COMMON CHEMICALS

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Acetal	2	3	0	
Acetaldehyde	2	4	2	
Acetic Acid (glacial)	2	2	2	
Acetic Anhydride	3	2	2	W
Acetone	1	3	0	
Acetonitrile	2	3	0	
Acetophenone	1	2	0	
Acetyl Chloride	3	3	2	W
Acetylene	1	4	3	
Acetyl Peroxide	1	2	4	
Acrolein	3	3	2	
Acrolein Dimer	1	2	1	
Acrylic Acid (glacial)	3	2	2	
Acrylonitrile	4	3	2	
Adipic Acid	1	1	0	
Adiponitrile	4	2	0	
Aldol	3	2	1	
Allyl Acetate	1	3	0	
Allyl Alcohol	3	3	0	
Allyl Bromide	3	3	1	
Allyl Chloride	3	3	1	
Aluminum (dust or powder)	0	1	1	
3-Aminopropanol	3	2	0	
Ammonia, Anhydrous	3	1	0	
Ammonium Bromide	2	0	0	
Ammonium Chloride	2	0	0	
Ammonium Fluoride	3	0	0	
Ammonium Nitrate	2	0	3	OX
Ammonium Perchlorate	2	0	4	OX
Ammonium Permanganate	2	0	3	OX
Ammonium Sulfate	3	0	0	
Amyl Acetate	1	3	0	
Amyl Alcohol	1	3	0	
Amylamine	3	3	0	
Amylbenzene	1	2	0	
Amyl Chloride	1	3	0	
Amyl Ether	1	2	0	
Amyl Maleate	0	1	0	
Amyl Nitrate	2	2	0	OX
o-Amyl Phenol	2	1	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Amyl Propionate	0	2	0	
Amyl Stearate	0	1	0	
Amyl Toluene	2	2	0	
Aniline	3	2	0	
o-Anisidine	2	1	0	
Anisole	1	2	0	
Antimony Pentafluoride	3	0	1	
Antimony Pentasulfide	3	1	1	
Arsenic Chloride	3	0	0	
Arsenic Trisulfide	3	1	0	
Barium Chlorate	1	0	2	OX
Barium Nitrate	1	0	0	OX
Barium Peroxide	1	0	0	OX
Benzaldehyde	2	2	0	
Benzoic Acid	2	1	-	
Benzol (benzene)	2	3	0	
Benzotrifluoride	4	3	0	
Benzoyl Chloride	3	2	1	W
Benzyl Acetate	1	1	0	
Benzyl Alcohol	2	1	0	
Benzyl Cyanide	2	1	0	
Benzyl Salicilate	1	1	0	
Beryllium (dust or powder)	4	1	0	
Biphenyl	2	1	0	
Boron Trifluoride	3	0	1	
Bromine	4	0	0	OX
Bromine Trifluoride	4	0	3	OX, W
Bromobenzene	2	2	0	
o-Bromotoluene	2	2	0	
Butadiene Monoxide	2	3	2	
Butane	1	4	0	
1-Butane	1	4	0	
Butenediol	1	1	0	
Butyl Acetate	1	3	0	
Butyl Acetoacetate	1	2	0	
Butyl Acrylate	2	2	2	
Butyl Alcohol	1	3	0	
Butylamine	2	3	0	
Butylamine Oleate	3	2	0	
Butylbenzene	2	2	0	
Butyl Benzoate	1	1	0	
Butyl Bromide	2	3	0	
Butyl Chloride	2	3	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Butylcyclohexane	0	-	0	
Butyldecalin	1	1	0	
Butyl Formate	2	3	0	
N-Butyl Isocyanate	3	2	2	
Butyl Isovalerate	0	-	-	
Butyl Lactate	1	2	0	
Butyl Methacrylate	2	2	0	
Butyl Naphthalene	1	1	0	
Butyl Nitrate	1	3	3	
Butyl Oxalate	0	1	0	
Butyl Propionate	2	3	0	
Butyl Stearate	1	1	0	
Butyl Trichlorosilane	2	2	0	
Butyraldehyde	2	3	0	
Butyraldol	2	2	0	
Butyraldoxime	2	2	0	
Butyric Acid	2	2	0	
Calcium Carbide	1	4	2	~~W~~
Calcium Chlorate	2	0	2	OX
