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CHAPTER 1

BLOODBORNE PATHOGENS

EXPOSURE CONTROL PLAN

INTRODUCTION

In March 1992 the OSHA (Occupational Safety and Health Administration) standard on Bloodborne Pathogens were promulgated. Compliance measures by employers are now in effect. The purpose of the standards (Title 29 Code of Federal Regulations, Part 1910.1030) is to protect workers whom may be reasonably expected to come into contact with human blood and other body fluids during the course of their jobs. Specifically, Acquired Immunodeficiency Syndrome (AIDS) and Hepatitis B virus merit serious concern by workers occupationally exposed to blood, other potentially infectious materials, and certain other body fluids that contain bloodborne pathogens.

EMPLOYEES

Vermont Technical College has developed this plan to outline the necessary steps to limit employee exposure to bloodborne pathogens. Vermont Technical College has identified employment positions with duties that are reasonably anticipated to have occupational exposure to blood or other potentially infectious materials.

Vermont Technical College will administer, at college cost, the HBV vaccine to employees whose positions have been identified as being at risk for occupational exposure to blood or other potentially infectious materials. If the employee chooses not to have the HBV vaccine administered, he/she must sign a declination form to that effect. However, should such an employee choose to be vaccinated at a later date, they can receive the vaccination series at college expense. Current employees will be given a six month time period from the date of the implementation of this policy to begin the HBV vaccination series. New employees in "at risk" positions will begin the HBV vaccine within the first ten days of employment at the college and after training has been provided.

Universal precautions and other constraints will be exercised to limit and control exposure for employees and others to potentially infectious materials.

Further, Vermont Technical College will provide training for employees on general and site specific aspects of bloodborne pathogen exposure.

EMPLOYMENT POSITIONS AT RISK FOR OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS

Vermont Technical College has identified the following positions as those most likely to have occupational exposure to blood or other potentially infectious materials. Persons in these positions shall be inoculated against the HBV virus unless they decline in writing. In addition, employees in other positions where exposure may occur will be identified and trained by a qualified trainer.

Job Class/Title

Duties

Health Services

Nurse

-all nurses are covered

Custodian

-only if required to clean and/or dispose of contaminated areas or material

Athletics

Coaches

-may have first contact with injured students, athletes, and facility users

Training Room Employees

-including students worker expected to have contact with injured athletes

SHAPE Facility Supervisors

-may have contact with athletes and injured facility users

SHAPE Lifeguards

-may have first contact with injured facility users

Public Safety

Director

-may have first contact in emergency situations

Security Officers

-may have first contact in emergency situations

Residential Life

Residence Hall Directors

-may have first contact with students in emergency situations

Academic

-teaching labs, hospital and patient Nursing Faculty exposure is a routine part of the job

Physical Plant

Custodian/Housekeepers

SHAPE/Athletic Facility Custodians

Medical/Nursing Office Custodians

Plumbers

-a minimum number at each college to be responsible for cleaning using universal hygiene precautions

RECORDKEEPING

Vermont Technical College will establish and maintain records *for all employees in positions identified for occupational exposure. Employee records will include: the name and social security number of the employee, a copy of the employee's Hepatitis B vaccination status, including dates of vaccinations and any medical records relative to the ability of the individual to be vaccinated.

Training records will be maintained in the Personnel Office, Security will maintain Bloodborne Pathogen training records, and Health Services will maintain Hepatitis B vaccination records. Records will be available upon request to employees, employee representatives and VOSHA or OSHA representatives.

Training records shall include: the dates of training sessions, contents or a summary of the training session, names and qualifications of trainers and the names and position titles of those attending the sessions.

Healthcare professionals who evaluate employees after an exposure incident shall be provided with the following:

1. A copy of the Federal Bloodborne Pathogen Regulation.
2. A description of the exposed employee's duties as they relate to the exposure incident.
3. Documentation of the exposure and circumstances under which it occurred.
4. Results of the source individual's blood testing, if available.
5. All medical records relevant to the appropriate treatment of the employee, including vaccination status.

The healthcare professional shall provide, for the employer, a copy of a written opinion within fifteen (15) days. A copy of that opinion shall be given to the employee. The information on the healthcare professional's written opinion shall be limited to:

1. Hepatitis B; whether the Hepatitis B vaccination is indicated and whether or not the employee has already received the vaccination.
2. Post-exposure follow-up information shall be limited to whether the employee has been informed of the results of the evaluation and whether the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

All other findings or diagnosis are to remain confidential and not be included in the report.

All employee medical records, including exposure records shall be preserved and maintained for at least the duration of employment plus thirty (30) years. An exception for employees who have worked less than one year is made if the records are provided to the employee upon termination.

*The keeping of employee medical records can be carried out on behalf of the employer by a physician or other healthcare professionals. Legal and ethical obligations concerning maintenance and confidentiality of employee medical information require careful consideration about the keeping of such records in college offices. Medical records may not be kept in employee personnel files and they must be kept locked and available only to limited authorized personnel. The employee or his/her designated representative, upon providing written consent, may review his/her medical records.

TRAINING

Current employees whomayhave occupational exposure to bloodborne pathogens will participate in a training program to learn about proper precautions and treatments. Training for new employees in positions determined to be open to exposure will be conducted prior to initial assignment to tasks where occupational exposure may occur. The educational training will be conducted by a person(s) at Vermont Technical College knowledgeable about the subject matter and it will cover both general and site specific information about workplace exposure.

Training will include the following:

1. The OSHA standard for Bloodborne Pathogens.
2. Epidemiology and symptomatology of bloodborne diseases.
3. Modes of transmission of bloodborne pathogens.
4. Explanation of the exposure control plan.
5. Explanation of methods for recognizing tasks that may involve exposure to blood and other potentially infectious matter.
6. Explanation of the use and limitations of methods to prevent or reduce exposure to blood or other potentially infectious matter.
7. Personal protective equipment available at the college, including; selection, use, handling, decontamination and disposal.
8. Post exposure evaluation and follow-up.
9. Signs and labels used at the college.
10. Hepatitis B vaccine program at the college.

All at risk employees will receive annual refresher training. This training will take place within one year of the previous training date.

COMPLIANCE METHODS

Universal precautions will be observed at the college in order to prevent contact with blood or other potentially infectious materials. All blood and other potentially infectious material (which includes semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids, any unfixed tissue or organ from a human, and HIV-containing cell, tissue or organ cultures) will be considered infectious regardless of the perceived status of the source individual.

Controls will be utilized to eliminate or minimize exposure for employees at Vermont Technical College. Where occupational exposure remains after institution of these controls, personal protective equipment shall be utilized (i.e., latex gloves, etc.). All personal protective equipment required for use at the college will be provided without cost to employees. This equipment will be chosen, based on the anticipated exposure to blood or other potentially infectious materials. The protective equipment will be considered appropriate only if it does not permit blood or other potentially infectious material to pass through or reach employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used. All personal protective equipment will be cleaned, laundered, and disposed of by the college at no cost to the employees. All repairs and replacements of protective equipment will be made by the employer at no cost to the employees. Any "red bag" waste will be disposed of appropriately.

Gloves shall be worn where it is reasonably anticipated that employees may have hand contact with blood, other potentially infectious materials, non-intact skin, and mucous membranes. Disposable gloves used at the college are not to be washed or decontaminated for re-use and are to be replaced as soon as practical when they become contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

In work areas where there is a reasonable likelihood of exposure to blood or other potentially infectious materials, employees and students are not to eat, drink, apply cosmetics or lip balm, smoke, or handle contact lenses. Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets, or on countertop or bench tops where blood or other potentially infectious materials are present.

All departments where employees have been trained and/or inoculated for possible exposure must have standard operating procedures that describe the work practice controls that must be practiced.

PROCEDURES FOR ACCIDENTAL EXPOSURE TO BLOOD AND BODY FLUIDS

Employees at risk of exposure to bloodborne pathogens and their supervisors must be familiar with these procedures. They are to be followed in the event of occupational exposure.

1. The incident is to be reported immediately to the employee's supervisor and the Vermont Technical College Bloodborne Pathogens Representative. Confidentiality is to be maintained with respect to the parties involved.
2. An appointment shall be made with the college designated health care professional unless the employee chooses to be seen by his/her personal physician. The injury shall be evaluated and treated according to the Federal Regulations Part 1910.1030 which shall be provided for the health care professional along with the appropriate forms (attached) and the relative employee medical records.
3. Workers' Compensation and an Incident Report (attached) will be filled out by the supervisor or college personnel representative.

4. Relevant information should be recorded in the employee's medical record:
 - a. Date and time of exposure.
 - b. Duties being performed at the time of exposure.
 - c. Description of the incident including severity of exposure, amount of fluid or material to which the employee was exposed and other pertinent details.
 - d. Information about follow-up steps, including counseling, post-exposure management and required reports from healthcare professionals.

5. Vermont Technical College shall be responsible for assuring that the employee receives all the necessary post-exposure treatment and information as legally indicated. A copy of Federal Regulation Section 1919.1030 shall be attached to these procedures as reference in the event of exposure.

6. Vermont Technical College Representatives for Bloodborne Pathogens shall serve as advisers for exposure incidents or other questions regarding bloodborne pathogens. When questions arise, the Vermont Department of Health, Division of Occupational and Radiological Health at 865-7730 or the VSC Office of the Chancellor at 241-2520 may be contacted for consultation.

Vermont Technical College Representative for Bloodborne Pathogens is the Health Services Coordinator and can be reached at x1270.

The on-campus College Health Coordinator can be reached at x1270

The off-campus College Health Care Professional is the campus physician. Contact x1270 for Health Services.

POST-EXPOSURE EVALUATION AND FOLLOW-UP

When an employee incurs an exposure incident, it should be reported to the Health Services Coordinator within twenty-four (24) hours of the exposure. All employees who incur an exposure incident will be offered post-exposure evaluation and follow-up to include the following:

1. Documentation of the route of exposure and the circumstances related to the incident.
2. Identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested at college expense (after consent is obtained) for HIV/HBV infection.
3. Results of testing of the source individual will be made available to the exposed employee if authorization is given by the source person. The exposed employee must be informed about the applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual.

