1912 SAINT JOSEPH'S COLLEGE

Hazard Communication Program

Your Right to Know

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SAINT JOSEPH'S COLLEGE POLICY

SAFETY IN THE WORKPLACE

It is the policy of Saint Joseph's College to comply with all Federal and State laws pertaining to the safety of College employees and to effect the elimination of unnecessary safety hazards from the workplace.

This policy includes requirements under Federal OSHA regulations (29 CFR 1910.1200), regulations issued by Federal and State Agencies covering hazardous chemicals, asbestos, radioactive waste materials, and other substance potentially harmful to employees or to students.

The President is committed to take actions necessary to assure that the College is in compliance with this policy and with all pertinent Federal and State regulations.

The Chemical Hygiene Officer is authorized to review and recommend for approval substance handling and use plans developed by individual departments prior to their implementation to assure compliance with this policy.

INTRODUCTION

This booklet is intended to help you better understand the safety and health hazards of chemicals. Although the focus here is on chemicals you may be exposed to on the job, what you will learn also applies to chemicals you may encounter at home. Chemical hazard awareness is a key to minimizing accidental injury and ill health due to chemical use.

SAINT JOSEPH'S COLLEGE CHEMICAL HAZARD COMMUNICATION PROGRAM

As users of hazardous chemicals, the College must fulfill certain obligations under State and Federal laws. These obligations include telling you:

1. The laws exist.
2. The campus is required to have a hazard communication program and the specific components or elements of that program.
3. There is a written statement that outlines the campus Hazard Communication Program, including lists of hazardous chemicals you may come into contact with, and compilations of Safety Data Sheets (Change contained in the new HCS (Hazard Communication Standard) 2012) on hazardous chemicals. (You will be informed where each of these is kept.)
4. About operations in your work area where hazardous chemicals are used. (You will be informed about these chemicals by your supervisor.)

The College has established a Chemical Hazard Communication Program in conformance with State and Federal laws to increase your awareness about the chemicals in your work area. The intent of this program is to make you an informed and active participant in your own safety. The program is called a communication program because its main feature is to alert you to and inform you about the chemicals with which you may come into contact.

There are four components of the College's program:

A. Chemical Hazard Training, which will enable you to understand and respond to information (communications) on chemicals.

B. Container Labels, which under the GHS are more organized and will serve as the means of communicating to you the common or chemical names of the hazardous chemicals contained, with appropriate hazard warnings.

C. Safety Data Sheets(SDS's, renamed from MSDS's), which are technical bulletins that serve as a valuable reference for information on hazardous chemicals.

D. Chemical Exposure Controls, which help prevent chemicals from being harmful.

A. CHEMICAL HAZARD TRAINING

The College has an obligation to provide adequate training that will prepare you to work safely with hazardous chemicals.

As part of your training, you will need to be aware of certain basic properties of hazardous chemicals. These properties relate to the following aspects:

1. How Can the Substance Cause Harm?
2. How Much of It Is Needed for Harm to Occur?
3. What Kinds of Contact Are Important?
4. How Can I Tell if the Substance Is Present?

1. How Can the Substance Cause Harm?

A stick of dynamite or a cyanide pill are examples of hazardous chemicals. They are both substances capable of doing harm one by physical destruction, the other by poisoning. A chemical is hazardous when it has the potential to do physical harm or make one ill. These, then, are the two potential harm categories: physical hazards and health hazards.

Of course, when we speak of such a potential, we assume it is under normal conditions of use or in response to emergency conditions. Otherwise, all chemicals would have to be considered hazardous. Even the most harmless could pose a problem if used in an absurd way. For example, common table salt, which is normally considered harmless, could kill if too much is swallowed at one sitting. But that would not be an ordinary use of the material.

a Physical Hazards

The following common categories of materials all present physical hazards. The specific properties of a substance which cause physical harm are well established. Refer to the glossary on pages 16-19 for more detailed definitions provided by OSHA. The specific properties include:

Combustible liquids - Liquids that can easily catch fire.