Calcium Cyanide	3	0	0	
Calcium Hypochlorite	2	0	2	OX
Calcium Oxide	1	0	1	
Camphor	0	2	0	
Caproic Acid	2	1	0	
Capryladehyde	2	2	0	
Caprylyl Chloride	3	2	1	
Carbon Disulfide	2	3	0	
Carbon Monoxide	2	4	0	
Carbon Tetrachloride	3	0	0	
Castor Oil	0	1	0	
Chlorine	3	0	0	OX
Chlorine Monoxide	3	4	3	
Chloroacetic Acid	3	1	0	
Chloroaceto Phenone	2	1	0	
Chlorobenzene	2	3	0	
Chloroform	2	0	0	
Chloropicrin	4	0	3	
Chlorotoluene	2	2	0	
Chromic Acid	3	0	1	OX
Citral	0	2	0	
Cobalt Naphtha	1	2	0	
Coconut Oil	0	1	0	
Cod Liver Oil	0	1	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Corn Oil	0	1	0	
Creosote Oil	2	2	0	
o-Cresol	3	2	0	
Crotonaldehyde	3	3	2	
Crotonic Acid	3	2	0	
Crotononitrile	-	1	0	
Cumene	2	3	0	
Cupric Nitrate	1	0	0	OX
Cyanogen	4	4	2	
Cyanogen Bromide	3	0	2	
Cyclobutane	1	4	0	
Cyclohexane	1	3	0	
Cyclohexanol	1	2	0	
Cyclohexanone	1	2	0	
Cyclohexene	1	3	0	
Cyclohexenone	1	3	0	
Cyclohexyl Chloride	2	3	0	
Cyclopentane	1	3	0	
Cyclopentene	1	3	1	
Cyclopentanone	2	3	0	
Cyclopropane	1	4	0	
Decaborane	3	2	1	
Decane	0	2	0	
Decanol	0	2	0	
1-Decene	0	2	0	
Decylamine	2	1	0	
Dehydroacetic Acid	1	1	0	
Denatured Alcohol	0	3	0	
Deuterium	0	4	0	
Diacetone Alcohol	1	2	0	
Diamyl Sulfide	2	2	0	
Dibenzoyl Peroxide	1	4	4	OX
Diborane	3	4	3	W
Dibutylamine	3	2	0	
Dibutyl Ether	2	3	0	
Dibutyl Oxalate	0	1	0	
Dibutyl Phosphite	3	2	0	
Dibutyl Phthalate	0	1	0	
o-Dichlorobenzene	2	2	0	
1,2-Dichlorobutane	2	2	0	
1,1-Dichloroethene	2	4	2	
1,2-Dichloroethylene	2	3	2	
Dichlorosilane	3	4	2	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Didecyl Ether	0	1	0	
Diesel Fuel Oil No. 1	0	2	0	
Diethylamine	2	3	0	
Diethylene Glycol Dimethyl Ether	1	2	1	
Diethylene Triamine	3	1	0	
Diethyl Fumarate	1	1	0	
Diethyl Ketone	1	3	0	
Diethyl Succinate	1	1	0	
Diethyl Sulfate	3	1	1	
Diethylzinc	0	3	3	W
Dihexylamne	2	1	0	
Diisobutylamine	3	3	0	
Diisobutyl Carbinol	1	2	0	
Diisobutyl Ketone	1	2	0	
Diisooctyl Phthalate	0	1	0	
Diisopropylamine	3	3	0	
Diisopropyl Benzene	0	2	0	
Diketene	2	2	2	
Dimethylamine	3	4	0	
N, N-Dimethylaniline	3	2	0	
2,2-Dimethylbutane	1	3	0	
Dimethyldioxane	2	3	0	
N, N-Dimethylformamide	1	2	0	
Dimethyl Maleate	1	1	0	
2,3-Dimethyloctane	0	2	0	
2,3-Dimethylpentane	0	3	0	
Dimethyl Phthalate	0	1	0	
Dimethyl Sulfate	4	2	0	
dimethyl Sulfide	2	4	0	
Dimethyl Sulfoxide	1	1	0	
Dinitrobenzene (ortho)	3	1	4	
2,4-Dinitrotoluene	3	1	3	
Dioctyl Ether	0	1	0	
p-Dioxane	2	3	1	
Dioxolane	2	3	2	
Dipentene	0	2	0	
Diphenylamine	3	1	0	
Diphenyl Phthalate	0	1	0	
Dipropylamine	3	3	0	