4. The employee will be offered the option of having his/her blood collected for test in HIV/HBV serological status. The blood sample will be preserved for up to 90 days in the event the employee allows for the blood collection, but does not immediately consent to the HIV serologic testing. However, if the employee decides prior to that time that testing will or will not be conducted, then the appropriate action can be taken and the blood sampled discarded. gfor
5. The employee will be offered post exposure prophylaxis when medically indicated in accordance with the current recommendations of the United States Public Health Service.
6. The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information on potential illness to be alert for and to be reported to the healthcare professional providing care.

STATEMENT PROHIBITING DISCLOSURE

INFORMATION THAT HAS BEEN PROVIDED FOR YOU IS FROM CONFIDENTIAL RECORDS THAT ARE PROTECTED BY STATE LAW. YOU ARE PROHIBITED FROM MAKING ANY FURTHER DISCLOSURE OF THE INFORMATION WITHOUT THE SPECIFIC WRITTEN PERMISSION OF THE PERSON TO WHOM IT PERTAINS. FURTHER DISCLOSURE MAY RESULT IN A FINE, JAIL SENTENCE OR BOTH. GENERAL AUTHORIZATION OF THE RELEASE OF INFORMATION IS NOT AN AUTHORIZATION FOR FURTHER DISCLOSURE. DISCLOSURE OF CONFIDENTIAL HIV INFORMATION THAT IS THE RESULT OF A GENERAL RELEASE OF MEDICAL OR OTHER INFORMATION WILL BE IN VIOLATION OF THE STATE LAW AND MAY RESULT IN A FINE, JAIL SENTENCE OR BOTH.

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

BLOODBORNE PATHOGEN TRAINING

Job Class/Title

Nurse
 All Athletic Department personnel
 Director of Public Safety
 All Security Officers
 All Residential Hall Directors
 All Residential Assistants (RA's)
 All Nursing Faculty and Staff

DirectorofFacilities
Assist.DirectorofFacilities
AllCustodians
AllLab.Technicians
DirectorofStudentLife

CPRANDFIRSTAID

- CPRTrainingmustbeupdatedannually
- FirstAidTrainingmustbeupdatedeverythreeyears

Nurse
AthleticDepartmentPersonnel
AllSecurityOfficers
AllResidentHallDirectors
AllresidentialAssistants(RA's)
AllNursingFacultyandStaff
DesignatedpersonnelintheFacilitiesDepartment
Lifeguards
SHAPESupervisors
AllInterestedFacultyandStaff

*SeeAppendix-ChapterIfor:

HepatitisBVaccination-EmployeeInformationAndDeclination
IncidentReportForBloodbornePathogensExposureEvaluation
BloodbornePathogensPostExposureEvaluation
HealthcareProvider'sWrittenOpinionPostExposureEvaluation

CHAPTER 2

CHEMICAL HYGIENE PLAN

FOREWORD

On 31 January, 1990 the Occupational Safety and Health Administration (OSHA) promulgated a final rule for occupational exposure to hazardous chemicals in laboratories. Included in the standard, which became effective on 1 May, 1990 is a requirement for all employers covered by the standard to develop and carry out the provisions of a Chemical Hygiene Plan (CHP). The standard requires that the CHP must be developed and implemented by January 31, 1991.

A CHP is defined as a written program which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace. Components of the CHP must include standard operating procedures for safety and health, criteria for the implementation of control measures, measures to ensure proper operation of engineering controls, provisions for training and information dissemination, permitting requirements, provisions for medical consultation, designation of responsible personnel, and identification of particularly hazardous substances.

This plan is the Chemical Hygiene Plan developed for Vermont Technical College. This CHP is maintained readily available to laboratory employees at VTC. All laboratory personnel must know and follow the procedures outlined in this plan. All operations performed in the laboratory must be planned and executed in accordance with the enclosed procedures. In addition, each employee is expected to develop safe personal chemical hygiene habits aimed at the reduction of chemical exposure to themselves and coworkers.

This document was developed to comply with paragraph (e) of the referenced OSHA 1910.1450 standard. Vermont Technical College will maintain the facilities and procedures employed in the laboratory compatible with current knowledge and regulations in laboratory safety. This CHP will be reviewed, evaluated and updated at least annually and is readily available to employees, their representatives and any representative of the Assistant Secretary of Labor for OSHA.

Ranking Official:

Dr. Robert Clark, President

1.0 Standard Operating Procedures for Laboratory Chemicals

1.1 Chemical Procurement

- 1.1.1 The decision to procure a chemical shall be a commitment to handle and use the chemical properly from initial receipt to ultimate disposal.
- 1.1.2 Requests for procurement of new chemicals for Academic Areas shall be submitted to one of the Chemical Hygiene Officer (CHO) for approval. Non-academic areas are requests for SHAPE, Food Service, Health Services, the Farm, Custodial, and Maintenance will be referred to the Chemical Hygiene Officer, Non-Academic (CHONA). The form titled "New Chemical Purchasing Request", Appendix C to this plan, shall be used for this purpose. Information on proper handling, storage and disposal shall be known to all involved personnel prior to the procurement of the chemical. Chemicals utilized in the laboratory shall be those which are appropriate for the ventilation system.
- 1.1.3 Personnel who receive chemical shipments shall be knowledgeable of the proper procedures for receipt. The CHO or CHONA must be notified upon receipt of all chemicals. Chemical containers shall not be accepted without accompanying labels, material, safety data sheets and packaging in accordance with all appropriate regulations. All chemical shipments should be dated when received and opened.

1.2 Chemical Storage

- 1.2.1 Received chemicals shall be immediately moved to the designated storage area. Large glass containers shall be placed in carrying containers or shipping containers during transportation.
- 1.2.2 The storage area shall be well-illuminated, with all storage maintained below eye level. Large bottles shall be stored no more than two feet from ground level.
- 1.2.3 Chemicals shall be segregated by hazard classification and compatibility in a well-identified area, with local exhaust ventilation.
- 1.2.4 Mineral acids should be separated from flammable and combustible materials. Separation is defined by NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials.
- 1.2.5 Acid-resistant trays shall be placed under bottles of mineral acids.
- 1.2.6 Acid-sensitive materials such as cyanides and sulfides shall be separated from acids or protected from contact with acids.

- 1.2.7 Highly toxic chemicals or other chemicals whose containers have been opened shall be stored in unbreakable secondary containers.
- 1.2.8 The storage area shall not be used as a preparation or repackaging area.
- 1.2.9 The storage area shall be accessible during normal working hours. The storage area for all academic areas is under the control of the CHO. All non-academic storage areas are under the control of the CHONA.
- 1.2.10 When chemicals are taken from the storage area, they shall be placed in an outside container or bucket.
- 1.2.11 Storage of chemicals at the lab bench or other work areas shall be limited to those amounts necessary for one operation or shift. The container size shall be the minimum convenient. The amounts of chemicals at the lab bench shall be as small as practical. Chemicals in the workplace shall not be exposed to sunlight or heat.
- 1.2.12 Stored chemicals shall be examined at least annually by the Chemical Hygiene Officer for replacement, deterioration, and container integrity. The inspections should determine whether any corrosion, deterioration, or damage has occurred to the storage facility as a result of leaking chemicals.
- 1.2.13 Periodic inventories (at least annually) of chemicals outside the storage area shall be conducted by the CHO and the CHONA. Unneeded items shall be properly discarded or returned to the storage area.

1.3 Chemical Handling

Each laboratory employee with the training, education and resources provided by supervision, shall develop and implement work habits consistent with this CHP to minimize personal and coworker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized.

General precautions which shall be followed for the handling and use of all chemicals are:

- 1.3.1 Skin contact with all chemicals shall be avoided.
- 1.3.2 All employees shall wash all areas of exposed skin prior to leaving the laboratory.
- 1.3.3 Mouth suction for pipeting or starting a siphon is prohibited.

- 1.3.4 Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present shall be avoided. These areas have been posted. Hands shall be thoroughly washed prior to performing these activities.
- 1.3.5 Storage, handling and consumption of food or beverages shall not occur in storage areas, refrigerators, glassware or utensils used for laboratory operations.
- 1.3.6 Risk determinations shall be conservative in nature.
- 1.3.7 Any chemical mixtures shall be assumed to be as toxic as its most toxic component.
- 1.3.8 Substances of unknown toxicity shall be assumed to be toxic.
- 1.3.9 Laboratory employees shall be familiar with the symptoms of exposure for chemical with which they work and the precautions necessary to prevent exposure.
- 1.3.10 The intent and procedures of this Chemical Hygiene Plan shall be continuously adhered to.
- 1.3.11 In all cases of chemical exposure, neither the Permissible Exposure Limits (PELs) of OSHA or the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) shall be exceeded.
- 1.3.12 The engineering controls and safety equipment in the laboratory shall be utilized and inspected in accordance with Appendix A of this plan.
- 1.3.13 Specific precautions based on the toxicological characteristics of chemicals shall be implemented as deemed necessary by the Chemical Hygiene Officer (see 7.2). These special precautions are listed in Section 8.0.

1.4 Laboratory Equipment and Glassware

Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled in accordance with Section 1.7. At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of laboratory equipment:

- 1.4.1 All laboratory equipment shall be used only for its intended purpose.

- 1.4.2 All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container.
- 1.4.3 All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
- 1.4.4 Labels shall be attached to all chemical containers, identifying the contents and related hazards.
- 1.4.5 Waste receptacles shall be identified as such.
- 1.4.6 All laboratory equipment shall be inspected on a periodic basis as specified in Appendix A, and replaced or repaired as necessary.

1.5 Personal Protective Equipment

- 1.5.1 Safety glasses meeting ANSI Z87.1 are required for employees and laboratory and will be worn at all times when in the laboratory. Contact lenses are prohibited in the laboratory, except as approved by the Chemical Hygiene Officer and supervisor.
- 1.5.2 Chemical goggles and/or a full face shield shall be worn during chemical transfer and handling operations as procedures dictate.
- 1.5.3 Sandals, perforated shoes, sneakers and bare feet are prohibited. Safety shoes, per ANSI 47 are required where employees routinely lift heavy objects.
- 1.5.4 Lab coats are provided and must be worn in the laboratory. Laboratory coats will be laundered on a periodic basis, not to exceed monthly. Laboratory coats shall be removed immediately upon discovery of significant contamination.
- 1.5.5 Appropriate chemical-resistant gloves based on the Table in Appendix B shall be worn at all times when there may be skin contact with chemicals. Used gloves shall be inspected and washed prior to re-use. Damaged or deteriorated gloves will be immediately replaced. Gloves shall be washed prior to removal from the hands.
- 1.5.6 Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal-resistant gloves shall be non-asbestos and shall be replaced when damaged or deteriorated.
- 1.5.7 Respirator usage shall comply with the OSHA Respiratory Protection CFR 1910.134, and the VTC Respiratory Program.