Compressed gasses - Gasses which are kept under high pressure inside special containers. Explosives - Chemicals that can suddenly and violently react under the right conditions.

Flammables - Substances that can easily catch fire. Flammable liquids are substances, which can burn at lower temperatures than combustible liquids.

In addition, there are other less common categories of substances, such as organic peroxides, oxidizers, pyrophoric substances, and reactive or water-reactive materials that will be explained if they are present in your work setting. If you must deal with a substance that is labeled as being in one or more of these categories, you should handle it in special ways.

b Health Hazards

Just as there are categories of substances posing physical harm, there are categories posing harm to our health. The health hazard categories are divided first by how fast the substance produces a noticeable effect on the body:

ACUTE EFFECTS are those which occur immediately, or very soon after exposure. According to OSHA, substances which cause acute effects include the following subcategories of materials:

- Irritants, like chlorine or formaldehyde, which cause reversible inflammation of the eyes, nose, throat, or skin;
- Corrosives, like caustic or acids, which cause visible destruction of living tissue;
- Sensitizing Agents, like poison ivy, which cause persons exposed to develop allergy-like responses upon repeat exposure, and toxins, like hydrogen sulfide or carbon monoxide, which are poisons. This category is further sub-divided into highly toxic and toxic groupings, based on chemical strength.

CHRONIC EFFECTS are those that take a longer time to develop. These substances can be categorized as:

- Carcinogens, like asbestos, which are proven or suspected cancer causing substances, and…
- Long-term Toxins, like lead, which are substances which change bodily organs or systems upon repeated exposure.

2. *How Much Of It Is Needed For Harm To Occur?*

The capability of a substance for producing harm after being taken in by the body is a measure of its potency, or more technically, its toxicity. The smaller the amount needed to produce harm, the more toxic the substance is. Theoretically, any substance, even the most highly toxic, can be tolerated by the body at some low level without measurable effect. The job of the toxicologist is to define that "no- effect" level.

In order for a toxic substance to be absorbed though, it must first overcome the body's ability to shield itself, neutralize or otherwise prevent the chemical from affecting our bodies.

The two factors— toxicity and the bodily defenses – are key factors in establishing safe limits of exposure. One more factor plays a role, and that is whether the harmful effect is caused by hazardous material or by cumulative exposure to multiple doses.

In the first case, if the effect is produced by a single involvement, it makes the most sense to limit exposure so that it never exceeds the amount capable of producing the adverse effect. As simple as this concept is, bear in mind that it's not always easy to say just how much is the minimum that will produce the adverse effect. After all, it is impossible to test each person to see what the safe limit is, so toxicologists must rely on experiments with animals or experience with accidental exposures. Often, there is controversy in using such data to project safe limits.

Most of the effects caused by one-time high level involvement with a hazardous substance are acute effects (those that occur immediately).

Again - to prevent acute effects, "never-to-exceed" limits are the ones that apply. In practice, these take the names of short-term exposure limits (STELs), instantaneous values, or ceiling limits, depending on the authority establishing the limit.

If the effect is produced by multiple involvements over a long period, it makes the most sense to limit the average daily involvement to some low level amount.

Most of the effects resulting from long-term involvements are chronic effects (those that take time to develop). Again - to prevent chronic effects, the average amount of involvement is the critical factor; occasional high levels can be tolerated without producing the chronic effect, as long as the average is not exceeded. The averages are most often expressed as time-weighted-averages or TWA limits.

The previous paragraphs highlight some of the reasons why there are so many limits; there are those that apply to acute hazards, those that apply to chronic hazards, and both may be set by different agencies.

The Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) are the two agencies involved in setting limits.

051-IA, an agency of the Federal Government, establishes Permissible Exposure Limits (PEL) which are legally binding limits of exposure. If employee exposure exceeds the PEL, the College may be cited by OSHA for having caused the exposure depending on the circumstances involved. In a few cases, OSHA also publishes a limit called an Action Level. The Action Level is a limit of exposure which is lower than the PEL; and if the Action Level is exceeded, certain programs such as exposure monitoring, medical surveillance, or special training must be started to ensure the PEL is not exceeded.