Divinylbenzene	2	2	2	
Divinyl Ether	2	3	2	
Dodecane	0	2	0	
1-Dodecanethiol	2	1	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
1-Dodecanol	0	1	0	
Endrin (dry)	2	0	0	
Epichlorohydrin	3	2	1	
Ethane	1	4	0	
Ethanolamine	2	2	0	
Ethoxybenzene	0	2	0	
3-Ethoxypropanal	2	2	0	
Ethyl Acetate	1	3	0	
Ethyl Acrylate	2	3	2	
Ethyl Alcohol	0	3	0	
Ethylamine	3	4	0	
Ethylbenzene	2	3	0	
Ethyl Benzoate	1	1	0	
Ethyl Borate	2	3	0	
Ethyl Bromide	2	1	0	
Ethylbutylamine	3	3	0	
Ethyl Butyl Carbonate	2	2	1	
Ethyl Butyl Ketone	1	2	0	
Ethyl Butyrate	0	3	0	
Ethyl Caprylate	2	2	0	
Ethyl Chloride	2	4	0	
Ethyl Crotonate	2	3	0	
Ethylcyclohexane	1	3	0	
Ethylene	1	4	2	
Ethylenediamine	3	2	0	
Ethylene Dichloride	2	3	0	
Ethylene Glycol	1	1	0	
Ethylene Glycol Dibutyl Ether	1	2	0	
Ethylene Glycol Ethylbutyl Ether	1	2	0	
Ethylene Glycol Monobutyl Ether Acetate	1	2	0	
Ethylene Oxide	2	4	3	
Ethyl Ether	2	4	1	
Ethyl Formate	2	3	0	
Ethyl Isobutyrate	0	3	0	
Ethyl Mercaptan	2	4	0	
4-Ethylmorpholine	2	3	0	
Ethyl Nitrate	2	3	4	
Ethyl Oxalate	0	2	0	
Ethyl Propionate	-	3	0	
Ethyl Silicate	2	2	0	
Fluorine	4	0	3	W, OX
Formaldehyde (water solution)	2	2	0	
Formamide	2	1	-	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Formic Acid	3	2	0	
Furan	1	4	1	
Furfuryl Alcohol	1	2	1	
Gas, Natural	1	4	0	
Gasoline 56-100 Octane	1	3	0	
Glycerine	1	1	0	
Glycidyl Acrylate	0	2	0	
Heptane	1	3	0	
2-Heptanol	0	2	0	
Heptylene	0	3	0	
Hexadecane	0	1	0	
Hexanal	2	3	1	
Hexane	1	3	0	
3-Hexanone	1	3	0	
1-Hexene	1	3	0	
Hexyl Alcohol	1	2	0	
Hexyl Methacrylate	0	2	0	
Hydrazine (Anhydrous)	3	3	2	
Hydrocyanic Acid-96%	4	4	2	
Hydrogen	0	4	0	
Hydrochloric Acid	3	0	0	
Hydrobromic Acid	3	0	0	
Hydrofluoric Acid	4	0	0	
Hydrogen Peroxide (35% to 52% by weight)	2	0	1	OX
Hydrogen Sulfide	3	4	0	
Hydroquinone	2	1	0	
Isoamyl Acetate	1	3	0	
Isoamyl Alcohol	1	2	0	
Isobutane	1	4	0	
Isobutyl Acetate	1	3	0	
Isobutyl Acrylate	1	3	1	
Isobutyl Alcohol	1	3	0	
Isobutylbenzene	2	2	0	
Isobutyl Chloride	2	3	0	
Isobutyl Methyl Ketone	2	3	0	
Isobutyraldehyde	2	3	1	
Isobutyric Acid	1	2	0	
Isobutyric Anhydride	1	2	1	W
Isodecaldehyde	0	2	0	
Isodecanoic Acid	0	1	0	
Isohexane	1	3	0	
Isooctane	0	3	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Isooctanoic Acid	0	1	0	
Isooctyl Alcohol	0	2	0	
Isopentane	1	4	0	
Isophorone	2	2	0	
Isoprene	2	4	2	
Isopropyl Acetate	1	3	0	
Isopropyl Alcohol	1	3	0	
Isopropyl Chloride	2	4	0	
Isopropyl Ether	2	3	1	
Jet Fuels (JP-4)	1	3	0	
Jet Fuels (JP-5)	0	2	0	
Lanolin	0	1	0	