1.6 Personal Work Practices

- 1.6.1 Laboratory supervision must ensure that each employee knows and follows the rules and procedures established in this plan.
- 1.6.2 All employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and/or conditions promptly.
- 1.6.3 Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.
- 1.6.4 Use only those chemicals appropriate for the ventilation system.
- 1.6.5 Avoid unnecessary exposure to all chemicals by any route.
- 1.6.6 Do not smell or taste any chemicals.
- 1.6.7 Encourage safe work practices in coworkers by setting the proper example. Horseplay is strictly forbidden.
- 1.6.8 Seek information and advice from knowledgeable persons, standards and codes about the hazards present in the laboratory. Plan operations, equipment and protective measures accordingly.
- 1.6.9 Use engineering controls in accordance with Section 3.0.
- 1.6.10 Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure.

1.7 Labeling

- 1.7.1 All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. The label shall be informative and durable, and at a minimum, will identify contents, source, date of acquisition, storage location and indication of hazard.
- 1.7.2 Portable containers shall be labeled by the individual using the container.
- 1.7.3 Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for the immediate use of the employee who performed the transfer.

- 1.7.4 The labeling program shall be periodically inspected by the Chemical Hygiene Officer to ensure that labels have not been defaced or removed. The form titled "Chemical Hazard Audit Checklist", Appendix D to this plan, shall be used for this purpose.

2.0 Criteria for Implementation of Control Measures

2.1 Air Sampling

- 2.1.1 Air sampling for evaluating employee exposure to chemical substances shall be conducted periodically or as specified by specific codes or regulations.
- 2.1.2 Upon addition of new chemicals or changes in control procedures, additional air sampling will be considered to determine the exposures. Conduct air sampling if there is reason to believe that exposure levels for regulated substances that require sampling routinely exceed the action level, or in the absence of an action level, the PEL. Air sampling will be implemented when usage of highly toxic substances exceeds three times per week.
- 2.1.3 The results of air sampling studies performed in the laboratory are maintained and recorded on the forms shown in Appendix E to this plan.

2.2 Housekeeping

- 2.2.1 Each laboratory worker is directly responsible for the cleanliness of his or her workspace, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards.
- 2.2.2 The following procedures apply to the housekeeping standards of the laboratory:
- 2.2.2.1 All spills on lab benches or floors shall be immediately cleaned and properly disposed of. Wherever large spills occur the local Fire Department will be called.
- 2.2.2.2 The lab benches shall be kept clear of equipment and chemicals except those necessary for the work currently being performed.
- 2.2.2.3 The work area shall be cleaned at the end of each operation and each shift.
- 2.2.2.4 All apparatus shall be thoroughly cleaned and returned to storage upon completion of usage.

2.2.2.5 All floors, aisles, exits, fire extinguishing equipment, eyewashes, shower electrical disconnects and other emergency equipment shall remain unobstructed.

2.2.2.6 All labels shall face front.

2.2.2.7 Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage.

2.2.2.8 All chemical wastes will be disposed of in accordance with the waste disposal plan.

2.3 Safety and Emergency Equipment

2.3.1 Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate have been posted.

2.3.2 All laboratory personnel will be trained in the proper use of fire extinguishers annually. Prior to procurement of new chemicals, the Chemical Hygiene Officers shall verify that existing extinguishers and other emergency equipment are appropriate for such chemicals.

2.3.3 All employees whom might be exposed to chemicals splashes shall be instructed in the location and proper usage of emergency showers and eyewashes. The eyewash and emergency showers shall be inspected weekly. These inspections shall be performed by laboratory employees. These inspections shall be in accordance with ANSI Z358.1 and manufacturer's specifications. Records shall be maintained.

2.3.4 Location signs for safety and emergency equipment have been posted.

3.0 Engineering Controls

3.1 Intent

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized.

3.2 Modification

No modification of engineering controls will occur unless testing indicates that worker protection will continue to be adequate.

3.3 Improper Function

Improper function of engineering controls must be reported to the Chemical Hygiene Officer immediately. The system shall be taken out of service until proper repairs have been executed.

3.4 Usage

All employees shall follow proper work practices when using the engineering controls.

3.4.1 Local Exhaust Ventilation

The following procedures shall apply to the use of local exhaust ventilation:

3.4.1.1 Openings of hoods shall be placed as close as possible to sources of the air contaminant.

3.4.1.2 Clear the screen on the face of the hood prior to usage.

3.4.1.3 Hood fans shall operate when hoods are being used.

3.4.1.4 After using hoods, operate the fan for an additional period of time sufficient to clear residual contaminants from the ductwork.

3.4.1.5 The ventilation system shall be inspected every three months. The duct velocity shall be maintained at 3500 feet per minute, minimum. Records of each inspection shall be maintained by the Chemical Hygiene Officer.

3.4.1.6 Prior to a change in chemicals or procedures, the adequacy of the ventilation system shall be determined by the Chemical Hygiene Officer.

3.4.2 Laboratory Hoods

The laboratory hood shall be utilized for all procedures which might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures involving substances which are appreciably volatile and have a permissible exposure limit (PEL) less than 5 ppm.

The following work practices shall apply to the use of hoods:

- 3.4.2.1 Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood. An inward flow of air can be confirmed by holding a piece of paper at the face of the hood and observing the movement of the paper.
- 3.4.2.2 Keep the sash of the hood closed at all times except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.
- 3.4.2.3 Storage of chemicals and equipment inside the hood shall be kept to a minimum.
- 3.4.2.4 Minimize interference with the inward flow of air into the hood.
- 3.4.2.5 Leave the hood operating when it is not inactive use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.
- 3.4.2.6 The ventilation system shall be inspected every three months. The hood face velocity shall be maintained between 75 and 125 feet per minute. A record of each inspection shall be maintained by the Chemical Hygiene Officer.
- 3.4.2.7 The hood shall not be used as a means of disposal for volatile chemicals.
- 3.4.2.8 Prior to the introduction of new chemicals, the adequacy of hood systems shall be determined by the Chemical Hygiene Officer.

3.4.3 Storage Cabinets

Storage cabinets for flammable and hazardous chemicals will be ventilated as needed.

4.0 Employee Information and Training

4.1 Hazard Information

All employees will be apprised of the hazards presented by the chemicals in use in the laboratory. Each employee shall receive training at the time of initial assignment to the laboratory, prior to assignments involving new exposure situations, and at a regular frequency as determined by the Chemical Hygiene Officer.

4.2 Forms

The forms in Appendices F-H entitled "New Employee Chemical Hygiene Orientation and Training Checklist", "Transfer Chemical Hygiene Training Checklist", and "New Chemical Training Checklist" shall be used for these purposes.

4.3 Training

This training shall include methods of detecting the presence of a hazardous chemical, physical and health hazards of chemicals in the lab, and measures employees can take to protect themselves from these hazards. The training shall present the details of the Chemical Hygiene Plan, and shall include:

- 4.3.1 The contents of the OSHA laboratory standard, and its appendices.
- 4.3.2 The location and availability of the Chemical Hygiene Plan.
- 4.3.3 The permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory.
- 4.3.4 Signs and symptoms associated with the chemicals present in the laboratory.
- 4.3.5 Location and availability of reference material on chemical hygiene.
- 4.3.6 Training shall be conducted by the CHO, CHONA, Instructors, and/or lab technicians as is appropriate.

5.0 Prior Approval of Laboratory Activities

5.1 Permit System

A permit system shall be used for laboratory activities which present specific, foreseeable hazards to the employees. These activities include off-hours work, sole occupancy of building, hazardous operations and unattended operations. The permit titled "Chemical Hygiene Permit" is included in Appendix I to this plan and shall be executed prior to the performance of these activities. The Security Officer must be notified in writing any time a permit is issued.

5.1.1 Off-Hours Work Procedures

Laboratory personnel are not permitted to work after hours in the lab, except when permitted. Approval, when granted, must be in writing in advance by the CHO.

5.1.2 Sole Occupancy

closed

At no times shall work be performed in the laboratory when the only person in the building is the laboratory person performing the work. Under unusual conditions, cross-checks, periodic security guard checks, circuit television, or other measures may be taken when permitted.

5.1.3 Hazardous Work

All hazardous operations are to be performed during a time when at least two personnel are present at the laboratory. At no times shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor and permitted.

5.1.4 Unattended Operations

When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

5.1.4.1 The permits system shall be utilized.

5.1.4.2 The laboratory supervisor will review work procedures to ensure for the safe completion of the operation.

5.1.4.3 An appropriate sign will be posted at all entrances to the laboratory.

5.1.4.4 The overhead lights in the laboratory will be left on.

5.1.4.5 Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).

5.1.4.6 The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

6.0 Medical Consultations and Examinations

6.1 An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. The opportunity for medical attention will be made available to employees under the following circumstances:

- 6.1.1 Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.
 - 6.1.2 Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or,
 - 6.1.3 Whenever an event takes place in the laboratory such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure the employee will be provided an opportunity for medical consultation for the purpose of determining the need for medical examination.
- 6.2** These medical consultations and examinations shall be provided without cost to the employees, without loss of pay and at a reasonable time and place.
 - 6.3** These medical consultations and examinations shall be administered by or under the direct supervision of a licensed physician. A current list of available physicians is maintained by the Director of Health Services. Employees seeking the opportunity of medical consultations should request the listing from the Chemical Hygiene Officer.

7.0 Chemical Hygiene Responsibilities

- 7.1** The Chemical Hygiene Officer is responsible for chemical hygiene in all academic areas and with assistance of other program administrators, will provide continued support for chemical hygiene. The CHONA is responsible for Chemical Hygiene in all Non-Academic areas.