The ACGIH is not a government agency, and therefore has only advisory power. In other words, its limits are not the law. However, since it updates its limits more often, the ACGIH guides are more current and better reflect scientific opinion on safe exposure limits. The ACGIH limits are called Threshold Limit Values (TLV).

Under the College Communication Program, training will be provided on the specific hazardous chemicals in employee work areas. Training will include information on chemicals that might be used where you work as well as those that are brought in from outside.

This training will prepare you to recognize the potential chemical hazards of materials you work with and what precautions are appropriate. But it is also important that you know what to do in non- routine situations, such as chemical spills or other foreseeable emergencies. You will also be trained for these events.

If you work near pipes or piping systems containing hazardous materials, you will also be trained on the special hazards associated with them.

Finally, if there are chemical exposure control systems in your work area, you will be told about them, so that you can tell if they are functioning properly and how to work with them.

3. *What Kinds of Contact Are Important?*

A hazardous chemical must come into contact with you for it to harm your health. But the forms of possible contact are significant, particularly with regard to the kind of precautions that are appropriate. The different forms of contact are called routes of entry, and they include the following:

--Direct Contact (to the skin or eyes) is the most important form of contact for corrosive substances. One attempts to avoid direct contact with such materials by using closed process systems. But some potential for exposure (accidental or as a part of specific processes such as solvent cleaning) may still exist. For this reason, use protective clothing such as gloves, goggles, aprons or other gear as a supplement, to minimize possible contact.

--Inhalation is the breathing of the substance. Once a hazardous smoke, dust, vapor, mist or gas is inhaled, it may damage the nose, throat and lungs, or pass into the blood system and damage other parts of the body. Strive to minimize the generation of such substances, and to prevent dangerous concentrations of them from building up in work areas. As a backup, and to help in situations where dangerous concentrations could be present, respiratory protection equipment is to be used.

--Skin Absorption occurs when chemicals can pass through the skin and get into our blood system.Some 25% of the chemicals regulated by OSHA possess the capability to be taken up by the body through skin absorption.

--Ingestion involves accidental swallowing of even small quantities of substances. Some of these substances are very toxic and can cause harm. Hence, a strong case can be made to be sure hands are clean before eating (or smoking), and after having worked with a hazardous chemical (particularly if the hazardous substance is not readily visible).

4. *How Can I Tell if the Substance Is Present?*

The less detectable a hazardous substance, the more dangerous it is, other things being equal. Hazardous substances may be invisible, odorless and tasteless. That's why we must rely on various electronic monitors to alert us to their presence in situations where the substances might be present.

Many other substances have characteristic properties we can use, without electronic monitors, to determine their presence. Some have particular smells, like alcohol vapors or hydrogen sulfide (in low concentrations). Others have a characteristic appearance, like the green color of chlorine.

You will be trained on the characteristic properties of chemicals you deal with, so that you can detect a release of the substance or its presence.

B. Container Labels

Any hazardous chemicals received from suppliers will be in containers that are labeled with key items of information and adhere to the United Nation's developed GHS (Global Harmonized System) of presenting information about the contents.

- **Symbols** (pictograms presented on the next page) convey health physical and environmental hazard information, assigned to a GHS hazard class and category. Pictograms include the harmonized hazard symbols plus other graphic elements, such as specific border colors, background patterns and graphic orientation. Also, harmful chemicals and irritants are marked with an exclamation mark, replacing the European Saint Andrew's cross. Pictograms will have a black symbol on a white background with a red diamond frame. Where a transport pictogram, which has a different function, appears, the GHS pictogram for the same hazard should not appear.
- **Signal words**: "Danger" or "Warning" will be used to emphasize hazards and indicate the relative level of severity of the hazard, assigned to a GHS hazard class and category. Some lower level hazard categories do not use signal words. Only one signal word corresponding to the class of the most severe hazard should be used on a label.
- **Hazard statements**: Standard phrases assigned to a hazard class and category that describe the nature of the hazard. An appropriate statement for each GHS hazard should be included on the label for products possessing more than one hazard.