Lead Arsenates	2	0	0	
Lead Nitrate	1	0	0	OX
Lead Thiocyanate	1	1	1	
Lithium	1	1	2	W
Lithium Hydride	3	4	2	W
Lubricating Oil, Mineral	0	1	0	
Magnesium (including all alloys)	0	1	2	W
Magnesium Nitrate	1	0	0	OX
Magnesium Perchlorate	1	0	0	OX
Maleic Anhydride	3	1	1	
Mercuric Cyanide	3	0	0	
Mesityl Oxide	3	3	0	
Methacrylic Acid	3	2	2	
Methane	1	4	0	
Methyl Acetate	1	3	0	
Methyl Acrylate	2	3	2	
Methylal	2	3	2	
Methyl Alcohol	1	3	0	
Methylamine	3	4	0	
Methyl Amyl Ketone	1	2	0	
Methyl Benzoate	0	2	0	
Methyl Borate	2	3	1	
Methyl Bromide	3	1	0	
Methyl Butyl Ketone	2	3	0	
Methyl Carbonate	2	3	1	
Methyl Cellosolve Acetate	0	2	0	
Methyl Chloride	2	4	0	
Methyl Chloroacetate	2	2	1	
Methylcyclohexane	2	3	0	
Methylcyclohexanone	-	2	0	
Methylcyclopentane	2	3	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Methylene Chloride	2	1	0	
Methylene Diisocyanate	1	2	1	W
Methyl Ether	2	4	1	
Methyl Ethyl Ether	2	4	1	
Methyl Ethyl Ketone	1	3	0	
Methyl Formate	2	4	0	
Methyl Glycol Acetate	1	2	0	
Methyl Hexyl Ketone	0	2	0	
Methylhydrazine	3	3	2	
Methyl Isoamyl Ketone	1	2	0	
Methyl Isobutyl Carbinol	2	2	0	
Methyl Isobutyl Ketone	2	3	0	
Methyl Isocyanate	2	3	3	W
Methyl Lactate	1	2	0	
Methyl Mercaptan	2	4	0	
Methyl Methacrylate	2	3	2	
Methyl Parathion (solid)	4	1	2	
2-Methyl-1-Pentene	1	3	0	
Methyl Phenylacetate	0	2	0	
1-Methyl Piperazine	2	2	0	
Methyl Propionate	1	3	0	
Methyl Propyl Ketone	2	3	0	
2-Methylpyrazine	2	2	0	
Methylpyrrole	2	3	1	
Methylpyrrolidine	2	3	1	
Methyl Salicylate	1	1	0	
Methyl Stearate	0	1	0	
Methyl Toluene Sulfonate	2	1	0	
Methyl Vinyl Ketone	3	3	2	
Mineral Oil	0	1	0	
Mineral Spirits	0	2	0	
Morpholine	2	3	0	
Mustard Oil	3	2	0	
Naptha	1	3	0	
Napthalene	2	2	0	
Nickel Carbonyl	4	3	3	
Nicotine	4	1	0	
Nitric Acid	3	0	0	OX
p-Nitroaniline	3	1	3	
Nitrobenzene	3	2	0	
Nitrobiphenyl	2	1	0	
Nitrochlorobenzene	3	1	1	
Nitroethane	1	3	3	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Nitrogen (liquified)	3	0	0	
Nitrogen Peroxide	3	0	0	OX
Nitrogen Trioxide	3	0	0	OX
Nitroglycerine	2	2	4	
Nitromethane	1	3	3	
1-Nitropropane	1	3	1	
o-Nitrotoluene	2	1	4	
Nonadecane	0	1	0	
Nonane	0	3	0	
Nonene	0	3	0	
Nonylbenzene	0	1	0	
Octadecane	0	1	0	
Octane	0	3	0	
2-Octanol	1	2	0	
1-Octene	1	3	0	
Oleic Acid	0	1	0	
Olive Oil	0	1	0	
Oxalic Acid	2	1	0	
Oxygen (liquid)	3	0	0	OX
Paraffin Oil	0	1	0	
Paraformaldehyde	2	1	0	
Paraldehyde	2	3	1	
Parathion	4	1	2	
Pentaborane	3	3	2	
Pentachlorophenol (dry)	3	0	0	
Pentane	1	4	0	
Pentanoic acid	2	1	0	
Pentaphen	2	1	0	