7.2 Chemical Hygiene Officer, and/or CHONA, as appropriate

The Chemical Hygiene Officers shall:

- 7.2.1 Work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices.
- 7.2.2 Monitor procurement and use of chemicals, including determining that facilities and training levels are adequate for the chemicals in use.
- 7.2.3 Perform regular, formal chemical hygiene and housekeeping inspections including inspection of emergency equipment.
- 7.2.4 Help project directors develop precautions and adequate facilities.
- 7.2.5 Maintain current knowledge concerning the legal requirements of regulated substances used at VTC.

- 7.2.6 Review and improve the Chemical Hygiene Plan on an annual basis.
- 7.2.7 Maintain overall responsibility for laboratory operations.
- 7.2.8 Ensure that workers know and follow the chemical hygiene rules applicable to the work at hand.
- 7.2.9 Determine the proper level of personal protective equipment, ensure that such protective equipment is available and in working order.
- 7.2.10 Ensure that appropriate training is provided to employees.
- 7.2.11 Monitor and assist with the waste disposal program.

7.3 Laboratory Workers and All VTC Personnel who work with chemicals

The laboratory workers are individually responsible to:

- 7.3.1 Have knowledge of the Chemical Hygiene Plan.
- 7.3.2 Plan and conduct each laboratory operation in accordance with the Chemical Hygiene Plan.
- 7.3.3 Develop good personal chemical hygiene habits and follow them.

8.0 Special Precautions

When laboratory procedures change to require the use of additional classifications of chemicals (allergens, embryotoxins, teratogens, carcinogens, etc.), additional special precautions shall be implemented as deemed necessary by the Chemical Hygiene Officer. The permit system shall be utilized for all special activities. All questions regarding the use of the permit system should be addressed to the Chemical Hygiene Officer.

8.1 Working with Allergens and Embryotoxins (Special Precautions)

- 8.1.1 Suitable gloves to prevent hand contact shall be worn when exposed to allergen or substances of unknown allergen activity.
- 8.1.2 Women of child-bearing age will handle embryotoxin only in a hood with confirmed satisfactory performance and will use protective equipment to prevent skin contact as prescribed by the supervisor and Chemical Hygiene Officer.
- 8.1.3 Embryotoxins will be stored in adequately ventilated areas in unbreakable secondary containers.

8.1.4 The supervisor and Chemical Hygiene Officer will be notified of spills and other exposure incidents. A physician will be consulted when appropriate.

8.2 Working with Chemicals of Moderate Chronic or High Acute Toxicity (Special Precautions)

8.2.1 Areas where these chemicals are stored and used are of restricted access and have special warning signs.

8.2.2 A special hood with a minimum face velocity of 60 linear feet per minute or other containment device will be used. Released vapors will not be discharged with the hood exhaust, but will be trapped.

8.2.3 Gloves and long sleeves will be used. Hands and arms will be washed immediately after working with these chemicals.

8.2.4 Two people will always be present during work with these chemicals.

8.3 Working with Chemicals of High Chronic Toxicity (Special Precautions)

8.3.1 All transfer and work with these substances shall be in a designated area: a restricted access hood, glove box or portion of lab.

8.3.2 Approval of the supervisor will be obtained before use.

8.3.3 Vacuum pumps must have scrubbers or high efficiency particulate absolute (HEPA) filters.

8.3.4 Any contaminated equipment or glassware will be decontaminated in the hood before removing them from the designated area.

8.3.5 For powders, a wet mop or vacuum with a HEPA filter will be used for cleanup.

8.3.6 The designated area will be marked with warning and restricted access signs.

8.3.7 Containers will be stored in a ventilated, limited access area in labeled, unbreakable, chemically resistant, secondary containers.

8.4 Working with Animals and Chemicals of High Chronic Toxicity (Special Precautions)

8.4.1 For large scale studies, special facilities with restricted access will be provided.

- 8.4.2 The substance will be administered by injection or gavage when possible rather than by diet. When diet is used, a caging system under negative pressure or under laminar airflow directed toward HEPA filters will be used.
- 8.4.3 Procedures will be used to minimize contaminated aerosol from food, urine and feces: HEPA filtered vacuum equipment for cleaning. Moistened contaminated bedding before removal from cage. Mix diets in closed containers in hood.
- 8.4.4 Plastic or rubber gloves and fully buttoned lab coats will be worn in the animal room.

9.0 Record Keeping

- 9.1 Accident investigations will be conducted by the immediate supervisor with assistance from other personnel as deemed necessary.
- 9.2 Accident reports will be written and retained for thirty years.
- 9.3 Exposure records for hazardous chemicals and harmful physical agents will be maintained for 30 years per 29 CFR 1910.20.
- 9.4 Medical records for employees exposed to hazardous chemicals and harmful physical agents will be maintained for the duration of employment plus 30 years per 29 CFR 1910.20.
- 9.5 Inventory and usage records for high risk substances (amounts of substances on-hand, amounts used and names of workers involved) shall be maintained for thirty years.
- 9.6 Records of inspections of equipment will be maintained for five years.
- 9.7 Records of employee training will be maintained for five years.

10.0 Chemical Spills, Releases and Accidents

In the event of a chemical spill, release or other accident, VTC will adhere to the procedures outlined in the Emergency Response Plan as required by OSHA standard 29 CFR 1910.38 and 1910.120.

11.0 Annual Chemical Hygiene Plan Audit

The Chemical Hygiene Officer and CHONA, as appropriate to their areas of responsibility, will conduct an audit of all phases of the Chemical Hygiene Plan each year. Results will be provided to the President and the Safety Committee. Supervisors are responsible for taking corrective action. Appendix J will be used as a guide for the audit.

12.0 References and Recommended Reading

National Research Council, Prudent Practices for Handling Hazardous Chemicals in Laboratories, National Academy Press, Washington, D.C. 1981.

National Research Council, Prudent Practices for Disposal of Chemicals from Laboratories, National Academy Press, Washington, D.C., 1983.

Freeman, N. T., Introduction to Safety in the Chemical Laboratory, Academy Press, 1982.

Manufacturing Chemists' Association, Inc., Guide For Safety In The Chemical Laboratory, D. Van Nostrand Company, Inc., 1954.

Green, Michael E., Safety In Working With Chemicals, MacMillan Publishing Co., Inc. 1978.

Pipitone, David A., Safe Storage of Laboratory Chemicals, Wiley & Sons, Inc. 1984.

Code of Federal Regulations, 29 CFR part 1910 subpart Z section 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, 1990.

*See Appendix-Chapter 2 for:

Laboratory Safety Equipment Inspection Schedule

Resistance to Chemicals of Common Glove Materials

New Chemical Purchasing Request

Chemical Hazard Audit Sheet

Air Sampling Data Record

New Employee Chemical Hygiene Orientation and Training Checklist

Transfer Chemical Hygiene Training Checklist

New Chemical Training Checklist

Chemical Hygiene Permit

OSHA Hazardous Chemicals in Laboratories Standard Compliance Checklist

CHAPTER 3

SAFETY PLAN

PERMIT-REQUIRED CONFINED SPACES

29CFR1910.146ANSISTANDARDZ117.1-1989

This program is designed to set forth the means of protecting the health of employees and significantly reducing the potential for accidental injury and death associated with entering, working in, and exiting confined spaces. The program has three goals.

1. To make the confined areas safe for work.
2. To make the workers aware of hazards associated with this work area.
3. To institute the safe work practices necessary to deal with these hazards.

DEFINITIONS

Acceptable entry conditions- The condition that must exist in a permit space to allow entry and to ensure that employees involved with permit-required space entry can safely enter into and work within the space.

Attendant- An individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all the attendant's duties assigned in the Vermont Technical College space permit plan.

Authorized entrant- An employee who is authorized by Vermont Technical College to enter a permit space.

Blanking or binding- The absolute closure of a pipe, line, or duct by the fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined Space- Any space large enough and so configured that an employee can bodily enter and perform assigned work and having a limited means of egress, which may be subject to the accumulation of toxic or flammable contaminants or a oxygen deficient atmosphere. Confined spaces include, but are not limited to, tunnels, shafts, silos, bins, vaults, pipelines, and conduits. Confined spaces are not designed for continuous occupancy.

Double block and bleed- Closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between two closed valves.

Emergency- Any occurrence (including failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Entry- The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit- The written authorization of the employer for entry under defined conditions into a confined area for a stated purpose during a specific time. It contains reasons for entry, anticipated hazards of entry, eligible attendants, entrants and individuals whom may be in charge of the entry, and the length of time for the permit.

Entry supervisor - The person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

Hazardous Atmosphere- An atmosphere which exposes employees to a risk of death, disablement, injury or acute illness from one or more of the following causes:

1. A flammable gas, vapor, or mist in excess of 10 percent of its lower flammability limit (LFL).
2. An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
3. An atmospheric oxygen concentration below 19.5 percent or more than 23.5.
4. An atmospheric concentration of any toxic or hazardous substance above the permissible exposure limit (PEL), published in Subpart Z of 29 CFR 1910, that could result in employee exposure in excess of this limit, and an atmospheric condition recognized as immediately dangerous to life or health (IDLH).

Hot Work Permit- Employer's written permission to perform operations as well as work that produces a source of ignition, such as welding, riveting, cutting, burning, or heating.

Immediately dangerous to life or health (IDLH)- Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Inerting- The displacement of the atmosphere in a permit space by a non-combustible gas (nitrogen) to such an extent that the resulting atmosphere is non-combustible.

Linebreaking- The intentional opening of a pipe, line, or duct that has been carrying flammable, corrosive, or toxic material, an inert gas or any fluid at a volume, pressure or temperature of causing injury.

Non-permit confined space- A confined space that does not contain or, with respect to atmospheric hazards, has the potential to contain any hazard capable of causing death or other serious physical harm.

Oxygen deficient atmosphere- An atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere- An atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space- An enclosed space that has one or more of the following characteristics:

1. Contains or has a known potential to contain a hazardous atmosphere.
2. Contains a material with the potential for engulfment of an entrant.
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

Permits system- The written procedure for preparing and issuing permits for entry and for returning the permits to service following termination of entry.

Prohibited condition- Any condition in a permit space that is not allowed by the permit during the period when the permit is authorized.