The additional label elements included in the GHS are:

- **Precautionary statements**: Measures to minimize or prevent adverse effects. There are four types of precautionary statements covering: prevention, response in cases of accidental spillage or exposure, storage, and disposal. The precautionary statements have been linked to each GHS hazard statement and type of hazard.
- **Product Identifier** (ingredient disclosure): Name or number used for a hazardous product on a label or in the SDS. The GHS label for a substance should include the chemical identity of the substance. For mixtures, the label should include the chemical identities of all ingredients that contribute to acute toxicity, skin corrosion or serious eye damage, germ cell mutagenicity, carcinogenicity, reproductive toxicity, skin or respiratory sensitization, or Target Organ Systemic Toxicity (TOST), when these hazards appear on the label.
- **Supplier identification**: The name, address and telephone number should be provided on the label.
- **Supplemental information**: Non-harmonized information on the container of a hazardous product that is not required or specified under the GHS. Supplemental information may be used to provide further detail that does not contradict or cast doubt on the validity of the standardized hazard information.

These labels will serve as the first means of conveying that a hazardous substance is present and that special precautions are in order. You will find additional information on the substance in the **Safety Data Sheet** for the substance named on the label, as exampled in Section C of this booklet.

Appropriate warnings indicative of the presence of hazardous chemicals will also be used for in-house containers (vessels, tanks, and barrels). However, the form of the warning may vary slightly from work area to work area. Any differences will be explained to you.

Never remove or deface any container label. Pipes and piping systems are handled separately from containers.

C. GHS (Global Harmonization System) Pictograms

HCS Pictograms and Hazards

Health Hazard  • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	**Flame**  • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	**Exclamation Mark**  • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  • Gases Under Pressure	**Corrosion**  • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals	**Exploding Bomb**  • Explosives • Self-Reactives • Organic Peroxides
Flame Over Circle  • Oxidizers	**Environment** **(Non-Mandatory)**  • Aquatic Toxicity	**Skull and Crossbones**  • Acute Toxicity (fatal or toxic)

D. Safety Data Sheets (SDS) (HCS 2012 name change from MSDS)

In addition to labels, suppliers will provide technical bulletins on hazardous chemicals. These technical bulletins are called safety data sheets or SDS's for short. Each SDS contains a wealth of detailed information, as described below.

The SDS's appropriate to chemicals in your work area will be kept in an accessible location, available for your use when needed. Feel free to refer to them, whenever you have a question about the chemicals in your work area.

Besides the name change, a very specific modification was implemented when HCS 1994 was updated to HCS 2012. Prior to HCS 2012, an MSDS could be provided by a chemical supplier in any format as long as the document contained the correct information. With adoption of HCS 2012, along with the name change from MSDS to SDS, a mandatory information format was specified. The following is a description of the particular location required and types of information found in an SDS:

Section 1 – Identification

Identifies the chemicals on the SDS and recommended uses. It also provides contact information for the supplier. Information required in this section includes:

- The product identifier used on the label and any common names or synonyms which the substance is known.
- Name, address, phone number of manufacturer, importer, or other responsible party, and emergency phone number.
- Recommended use of the chemical (such as a brief description of what it does) and any restrictions on use.

Section 2 – Hazard(s) Identification

Identifies the hazards of the chemical and the appropriate warning information associated with the hazards. Information required in this section includes:

- The hazard classification of the chemical.
- Signal word.
- Hazard statement(s).
- Pictograms.
- Precautionary statement(s).
- Description of any hazard not otherwise classified.
- For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown toxicity. Note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3 – Composition / Information on Ingredients

Identifies the ingredient(s) contained in the product identified on the SDS including impurities and stabilizers. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed. Information required in this section includes:

Substances

- Chemical name.
- Common name and/or synonyms.
- Chemical Abstract Service (CAS) number and other unique identifiers.
- Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.