1-Pentene	1	4	0	
Perchloric Acid	3	0	3	OX
Perchloroethylene	2	0	0	
Petroleum, Crude	1	3	0	
Petroleum Ether	1	4	0	
Phenol	3	2	0	
Phenylacetaldehyde	1	2	0	
Phenyl Acetate	1	2	0	
Phenylacetic Acid	1	1	0	
o-Phenylenediamine	-	1	0	
Phenylhydrazine	3	2	0	
Phenylpropyl Alcohol	0	1	0	
Phosgene	4	0	0	
Phosphine	3	4	1	
Phosphoric Acid	2	0	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Phosphorus Pentasulfide	3	1	2	W
Phosphorus, Red	0	1	1	
Phosphorus Trichloride	3	0	2	W
Phosphorus, White or Yellow	3	3	1	
Phosphoryl Chloride	3	0	2	W
Phthalic Acid	0	1	1	
Phthalic Anhydride	2	1	0	
Picric Acid	2	4	4	
Pine Oil	0	2	0	
Pine Tar	0	2	0	
Piperazine	2	2	0	
Piperidine	2	3	3	
Potassium	3	1	2	W
Potassium Bromate	1	0	0	OX
Potassium Chlorate	2	0	0	OX
Potassium Cyanide	3	0	0	
Potassium Hydroxide (lye)	3	0	1	
Potassium Nitrate	1	0	0	OX
Potassium Permanganate	1	0	0	OX
Potassium Peroxide	3	0	2	W, OX
Potassium Persulfate	1	0	0	OX
Potassium Sulfide	2	1	0	
Propane	1	4	0	
Propionic Acid	2	2	0	
Propionyl Chloride	3	3	1	
Propyl Acetate	1	3	0	
Propyl Alcohol	1	3	0	
Propylamine	3	3	0	
Propyl Chloride	2	3	0	
Propylene	1	4	1	
Propylene Dichloride	2	3	0	
Propylene glycol	0	1	0	
Propylene Oxide	2	4	2	
n-Propyl Ether	-	3	0	
Propyl Nitrate	2	4	3	OX
Pyridine	2	3	0	
Pyrrole	2	2	0	
Pyrrolidine	2	3	1	
Quinoline	2	1	0	
Resorcinol	-	1	0	
Rhodinol	0	1	0	
Salicylic Acid	0	1	0	
Silane	1	4	2	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Silver Nitrate	1	0	0	OX
Sodium	3	1	2	W
Sodium Chlorate	1	0	2	OX
Sodium Chlorite	1	1	2	OX
Sodium Cyanide	3	0	0	
Sodium Fluoride	2	0	0	
Sodium Hydride	3	3	2	W
Sodium Hydroxide (lye)	3	0	1	
Sodium Nitrate	1	0	0	OX
Sodium Perchlorate	2	0	2	OX
Sodium Peroxide	3	0	2	OX, W
Sodium-Potassium Alloys	3	3	2	W
Sodium Sulfide	2	1	0	
Stannic Chloride	3	0	1	
Stearic Acid	1	1	0	
Stearyl Alcohol	0	-	0	
Stoddard Solvent	0	2	0	
Styrene	2	3	2	
Sulfur	2	1	0	
Sulfur Chloride	2	1	2	W
Sulfur Dioxide	2	0	0	
Sulfuric Acid	3	0	2	W
Tannic Acid	0	1	0	
Terephthaloyl Chloride	3	1	0	
Tetrachlorobenzene	0	10	0	
Tetrachloroethylene	2	0	0	
Tetradecanol	0	1	0	
Tetraethylene Glycol	1	1	0	
Tetraethyl Lead, Compounds	3	2	3	
Tetrafluoroethylene	3	4	3	
Tetrahydrofuran	2	3	1	
Tetramethyl Lead, Compounds	3	3	3	
Thionyl Chloride	3	0	2	W
Thiophene	2	3	0	
Titanium Tetrachloride	3	0	1	
Toluene	2	3	0	
Toluene-2,4-Diisocyanate	3	1	1	
o-Toluidine	3	2	0	
Trimylamine	2	1	0	
Triamylbenzene	0	1	0	
Tributylamine	2	2	0	
Tributyl Phosphate	2	1	0	
Tributylphosphine	0	1	0	