Rescue service- The personnel designated to rescue employees from permit spaces.

Retrieval system- The equipment used for non-entry rescue of persons from permit spaces.

Testing- The process by which the hazards that may confront entrants of a permit space are identified and evaluated.

THE PROGRAM

The supervisor who is responsible for sending workers into confined spaces shall:

1. Be a qualified person.
2. Use this written procedure for a confined space entry.
3. Identify each confined space and inform employees by sign, placard, training program, or other effective means to prevent inadvertent entry.

4. Providedesignatedemployeeswiththespecifictrainingnecessary,beforetheemployees maybeauthorizedtoenteraconfinedspaceperformtheirspecificduties.
5. Assuretheavailabilityofprotectiveclothingandotherpersonalprotectiveequipment necessaryforsafeentry.
6. Assurethereadyon-siteavailabilityanduseofrescueandsafelyrelatedequipmentor services,suchasliftingorretrievaldevicesforuseinanemergency.
7. Provideandrequiretheuseofretrievallinesforatmospheresimmediatelydangeroustolife andhealthorwherethereisariskofengulfment,tomakearescuepossiblewithout entering.Theshallbeadequateattachmentpointsoutsidetheconfinedspacefortyingoff orotherwisecuringsretrievallinesforallauthorizedentrants.Whenretrievallinescould constituteanentanglementhazardorcannotbeused,alternaterescuemethodsmustbe provided.
8. Determineandevaluatethesourceofanyatmosphericcontaminationfoundbeforethetime ofentry.

PROCEDUREFORENTRY

1. The"ConfinedSpaceEntryPermit/CheckList"mustbefilledoutcompletelybefore enteringaconfinedspaceandmustbeavailableatthesiteforthedurationofthejob.The entrancetotheconfinedspaceshallbeposted.
2. Beforeentryintoaconfinedspace,itshallbetestedforflammableandtoxicgasesand/or oxygendeficiency.Theoxygenlevelmustbebetween19.5and23percentandthe explosivelimitbelow5%ofthelowerexplosivelimit(LEL).
 - a. Whenoxygenlevelsarelessthan19.5%,approvedrespiratoryequipmentmustbe used.
 - b. Whenoxygenlevelsaregreaterthan23%,nohotworkcan beperformeduntil ventilatingtechniqueshave reducedtheoxygenleveltolessthanapproximately 21%.
 - c. Whentheconcentrationofflammablegasesisgreaterthan10%oftheLEL,hot workmayNOTbeperformed.Noattemptshouldbemadetoverilate the confinedspaceifthereadingisabove theLEL.
3. Ifworkisdiscontinuedandworkersleavetheconfinedspaceareaforanyreason,itmust bere-testedforoxygenandLELpriortore-entry(withoutexception).Thenewdatamust berecordedonthepermit/checklist.
4. Atnotime shouldlessthan twopeopleworkata confinedspace.
5. Aqualifiedpersonshall establishcontinuousventilationifrequired.

6. At least one person must be stationed at the entry to the confined space and communications should be established between the outside and inside.
7. At least one person on the team shall be trained in CPR and first aid. An adequate supply of first aid equipment should be within easy access of the confined space.
8. At least one member entering the confined space will wear a monitoring device with an alarm, which must be tested before entry and carried for the duration of the project.
9. If the monitor alarm sounds during the performance of work in the confined space, everyone should evacuate immediately and the supervisor must be notified.
10. In case of emergency notify Campus Security and/or the Physical Plant. The emergency messages should clearly describe the situation and the immediate needs.
11. Upon completion of work or at the end of a normal workday, a dated, signed, and completed check sheet must be submitted to the Supervisor.

RESCUE PROCEDURES

Rescue procedures shall be specified for each entry. The outside attendant must:

1. Immediately call Security for help.
2. Maintain unobstructed lifelines and communication to all workers within the confined space.
3. Never enter the confined space unless relieved by a qualified person.
4. Make rescue attempts using the lifeline from outside the confined space while awaiting assistance.
5. Must wear a lifeline when entering the confined space to perform a rescue.
6. Wear a SCBA (Self Contained Breathing Apparatus) when performing a rescue.

TRAINING

Personnel who are required to work in confined spaces or in support of those working in confined spaces shall have training in the following areas: emergency entry and exit procedures, use of applicable respirators, first aid, lockout procedures, safety equipment use, permits system, and work practices.

Rescue and training drills shall be given initially to new employees and at least annually thereafter.

Before entering a confined space, employees shall review site specific guidelines for safe entry and emergency exit. These guidelines shall be compiled by a qualified person and recorded on the entry permit.

MEDICAL GUIDELINES

Workers who enter a confined space must have a pre-placement examination by a College recommended physician. The physicians shall be informed of the type of confined space the employee may be required to enter, the type of substance the employee may encounter, and a description of any protective devices the employee may be required to use.

The physical examinations shall include a demonstration of the worker's ability to use negative and positive pressure respirators and to see and hear warning signals.

Following the examination, the physicians shall give to the employer a written statement specifying any condition or abnormality found that would increase risk to the employee's health by working in confined spaces.

Periodic medical exams will be made available to employees required to work in confined spaces.

RECORDKEEPING

Records of training, inspection, testing, and maintenance as well as employee exposure records shall be retained for at least one year.

When atmospheric testing indicates the presence of a toxic substance, records shall be maintained for thirty years.

Attached to this plan are the list of confined areas and crawl spaces at Vermont Technical College, confined space entry permit checklist records and training, inspection, testing and maintenance records for at least one year.

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

CONFINED SPACE TRAINING

Job Class/Title

Director of Facilities
Assoc. Director of Facilities
All Maintenance Personnel

*See Appendix - Chapter 3 for Confined Space Entry Permit

CHAPTER 4

FIRE PROTECTION

29CFR1910SUBPART SE, H, L, AND S, 1926SUBPART F

It is the policy of Vermont Technical College to provide a fire safe environment for all employees and students through adherence to the fire protection program outlined in this section. Vermont Technical College shall adopt the highest fire safety standards available. The fire protection criteria shall conform to the requirements and recommended practices contained in the current National Fire Codes, published by the NFPA. Except as otherwise noted, National Fire Code requirements shall provide the basic level of protection. Fire protection includes all measures relating to preventing, detecting, controlling, and extinguishing fire to minimize damage to property; and more importantly all measures pertaining to safeguarding life against the hazards of fire. Such measures include, but are not limited to, the following:

1. Providing safe egress routes from all areas within buildings.
2. Detecting and/or suppressing fires in the earliest stages.
3. Identifying and eliminating hazardous procedures, operations and conditions.
4. Guarding against or controlling fire hazards that cannot be eliminated.
5. Establishing safe practices consistent with operations.
6. Motivating, training, and educating all personnel in fire safety principles.

RESPONSIBILITIES

The Director of Facilities and/or Director of Security are the "Authority Having Jurisdiction" referred to in the NFPA documents and other fire safety codes and standards. He/she exercises administrative control over the operations of the program.

1. **Department Chairpersons, Administrators and/or Supervisors** are responsible for implementing the fire protection in the building/facility/office protection program in the buildings/facilities/offices where they have their operations. Each shall:
 - a. Ensure that the buildings, facilities, and offices under their jurisdiction are secure from fire hazards and follow good building, fire, and life safety practices.
 - b. Request appropriate repair and restoration funding to correct identified fire/life safety discrepancies.
 - c. Request new fire extinguishers for new or newly renovated facilities.

- d. Initiate action to protect high value items and data that are irreplaceable or critical to the College's mission by contacting the Director of Facilities, or Director of Security or designee for a fire protection evaluation.
- e. Ensure that smoking occur only within designated smoking areas and that these areas are posted as such.

2. The Director of Facilities or his/her designee shall:

- a. Ensure that fire doors and emergency exit doors are labeled and in proper working order.
- b. Post a conspicuous warning sign in each elevator to read, "NOTICE: THIS ELEVATOR MUST NOT BE USED DURING EMERGENCIES. USE THE STAIRWAY".
- c. Mark all hazardous areas with appropriate signs, such as "DANGER," "FLAMMABLE LIQUIDS," "NO SMOKING," and so forth.
- d. Ensure that proper receptacles for smoking materials are placed in designated smoking areas.
- e. Ensure that metal containers with tight-fitting metal lids are provided for the disposal of flammable and combustible materials.
- f. Ensure that trash is not permitted to accumulate and is removed daily.
- g. When appropriate, issue written authorizations approving the use of coffee pots, space heaters, and other heat-producing electrical appliances.
- h. Ensure that appropriate and prompt corrective action is taken to eliminate fire hazards.
- i. Ensure that all fire extinguishers are properly mounted and not blocked.
- j. Ensure that all exit signs and emergency lights are lamped and in proper working order.

3. The Director of Facilities or Director of Security shall:

- a. Conduct semiannual fire prevention inspections, using "Fire Safety Check List" (appendix X) and shall submit the report to the Office of the Physical Plant (OPP).
- b. Schedule unannounced fire drills for each building.
- c. Ensure that fire doors are kept closed.
- d. Provide employees with fire-safe working conditions.

- e. Ensure that fire regulations are followed.
- f. Correct fire hazards immediately.
- g. Implement the college's fire safety policies and procedures.
- h. Ensure that employees are educated and trained in fire-safe work practices.
- i. Encourage employees to report hazardous conditions.
- j. Make available to every employee a copy of the "College Safety Manual" and discuss the elements of the "Emergency Self-Protective Plan" for his/her particular worksite on a yearly basis.
- k. Alert the security office prior to activities that might cause the activation of a fire detector (such as cooking, soldering, painting, or sanding).

4. Employees shall:

- a. Keep their work areas neat and orderly and shall place all trash in appropriate metal waste containers for daily pickup.
- b. Place oily rags and similar materials in approved metal containers with tight-fitting metal covers.
- c. Observe no-smoking regulations and deposit smoking materials in receptacles provided for this purpose.
- d. Secure written approval from the Director of Facilities before installing or using any heat-producing electrical appliance.
- e. Ensure that fire doors are kept closed.
- f. Keep hallways, exit doors, stairways, fire lanes, and access aisles clear of storage or obstacles.
- g. Maintain clear access to fire equipment such as stand pipe connections and fire extinguishers.
- h. Know how to properly select and use portable fire extinguishers.
- i. Notify the Office of the Physical Plant of any apparent fire hazard.
- j. Immediately evacuate the building upon activation of the fire alarm system. Know both primary and secondary exit routes.