Mixtures

- Same information as required for substances.

- The chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are:
    - Present above their cut-off/concentration limit, or
    - Present a health risk below the cut-off/concentration limit.
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used I the following situations:
    - A trade secret,
    - There is batch-to-batch variation, or
    - The SDS is used for a group of substantially similar mixtures.

Section 4 – First-Aid Measures

Describes initial care that should be provided by untrained responders to an individual who has been exposed to the chemical. Information required in this section includes:

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms tha are acute or delayed.
- Recommendations for immediate medical care and special treatment needs when necessary.

Section 5 – Fire-Fighting Measures

Provides recommendations for fighting a fire caused by the chemical. Information required in this section includes:

- Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
- Advice on specific hazards that develop from the chemical during a fire, such as any hazardous byproducts created when the chemical burns.
- Recommendations of special protective equipment or precautions for firefighters.

Section 6 – Accidental Release Measures

Provides recommendations on the appropriate response to spills, leaks, or releases, including containment and clean up practices to prevent or minimize exposure to people, properties, and/or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. Information required in this section includes:

- Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent contamination of skin, eyes, and/or clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment (e.g., cover drains and capping procedures).
- Clean up procedures (e.g., appropriate neutralization techniques, decontamination, cleaning or vacuuming, adsorbent materials, and/or equipment required for containment/clean up).

Section 7 – Handling and Storage

Provides guidance on safe handling practices and conditions for safe storage. Information required in this section includes:

- Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing release into the environment, and providing advice on general hygiene practices (e.g., eating, drinking, and smoking in work areas prohibited).
- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation).

Section 8 – Exposure Controls / Personal Protection

Indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize exposures. Information required in this section includes:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the manufacturer, importer, or employer preparing the SDS.
- Appropriate engineering controls (i.e., use local exhaust ventilation, or use only in a closed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure, such as personal protective equipment (PPE) (e.g., eye, face, skin, or respiratory protection needed).
- Any such special requirements for PPE, protective clothing or respiratory protection (e.g., type of glove material and breakthrough time of the glove material).

Section 9 – Physical and Chemical Properties

Identifies physical and chemical properties associated with the substance or mixture. The minimum required information required in this section includes:

- Appearance (physical state, color, etc.)
- Odor
- Odor threshold
- pH
- Melting/freezing point
- Initial boiling point and boiling range
- Flash point
- Evaporation Rate
- Flammability (solid, gas)
- Upper/lower flammability/explosive limits
- Vapor pressure
- Vapor density
- Relative density
- Solubility(ies)
- Partition coefficient: n-octanol/water
- Auto-ignition temperature
- Decomposition temperature
- Viscosity

The SDS may not contain every item on the above list as information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other related properties such as the dust deflagration index (Kst) for combustible dusts, used to evaluate a dust's explosive potential.

Section 10 – Stability and Reactivity

Describes the reactivity hazards of the chemical and chemical stability. This section is divided into three sections; reactivity, chemical stability, and other. Information required in this section includes:

Reactivity

- Description of the specific test data for the chemical(s). This data can be for a class or family of the chemical if the data adequately represents the anticipated hazard of the chemical(s), where available.

Chemical Stability

- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
- Description of any stabilizers that may be needed to maintain chemical stability.
- Indication of any safety issues that may arise should the product change in physical appearance.

Section 11 – Toxicological Information

Provides toxicological and health effects information or indicates that such data are not available. Information required in this section includes:

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). The SDS should also indicate if the information is unknown.
- Description of the delayed, immediate, or chronic effects from short- and long-term exposures.

- The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (medial lethal dose))-the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.
- Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms fro the lowest to the most severe exposures.
- Indication of whether is listed in the National Toxicity Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition) or found to be a potential carcinogen by OSHA.