CHEMICAL	HEALTH	FIRE	REACT	SPEC. HAZ.
Tributyl Phosphite	2	1	1	
1,1,1-Trichloroethane	2	1	0	
Trichloroethylene	2	1	0	
Trichloroethylsilane	3	3	0	
Trichlorosilane	3	4	2	W
Triethanolamine	2	1	1	
Triethylamine	2	3	0	
Triethyl Phosphate	0	1	1	
Triisobutyl Borate	3	2	1	
Trimethylamine	2	4	0	
Trimethylchlorosilane	3	3	2	W
Trinitrobenzene	2	4	4	
Trinitrotoluene (tnt)	2	4	4	
Trioxane	2	2	0	
Triphenylmethane	0	1	0	
Tripropylene	0	3	0	
Tripropylene Glycol	0	1	0	
Turpentine	1	3	0	
2-Undecanol	1	1	0	
Valeraldehyde	1	3	0	
Vanadium Tetrachloride	3	0	2	W
Vinyl Acetate	2	3	2	
Vinyl Bromide	2	0	1	
Vinyl Butyl Ether	2	3	2	
Vinyl Chloride	2	4	1	
Vinyl Crotonate	2	3	2	
Vinyl Ethyl Alcohol	0	2	0	
Vinyl Ethyl Ether	2	4	2	
Vinyl Fluoride	1	4	2	
Vinylidene Chloride	2	4	2	
Vinylidene fluoride	1	4	2	
Vinyl Methyl Ether	2	4	2	
Vinyl Propionate	2	3	2	
Vinyl Toluene	2	2	1	
o-Xylene	2	3	0	
o-Xylidine	3	1	0	
Zinc (powder or dust)	0	1	1	
Zinc Chlorate	2	0	2	OX
Zirconium Tetrachloride	3	0	1	