- k. Immediately report any fire before attempting to extinguish it by calling the Security Office X1292.

5. Security staff shall:

- a. Conduct daily tours to note and report life safety hazards.
- b. Notify offenders and the Office of the Physical Plant of all violations.
- c. Report repeated violation to the Office of the Physical Plant.
- d. Provide extra patrols in areas where fire systems are out of service.
- e. Limit crowds below occupancy limits.
- f. Know the location of fire detection and automatic suppression systems and their controls.
- g. Know the types and locations of hazards within a building.
- h. Know the locations of utility services, such as gas cutoff valves and electrical switch gear rooms.
- i. Assist the fire department and coordinate facility and security emergency plans in the event of fire.
- j. Enforce no-smoking regulations in public areas.
- k. Conduct daily inspections of the emergency exit doors to ensure door and door hardware are operational.

6. Office of the Physical Plant:

- a. Ensure that fire protection and life safety systems are maintained in good working order at all times.
- b. Expedite repairs of fire protection and life safety systems to minimize their down time.
- c. Inspect and repair fire doors.
- d. Coordinate the evacuation of smoke from a building in the event of fire.
- e. Provide assistance to clean up and restore fire and water damaged areas.
- f. Maintain the fire extinguishers by conducting inspections of portable fire extinguishers, recording the date of the inspection and the name of the inspector on a tag attached to the device.

- g. Know the locations of utility services, such as gas cutoff valves and electrical switchgear rooms.

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

FIRE EXTINGUISHER TRAINING

Job Class/Title

Administrative Dean
Secretary to Dean of College
Dir. of Computer Services & Staff
Dir. of K-12 & Outreach or Designee
Dir. of VIT or designee
Dir. of VMEC or designee
Dir. of SBDC or designee
All Laboratory Technicians
Dir. of TRIO or designee
Dir. of Library or designee
Registrar or designee
Dir. of Construction Practice/Management
Auto Tech Faculty
Chair: Mechanical Dept.
Dir.: Biotechnology
All Farmstead Staff
Director of Physical Plant
Assoc. Director of Physical Plant
All Maintenance personnel
All Custodial personnel
All Security personnel
All Residential Life personnel
All Residential Assistants (RA's)
All Designated VTC Fire Wardens
Two representatives of Business Office
ARAMARK Director
ARAMARK Dep. Dir.
ARAMARK RAT Mgr.

CHAPTER 5

GENERAL SAFETY

CIGARETTE RECEPTACLES

Cigarette receptacles should be provided in all smoking areas in the general vicinity of entrance to "No Smoking" areas.

HEATING PLANT AREAS

Fires and accidents in heating plant areas are most often caused by spontaneous combustion of materials stored in the vicinity of heating plants or development of excessive heat by improper ventilation. To prevent these types of accidents, furnace and mechanical rooms shall be kept clear at all times and will not be used as storage areas for any materials. In order to ensure proper functioning of heating plants, furnaces shall be properly adjusted and outside ventilators of proper size shall be kept clean and clear.

MAINTENANCE FACILITIES

The prevalent cause of accidents is unsatisfactory housekeeping. In automotive maintenance shops, grease on floors and greasy tools account for the greatest number of accidents. In order to eliminate these hazards, the following safety rules shall apply:

1. Satisfactory housekeeping conditions must prevail at all times.
2. Grease racks and lifts must be kept clean and free of grease and debris at all times.
3. Droplights used should be equipped with vapor-proof globes and shields. Droplights shall be approved type and under no conditions shall the cord be spliced.
4. Oil and grease-soiled rags shall be kept in self-closing metal containers and removed from the area daily or when capacity is reached. Under no conditions should the containers be left uncovered.
5. Gasoline or other flammable liquids MUST NOT be used to clean vehicles, parts, floors, or other materials. Only approved cleaning solution or plain soapy water will be used for cleaning. Flammable substances must be stored in approved storage facilities. Containers will be kept closed at all times when not actually using the material.
6. Smoking is prohibited in maintenance facilities, except in designated areas. The smoking area shall be designated, and provided with butt receptacles.
7. Serviceable firefighting equipment of property and capacity will be located strategically within the area.

8. Vehicle engines or machinery exhausting toxic vapors will not be operated in enclosed areas without a safe exhaust system being utilized.
9. Air compressor shall be properly grounded, control switches in proper repair, and stop switches painted RED. Drive belts shall be equipped with a guard to prevent an individual, tool, or clothing from being caught in the drive unit.

WELDING OPERATIONS

Welding operations require that welding goggles or shields and approved gloves be worn while performing the operations. An approved type of fire extinguishers shall be in the immediate vicinity and proper ventilation provided. Acetylene and oxygen tanks must be securely fastened to prevent their falling over or being knocked down.

COMPRESSED GAS CYLINDERS

Gas cylinders may contain up to 2500 PSI pressure. Accidents have occurred when the heads or these cylinders were broken off. Escaping gases create jet action of sufficient force to propel the cylinders through the walls of buildings, creating fires, and maiming the persons in the vicinity. Flammable gases create the additional hazards of catalytic action or oxidation under certain conditions.

Improper storage, movement, and use of gas cylinders are considered some of the major safety hazards on the campus. Cylinders shall be properly segregated and securely fastened in storage, movement, and use. Operation must ensure that head caps are firmly in place when not in use and only the proper gauges are used in metering the gases.

GRINDERS AND BUFFERS

Considerable eye damage results from improper use of grinders. In order to prevent this danger, wheels **WILL NOT BE USED** without the metal guard and eye pieces in place. In addition, prior to use, the wheel should be checked for scoring or cracking. When new wheels are installed, the RPM capacity of the wheel should be checked against the maximum RPM capacity of the motor.

POWER MACHINERY AND EQUIPMENT

Supervisors shall allow only experienced personnel to operate power machines and shall give proper instructions in their safe operations. Power saws, sharpeners, and other equipment must have the proper type safeguards in place when operating the equipment. Protective eye equipment shall be used when operating machines which could cause particles to be discharged in such a manner as to cause injury. All machinery shall be properly grounded and control switches shall be located at the point of operation best suited to control the equipment.

USE OF LADDERS

Prior to using a ladder, and inspection of uprights and ladders should be made. In addition, the rope on extension ladders should be inspected. Step ladders should be checked for unsafe hinges as well as steps and uprights.

EYE PROTECTION

All personnel who work on or in close proximity to operation which are classified as eye-hazardous shall be equipped with and required to wear eye protectors approved for operation. Types of eye protection are: Plano-type safety spectacles, prescription-type safety spectacles, face shields, and approved plastic goggles.

STORAGE AND WAREHOUSE

In buildings with installed sprinkler systems, stacked material shall have a minimum clearance of 18 inches between the top of the stack and the sprinkler system piping.

In buildings without installed sprinkler systems, the material stack height shall not exceed 15 feet. All stacks shall have a minimum of 36 inches clearance between the top of the stack and joist, rafters or roof trusses.

Where firefighting equipment locations and manual fire alarm boxes are not visible from the center aisle, directional signs with white letters on red field will be erected at appropriate locations.

Persons in charge of warehouses will notify the Safety Department upon receipt of unusually large quantities of hazardous materials.

STORAGE AND USE OF FLAMMABLE LIQUIDS

For the purpose of this program flammable liquids may be defined as those liquids with a flash point of 140°F or less and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100°F.

Flammable liquids will be dispensed from and stored in standard safety cans conspicuously labeled as to contents. Dispensing drums will be properly grounded and bonded.

Flammable liquids required in small quantities for frequent use will be stored in approved safety cans, in a metal cabinet or closet, ventilated to the outside where practicable.

Flammable liquids will not be used for cleaning floors, clothing, or equipment.

For those laboratories and shops which do not have a satisfactory flammable liquid disposal system, flammable liquids requiring disposal will be segregated and stored until disposition instructions are received from the Chairman of the Department. At no time will flammable liquids be poured down drains or sewers. In those cases not covered by specific guidance the Director of Security will be contacted.

All containers for storage, issue, and transportation of flammable liquids shall be clearly marked in accordance with Section 326 of the National Fire Code (NFPA). All devices for closing or sealing such containers shall be in good operating condition.

PAINTING AND PAINT STORAGE

Paints and painting referred to include varnish, shellac or similar commodities, with the exception of water based paints.

All spray rooms, paint rooms, and equipment will be thoroughly cleaned at the close of each day's work.

Paint will be stored in sealed containers. Paint in unsealed containers will be stored at a safe distance from combustible type construction.

Wiping rags, strainers, drop cloths, and paint stained work clothing will not be stored with thinners, paints, turpentine, or other combustible materials. Paint brushes will not be left to soak in cleaning fluid, but will be cleaned and suspended for air-drying and the cleaner will be disposed of or returned to the original container.

All waste masking paper will be removed from the building at the close of each day's work.

All paint spills will be cleaned up immediately. Benches, floors, and all equipment will be cleaned of accumulation of paint.

Smoking is prohibited in any part of the paint shop.

Empty paint containers will be disposed of daily.

Each foreman will be held responsible for and will personally inspect all fire extinguishers and will assure himself of their operating condition before ordering work to commence.

PARKING

The difference between completed destruction or saving a building is measured in minutes. These minutes are normally the time needed for fire equipment to position itself and deliver concerted fire fighting effort. Loss of time is often associated with parking problems in the vicinity of fire hydrants or fire lanes. In order to eliminate this hazard, parking in the vicinity of fire hydrants and in fire lanes is prohibited. Specifically, the following rules apply:

1. If parking at any location will interfere with or impede fire department operations, the College Safety and Security Officer will designate and properly mark "No Parking - Tow Away Zone" areas.
2. Parking within ten (10) feet of discharge points of exit ways in any building is prohibited except for loading and unloading.

3. Parking within ten (10) feet of any fire hydrant is prohibited.
4. Parking within fifteen (15) feet of any fire department connection in building equipped with automatic sprinkler system or stand pipe is prohibited.
5. Parking within ten (10) feet of combustible building is prohibited.