NOTE: The following categories are non-mandatory but are included to show the extent of the standard. If the categories are included, they must be in the following order:

Section 12 – Ecological Information (non-mandatory)

Section 13 – Disposal Considerations (non-mandatory)

Section 14 – Transport Information (non-mandatory)

Section 15 – Regulatory Information (non-mandatory)

Section 16 – Other Information

indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information may also be included in Section 16.

E. Chemical Exposure Control

There are many ways the College may use to minimize worker exposure to chemicals. These include:

- Engineered controls include applying ventilation techniques to remove contaminated air or supplyfresh air, storage areas or cabinets to prevent release of a hazardous material, incorporation ofnew technology to substitute for processes or ingredients considered hazardous and design offacilities with state-of-the-art means of minimizing exposure.
- Administrative controls are mainly procedures adopted to prevent accidents; these include buddy systems, use of personal monitors, and vessel entry procedures.
- Personal protective equipment includes use of dust masks and other kinds of respirators, goggles,face shields, aprons, gloves, impervious boots and other forms of safety clothing, all designed to restrict the normal route of entry for the hazardous material being used. Personal protective equipment is used as an extra precaution whenever called for or as a last resort when other means are unavailable.

CONCLUSION

Chemical safety is a team effort. Administrators, department heads, directors, supervisory staff, operational employees and others, all get involved in preventing chemical accidents. But the key person is really you, the one who works with chemicals on a daily basis. Personal protective equipment only works if it's worn properly. Engineered systems provide designed protection only if operated as intended. And beyond that, the best safeguard is an informed employee.

Take the training you are provided to heart. The College wants you to be an informed and active participant in your own safety.

GLOSSARY OF TERMS

ACGIH - American Conference of Governmental Industrial Hygienists; an organization of health and safety professionals from governmental agencies or educational institutions. ACGIH develops recommended occupational exposure limits for chemical substances and physical agents (see Threshold Limit Value).

Acute Effect - An adverse effect on the body quickly following a one-time or brief exposure to a high level of a material.

American Conference of Governmental Industrial Hygienists - See ACGIH.

Asphyxiant - A vapor gas which can cause unconsciousness or death by suffocation from lack of oxygen. Asphyxiation is one of the principal potential hazards of working in confined and enclosed spaces.

Boiling Point - The temperature at which a liquid boils or changes to a vapor. Flammable materials with low boiling points present special fire hazards.

C Limit - See ceiling limit.

Carcinogen - A substance or material that is capable of causing cancer.

Caustic - A corrosive chemical with a high pH (alkaline or basic).

Ceiling Limit - The maximum concentration of a chemical, dust, or physical agent that is allowed at anyone time (see also PEL and TLV).

Chemical Hazard - A substance with the potential to do harm.

Health Hazard - Substances that can adversely affect our health.

Chronic Effect - An adverse effect on the body which develops slowly over a long period of time. The result of a long-term or frequent exposure to hazardous concentrations of a material. Chronic effects or diseases may not show up for many years after exposure.

Combustible Liquids - Any liquid that has a flash point (becomes flammable) above 100 degrees but less than 200 degrees F.

Compressed Gasses - Gasses that have absolute pressures exceeding lO4psi at 70 degrees F, or an absolute pressure exceeding lO4psi at 130 degrees F, regardless of the pressure at 70 degrees F, or a liquid having a vapor pressure exceeding 4opsi at 100 degrees F.

Concentration - The relative amount of chemical, dust or other substance in a given amount of air. The unit for measuring concentration of dust or mist in the air is using mg/M3 (milligrams of the substance per one cubic meter of air). The units for measuring concentration of gasses and vapors is usually ppm or parts of a material per million parts of air.

Corrosive - A substance that can cause visible destruction or eat away another substance. Corrosive chemicals, such as strong acids, alkalis, and caustics can cause burns and irritation at the site of contact with the human skin.