REVISION/REVIEW LOG

This manual will be reviewed in its entirety on an annual basis and the annual review date recorded on the cover. However, any revisions made independent of this annual review and all major revisions made as part of this annual review will be documented below.

Section 1: INTRODUCTION	
Revision	**Date**
Program made into campus-wide document.	October 2013
Updated to reflect the Environmental, Health & Safety channel on MC-Square where a link to this manual appears.	July 2014
Updated to reflect conversion of MC-Square to College Intranet.	May 2017
Updated to reflect conversion from MC-Square to FalconLink.	October 2018

Section 2: DEFINITIONS	
Revision	**Date**
Program made into campus-wide document.	October 2013

Section 3: LABELS AND OTHER FORMS OF WARNING	
Revision	**Date**
Program made into campus-wide document.	October 2013

Section 4: SAFETY DATA SHEETS (SDSs)	
Revision	**Date**
Program made into campus-wide document.	October 2013
Changed screen shots of 3E Online system to reflect changes 3E Company made (ex., color changes and addition of 5th tab.	May 2014
Update access via MC-Square to reflect the EHS channel now available on both the Employee and Student tabs.	July 2014
Added statement re SDSs for toner cartridges used in copiers.	July 2016
Updated to reflect conversion of MC-Square to College Intranet.	May 2017
Updated to reflect conversion from MC-Square to FalconLink.	October 2018
Campus Post Office and Dept of Safety added to locations where SDSs for toner cartridges can be found.	March 2022

Section 5: METHODS TO INFORM EMPLOYEES OF HAZARDS OF CHEMICALS	
Revision	**Date**
Program made into campus-wide document.	October 2013

Section 6: CHEMICAL HAZARDS

Revision	Date
Program made into campus-wide document.	October 2013
Added welding fumes and UV radiation from welding to list of carcinogens.	May 2017

Section 7: MEASURES TO PROTECT AGAINST CHEMICAL EXPOSURES AND GENERAL WORKSITE SAFETY PRACTICES	
Revision	**Date**
Program made into campus-wide document.	October 2013
Added section on proper use of fire blankets.	August 2014
Revised section on Personal Protective Equipment to simply reference Section 25 of the *Safety Manual*.	September 2015

Section 8: SPILL PROCEDURE	
Revision	**Date**
Program made into campus-wide document.	October 2013
Updated Attachment A, Contacts Referenced In Procedure	September 2014
Updated Contacts to change Director of Safety from C Burger to L Maynard	May 2016
Updated to include Winding Hill.	May 2017
Added minor clarifications for Winding Hill and updated list of contacts in Attachment A.	September 2017
Changed references to Steven Funck to Lauri Norbeck	August 2019
Defined RCRA and corrected typo; updated contacts.	October 2019

Section 9: EMPLOYEE INFORMATION AND TRAINING	
Revision	**Date**
Program made into campus-wide document.	October 2013

Section 10: INVENTORY LIST(S) OF HAZARDOUS CHEMICALS	
Revision	**Date**
Program made into campus-wide document.	October 2013
Updated to reflect changes to 3E Online system. (Addition of Report Center tab to be used for inventory lists instead of Inventory tab; picture of new “look” which reflects color changes.)	May 2014
Updated to reflect conversion of MC-Square to College Intranet.	May 2017
Updated to reflect conversion from MC-Square to FalconLink.	October 2018

Section11: CONTRACTORS	
Revision	**Date**
Program made into campus-wide document.	October 2013

Section12: NFPA LABEL CODES FOR COMMON CHEMICALS	
Revision	**Date**

Program made into campus-wide document.	October 2013

ANNUAL REVIEWS COMPLETED:
May 2014; May 2015; May 2016; May 2017; May 2018; May 2019; May 2020; September 2021; June 2024

Changed all references from College to University and updated employee job titles/names impacted by Voluntary Separation Program:
July 2020

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