EMERGENCY LIGHTING SYSTEMS

Many of the structures on campus are equipped with emergency lighting systems which would permit uninterrupted service under adverse conditions. In other buildings emergency lighting systems are installed to ensure continuous lighting of critical areas and exit facilities. In order to ensure that these emergency lighting systems are functioning properly, building engineers shall test each system under their control monthly. The tests should be conducted at a time which would cause least disruption to normal activities. The tests shall include, but not be limited to, the functioning of the circuit breaker activator, operation of the system for a period of approximately one-half (1/2) hour, and appropriate servicing.

CHAPTER 6

HAZARD COMMUNICATION PROGRAM

29CFR1910.1200

It is the policy of Vermont Technical College that all employees engaged in operations involving the handling or use of hazardous chemicals comply with the requirements of this chapter and all applicable subparts of the Occupational Safety and Health Act.

GENERAL REQUIREMENTS

1. The Federal Hazard Communication Standard requires that associated health risks be disclosed to those potentially exposed to certain chemicals. This regulation consists of several essential program components, which provide a comprehensive framework for ensuring chemicals safety in the workplace. Program components include:
 - a. A written hazard communication plan for each facility.
 - b. Conducting chemical hazard evaluations and updating an inventory of all hazardous chemicals in each facility.
 - c. Developing and maintaining a file of materials safety data sheets (MSDS) for all hazardous chemicals in each facility.
 - d. Conducting employee training programs regarding the hazards of using chemicals and protective measures.
2. The Vermont Technical College Hazard Communication Program is a centralized program. The Academic Dean, Director of Facilities and the Director of Security are responsible for the management and maintenance of a department or facility-specific program in accordance with this section and 29CFR1910.1200.
3. The Director of Security will coordinate the Hazard Communication Training Program for the purpose of implementation. The Vermont Technical College designated trainers shall provide training and technical assistance to the hazard communication program coordinator as requested.

PROGRAM COMPONENTS

1. Written Hazard Communication Plan

The Health and Safety Committee shall maintain at the workplace a written communication plan for the college. The plan is to describe the specific methods used to achieve compliance with the Hazard Communication Standard. These methods shall include, but are not limited to, the criteria for labels and other forms of warning, material

safety datasheets, and employee information and training. The plans shall also include an inventory of the hazardous chemicals known to be present and shall use an identity for the chemical that is referenced on the appropriate materials safety data sheet (the inventory may be compiled for the workplace as a whole or for individual work areas). The inventory shall be updated as necessary. The written hazard communication plans shall be available, upon request, to all employees or their designated representative.

2. Chemical Warning Labels

- a. The CHONA, CHO, as appropriate, shall ensure that all containers of hazardous chemicals are labeled, tagged, or marked with the following information:
 - (1) Identity of the hazardous chemical(s).
 - (2) Appropriate hazard warnings.
 - (3) Name and address of the chemical manufacturer/importer or other responsible party.
- b. The CHONA, CHO is required to ensure portable containers into which hazardous materials are transferred are properly labeled (even those intended only for the immediate use of the person who performs the transfer).

3. Material Safety Data Sheets (MSDS)

The CHONA, CHO officers shall ensure that copies of the required MSDS for each hazardous chemical are maintained in the facility, and shall ensure that they are readily accessible during each work shift to employees when they are in their work areas. Materials safety data sheets will be kept in written form and may be designated to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. Material safety data sheets or a chemical inventory shall be retained for at least 30 years.

4. Employee Information and Training

- a. Department chair persons and supervisors will check with CHONA and CHO, and shall provide necessary information and training on the hazardous chemical to the employees who use, handle, or are potentially exposed to hazardous chemicals any time in their work area. This training shall be provided at the time of the employee's initial assignment and whenever a new chemical hazard is introduced into the work area. Supervisors shall ensure that all new employees receive the required training before they begin their assigned duties. The required trainings shall include:
 - (1) The requirements of the Hazard Communication Standard.
 - (2) All operations in their work area where hazardous chemicals are present.

- (3) The location and availability of the written facility hazard communication plan, including the inventory of hazardous chemicals and the use and location of material safety data sheets.
 - (4) Methods and techniques that may be used to detect the presence or release of a hazardous chemical in the workplace.
 - (5) All physical and health hazards of the chemical used in the work area.
 - (6) The measures employees are to follow to protect themselves from recognized hazards, including facility-specific procedures implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and use of personal protective equipment.
 - (7) Other specific details of Vermont Technical College Hazard Communication Program described in this manual.
- b. Department chair persons and supervisors, working with the CHONA, and CHO, shall identify employees potentially exposed to hazardous chemicals and shall maintain a list of those who have received the training and the date the training was conducted.

5. Accessibility

This document is available to Vermont Technical College employees and students or their designated representatives upon request. It is also available to the Assistant Secretary of Labor for Occupational Safety and Health and the Director of the National Institute for Occupational Safety and Health (NIOSH).

6. Employee Responsibility

It is the objective of Vermont Technical College to ensure that any employee who handles hazardous chemicals be fully informed of the hazards involved and that they be trained to perform their jobs safely. However, it is essential that each employee actively participate in the program to make the Hazard Communication Program a success.

HAZARD DETERMINATION PROCEDURE

Vermont Technical College will rely on hazard evaluations performed by the chemical manufacturers and importers of all chemicals purchased.

Material Safety Data Sheets obtained from suppliers on all chemicals purchased shall be used in determining health and physical hazards of materials present on the site. If MSDSs are not properly completed the material will not be used until the missing information is obtained. A letter will be sent to the manufacturer or importer requesting the updated MSDSs.

Manufacturers and importers are expected to send a copy of updated MSDSs within the required time periods specified by OSHA. (An example letter can be found in Appendix B of the Hazard Communication Standard.)

All chemicals used on the site that meet the OSHA definition of a "hazardous chemical" will be listed on the Hazardous Substance List. This list will include "articles" and "consumer products" as defined by OSHA in anticipation of OSHA revisions to Hazard Communication.

The process mixtures prepared by Vermont Technical College will be assumed to present the same health hazards as each component of the mixture, therefore the MSDSs of all components will be used in determining the hazards present.

If any of the mixture components are carcinogens, the mixture will be considered to be carcinogenic if a carcinogenic component is present in a concentration equal to or greater than 0.1%.

If any ingredient in the mixture is released in concentrations which would exceed the established OSHA Permissible Exposure Limit (PEL) or ACGIH Threshold Limit Value (TLV) the mixture will be assumed to present the same hazard as the component released.

The supervisor of each process is responsible for determining the hazard of process mixtures. When questions or concerns arise that the supervisor cannot resolve, the Director of Facilities or the Director of Security should be consulted.

LIST OF HAZARDOUS SUBSTANCES

The supervisor of each work area throughout Vermont Technical College will make a list of all hazardous chemicals used on-the-job by their employees and will update the list as necessary. The head of the Department or the supervisor of each work area is responsible for maintaining:

1. A list of all chemicals used and stored in the work area, and
2. A list of all the chemicals in the work area that have been proven to be hazardous chemicals as defined by the OSHA Hazardous Communication Standard.

Employees in the work area or on the company premises will have free access to the List of Hazardous Substances during each work shift.

LABELS AND OTHER FORMS OF WARNING

All supervisors will ensure that all hazardous chemicals in their work area are properly labeled and updated, as necessary. This includes both in-plant and shipped containers.

It is Vermont Technical College's policy to require that suppliers of chemical products label their materials. As a minimum, the label on the containers of hazardous substances shipped to the site shall contain:

- * "Identity" of the material
- * Appropriate hazard warnings
- * Name and address of manufacturer or importer

No container will be accepted unless it is properly labeled with the required information.

In-house transfer containers used on the sites shall be labeled with the following information:

- * "Identity" of the material
- * Appropriate hazard warnings

It is not required to label in-house containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the "immediate use" of the employee who performed the transfer.

As a supplement to labels, signs will be used to provide the required information when appropriate.

Under no condition will a container without a label be used when it is not intended for the chemical to be used immediately.

Pipes or piping systems will not be labeled but their contents will be described in the training sessions.

All labels will be in English.

Stationary containers shall be labeled with the following information:

- * "Identity" of the material
- * Appropriate hazard warnings
- * Name and address of the chemical manufacturer

CHAPTER 7

HAZARD COMMUNICATION TRAINING PROGRAM

PREFACE

This manual is written for training purposes only; and is not intended to be a comprehensive referenced document. Comprehensive safety information on specific substances should be obtained only from Material Safety Data Sheets (MSDSs), container labels, or consultation with Vermont Technical College's Director of Facilities, Safety and Security or designee.

FORWARD

About 32 million workers are potentially exposed to one or more chemical hazards. There are an estimated 575,000 existing chemical products, and hundreds of new ones being introduced annually. This poses a serious problem for exposed workers and their employers. Along with this growth in the number of chemicals comes the responsibility for handling these chemicals safely.

In the past, there was no guarantee that workers would be told about the chemical hazards they might face on the job. Container labels and warning sheets, when they were available, didn't always have sufficient information on the potential hazards of the chemicals, or detail what to do in the event of an emergency.

In response to this need to know more about the potential chemical hazards we face on the job, Vermont Technical College will utilize a Hazard Communication Training Program. This program includes a chemical inventory, in-house chemical labeling, Material Safety Data Sheets (MSDS), and employee information and training. Each of these elements has been instituted to ensure that work-related chemical hazards are effectively communicated to VTC faculty, staff, and students.

The goals of the Vermont Technical College's Hazard Communication Training Program are to develop in employees an awareness of potentially hazardous substances in the workplace, and to train employees in appropriate, safe work practices. Upon completion of the Hazard Communication Training Program, the employees shall:

1. Be fully aware of potentially hazardous chemicals in the workplace.
2. Be cognizant of Material Safety Data Sheets and other information sources on workplace chemicals.
3. Be able to identify and use various control measures to prevent chemical exposure.

HAZARD COMMUNICATION STANDARD

According to the Occupational Safety and Health Administration (OSHA) one out of every four workers is exposed to chemical hazards in the workplace. In the past there was no guarantee that

workers would be told about the chemicals they worked with and how to use them. To make sure that all workers are informed about the hazardous chemicals in the workplace, OSHA developed the Hazard Communication Standard (HCS) 29 CFR 1910.1200, sometimes known as the "right-to-know" law.