Dermatitis - Inflammation of the skin such as redness, rash, dry or cracking skin, blisters, swelling, orpain. May result from skin exposure to toxic or abrasive materials.

Dose - The rate at which a substance is administered (amount divided by time).

Explosive - A chemical that can suddenly and violently react under the right conditions.

Flammable Limits - (Explosive Limits)

Lower Flammable - (Explosive) Limit - The lowest concentration of a combustible or flammable gas or vapor in air that will produce a flash of fire. Mixtures below this concentration are too lean to burn.

Upper Flammable - (Explosive) Limit - The highest concentration of a combustible or flammable gas or vapor in air that will produce a flash of fire. Mixtures above this concentration are too rich to burn.

Flammable Liquids - Burn at lower temperatures than combustible liquids and have flash points below 100 degrees F.

Flash Point - The temperature at which a liquid will give off enough flammable vapor to sustain combustion.

Industrial Hygiene - The technical specialty concerned with the recognition, evaluation, and eliminationof workplace health hazards.

Ingestion - Eating or taking in a substance by mouth.

Inhalation - The breathing of something into the lungs.

Irritant - A substance which will cause an inflammation or reaction of the eyes, skin or respiratorysystem. The effect of an irritant is reversible after exposure is ended.

Lethal Dose - The concentration of a substance being tested that will kill a test animal.

MSDS – (Material Safety Data Sheet), This is the FORMER name of the technical bulletin covering a chemical.

Oral Toxicity - Adverse effects resulting from taking a substance into the body through the mouth.Usually used to denote effects in experimental animals.

OSHA - Occupational Safety and Health Administration, a federal regulatory agency established by the Department of Labor.

Oxidizing Agent - A chemical or substance which gives off oxygen in a chemical reaction and stimulatesthe combustion of organic materials.

PEL or Permissible Exposure Limit - Maximum safe exposure limits established by OSHA.

Physical Hazard - See Health Hazard.

Polymerization - A chemical reaction in which two or more small molecules combine to form larger molecules. A hazardous polymerization is a reaction that takes place so fast that large amounts of energy are released.

Reactivity - The tendency of a material to undergo a chemical reaction with the release of energy or the formation of noxious, toxic, or corrosive by-products.

Reducing Agent - A chemical which combines with oxygen in a chemical reaction.

Route of Entry - The means by which a chemical can be taken into the body.

SDS – (Safety Data Sheet), Replaces MSDS (Material Safety Data Sheets) as the current technical bulletin covering specific information required about a chemical.

Sensitizer - A substance which on first exposure causes little or no reaction in man or test animals, but which on repeated exposure may cause a noticeable response such as a skin reaction or respiratory distress.

Solubility - A measure of the amount of a substance that will dissolve in a given amount of water or another solvent.

Solvent - A liquid capable of dissolving another substance.

Spontaneous Heating - An increase in the internal temperature of a substance due to a chemical or physical change without the application of external heat.

Stability - A measure of the tendency of a substance to be handled and stored without undergoing unwanted chemical changes.

STEL - Short Term Exposure Limit, a form of averaging an involvement with a chemical over a brief period of time, normally taken as 15 minutes.

Teratogen - An environmental agent that interferes with the normal development of a fetus.

Thermal Decomposition- - The chemical breakdown of a material brought about by exposure to heat.

Toxicity - The degree of injury, illness, or adverse effects resulting from exposure to hazardous materials.

A highly toxic substance has an LD of 50 milligrams or less per kilogram of rat body weight,administered orally.

A toxic substance has an LD between 50 and 500 milligrams per kilogram of rat body weight, administered orally.

TWA - Time Weighted Average, a way of arriving at a simple number to represent an exposure to a time varying involvement with a chemical.

ACKNOWLEDGEMENTS

Saint Joseph's College wishes to acknowledge the preliminary work done by the following, without which our task would have been more difficult.

- University of Maine Systems & Campuses
- Bureau of Labor Standards
- Morse, Payson & Noyes
- Saint Joseph's College Communications Office