As you employer, Vermont Technical College must comply with the Hazard Communication Standard. The Standard defines the responsibilities of chemical manufacturers, employers, and employees.

Manufacturers:

The responsibility for keeping materials safe begins with manufacturers or importers who ship materials to Vermont Technical College. According to the Hazard Communication Standard, producers and importers of substances which are used in the workplace must:

1. Determine the physical and health hazards of their products.
2. Put warning labels on the containers their products are packaged in.
3. Give users of their products Material Safety Data Sheets (MSDSs) which describe a product, its hazards, and its safe use.

Employers:

As you employer, Vermont Technical College is responsible for making sure you are protected from hazardous chemicals. VTC must:

1. Tell you about the Hazard Communication Standard and your right to know about the chemicals you work with.
2. Write a Hazard Communication Plan which describes how it will comply with the Standard and inform you about how this plan is being put into effect. You can obtain a copy of the College's Hazard Communication Plan from the Dean of Administration or the Director of Safety and Security.
3. Teach you about the chemicals you work with, how to use them safely, and how to read and understand labels and MSDSs. The College will train you when you begin your new job and whenever you are assigned to a new work area. You will learn how to recognize the hazards of the substances you work with, how to protect yourself from those hazards, and how to respond to emergency situations. Before you begin working with a new material your supervisor must inform you about the protective measures you'll need to take.
4. Make sure that all chemicals are properly labeled and that you have access to MSDSs for all of the substances you work with. MSDS binders are available at worksites at the College. If you are using a hazardous material and want to review the MSDS, look for the product's MSDS in the binder. The College also maintains a list of all hazardous substances that are used at the College and a file of MSDSs. If you can't find an MSDS

that you are looking for at your worksite, check with your supervisor, then contact the Director of Safety and Security and he/she will send a copy of the MSDS to you.

5. Make sure that employees use safe procedures at worksites where hazardous substances are used. It is the College's legal responsibility to provide you with personal protective equipment and to make sure that the area you work in is as safe and secure as possible.

Employees:

As an employee of Vermont Technical College, you have responsibilities too. You are required to:

1. Read labels and MSDSs for all materials you work with and follow the instructions and warnings they contain.
2. Follow established rules for using hazardous substances safely.
3. Take part in College training programs.
4. Practice personal hygiene.

WHAT IS A HAZARDOUS SUBSTANCE?

According to the OSHA Hazard Communication Standard a hazardous chemical is any element, chemical compound, or mixture of elements and/or compounds which is a physical hazard or a health hazard.

OSHA considers a chemical hazardous if it is listed in any of the following:

1. OSHA's law 29 CFR 1910.1000, table Z-1 through Z-3, OSHA Safety and Health Standards.
2. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, published by the American Conference of Governmental Industrial Hygienists (ACGIH).
3. The Registry of Toxic Effects of Chemical Substances, published by the National Institute of Occupational Safety and Health (NIOSH).

There are over 600,000 substances which appear on at least one of these lists.

WHAT MAKES A SUBSTANCE HAZARDOUS?

A hazardous substance is any material or mixture that possesses properties capable of producing adverse effects on the health and/or safety of humans. Substances that are considered hazardous include:

Physical Hazards:

Flammable liquids are materials that will readily ignite in the presence of heat, sparks, or flame.

Combustible liquids are similar to flammable liquids, but they do not ignite easily.

Pyrophoric chemicals are those that will spontaneously burst into flame at temperatures lower than 130 °F.

Oxidizers are materials that readily release oxygen, which may cause combustible material to burn on contact or accelerate the burning.

Organic peroxides are a special chemical family (containing oxygen) that behave as powerful oxidizers.

Explosive chemicals cause a sudden release of energy, which includes a release of pressure, gas, and heat when subjected to shock, pressure, or heat.

Water-reactive chemicals are substances that will react with water to release a gas which is either flammable or presents a health hazard.

Unstable materials are "self" reactive under such conditions as shock, pressure, or temperature.

Compressed gases are materials stored under pressure, but are released as a gas for use.

Health Hazards:

Irritants are chemicals that cause intense redness or swelling on contact with body tissue.

Sensitizers are substances that cause an allergic reaction in a majority of people after repeated exposure.

Corrosives can cause tissue damage at the site of contact.

Target organ effects are caused by chemicals that affect body organs such as the liver, kidneys, and brain.

Toxic substances are proven to cause death in animals and man at moderate to low doses.

Reproductive toxins are chemicals that may cause birth defects or sterility.

Carcinogens are substances capable of causing cancer.

WHERE THEY WILL DO THE MOST DAMAGE

Chemicals are often classified according to the *target organ* or *system* that they affect after they have entered the body. Substances which damage the kidneys, for instance, are referred to as *nephrotoxins*. A classification of health hazards according to the target organ or system that they threaten appears on page 6 under the heading "Health Hazards."

When you know the "how, what, and where," about a chemical before you begin working with it you'll be more likely to treat it with respect and follow the recommended safety measures. You can find out the "how, what, and where" from the training that your supervisor gives you, from this manual, from labels, and from MSDSs. If you still have questions or need more information contact EHS & RM for assistance.

CHEMICALS IN YOUR WORKPLACE

You are exposed to a wide variety of chemicals every day. Some common chemicals found in many work areas include:

Inks Used for print machines and processors, contain metals and solvents that may be toxic and/or flammable.

Solvents Used to clean machinery and thin paint, can be flammable and/or toxic.

Paints Mixtures of color pigments, usually metals and solvents.

Fuels Includes gasoline, kerosene, and propane; in addition to fire hazard, may also be toxic.

Cleaning Product Contain a wide variety of chemicals that may be corrosive, flammable, or toxic.

Laboratory Chemicals Include sulfuric acid, zinc carbonate, sodium hydroxide; possess a variety of hazardous characteristics.

RECOGNIZING HAZARDOUS SUBSTANCES IN THE WORKPLACE

How do you recognize that a particular chemical in your workplace may be harmful or dangerous? How do you work safely with or around these materials. There are several easy methods used to recognize and learn about hazardous materials you use at work. Three readily accessible methods are:

Hazardous Substance Inventories:

One way to determine if a material is hazardous is to refer to the VTC's workplace chemical inventory.

This is a comprehensive list of all the hazardous substances used or stored in each workplace or building on campus. These lists are broken down to itemize the hazardous chemicals found in each work area.

When working with a new substance or in a new work area, you can refer to these lists to determine if any of the products you may be working with are dangerous. These lists are available in the safety manual of each work area, or by asking your supervisor.

Container Labels:

A second method is to read the container labels.

Chemical manufacturers are required by law to provide specific information on containers of chemicals that are considered hazardous. OSHA requires each container of hazardous substances coming into and/or leaving the workplace to be labeled with the chemical's identity, appropriate hazard warnings, and the name of the manufacturer of the material. There are no standard college labeling systems. Labels coming into the workplace may have different labeling formats or symbols that relate similar information.

Around the college you will see two kinds of labels: commercial labels and college in-house labels. Commercial labels are found on purchased containers coming into the college. College labels identify material that are dispensed into and stored in the college containers.

Material Safety Data Sheet (MSDS):

When additional information on hazardous materials in the workplace is required, a third method is to refer to the material safety data sheet, (MSDS).

Because of space limitations on containers, manufacturers and suppliers are required by federal and state law to provide an MSDS containing information about the hazards of products they produce and sell to users of the chemical. MSDS formats will differ by manufacturer, but all must contain, at a minimum, the specific hazard information required by OSHA. The completed MSDS that follows illustrates the minimum information that must be provided. If an MSDS does not contain this information, report it to your supervisor.

Material Safety Data Sheets must be made available for any hazardous substance in your work area. You can get an MSDS by contacting your supervisor.

Health Hazards:

A chemical is a health hazard if it causes acute or chronic health effects in employees who have been exposed.

Acute health effects - severe symptoms which develop immediately after exposure. Some examples of acute health effects are nausea, dizziness, headaches, burns, and unconsciousness.

Chronic health effects - symptoms that develop slowly over a long period of time or that recur frequently. Some examples of chronic health effects are allergic sensitizations, skin problems, respiratory disease, and existing medical conditions that are made worse by exposure to a chemical.

KNOW THE CHEMICALS YOU WORK WITH

Toxicity is the ability of a chemical substance or compound to cause injury once it reaches a susceptible site in or on the body. To understand the possible risks of working with toxic substances you need to know three things about them.

How they can enter your body:

The best protection against poisoning is to keep chemicals from entering your body--if a chemical can't get into your body it can't harm you. Knowing the way a hazardous chemical can get into your body helps you take measures to keep it from doing so. Certain solvents, for example, can enter the body through the skin; so, if you are working with xylene-based compounds, you'll want to wear protective clothing and protective gloves.

These are three *routes of exposure* by which chemicals can enter your body:

1. Toxic fumes, vapors, and dust can enter through your nose, pass through your lungs, enter your bloodstream, and circulate through your body. Breathing cigarettes while working with chemicals is especially dangerous.
2. Many toxic substances can be absorbed through exposed skin. Chemicals can also enter your body through cuts or wounds in your skin.
3. If you eat, smoke, or accidentally touch your lip when there is a hazardous substance on your hand, the substance can enter your system through your mouth.

How to make safe work procedures a habit:

Whenever you are working with hazardous substances follow this list of general recommendations:

Personal Hygiene

1. Keep work areas and tools clean.
2. Wear recommended personal protective equipment.
3. Keep work clothing clean, inspect it regularly for holes or tears, and never mix it with your home laundry.
4. When working with chemicals, never wear sandals, shorts, or other clothing in which your skin will be exposed.
5. Remove all jewelry before you begin working.
6. Don't wear contact lenses when you are working in an area where there might be chemical vapors.

7. Never deliberately smell or taste a hazardous chemical.
8. Wash your hands often, especially before you apply makeup or lotion; before you smoke, eat, or drink; and after you have completed your work.
9. Smoke, eat, or drink in designated areas only.

Procedures

1. Read warning signs, labels, and MSDSs for substances you work with before you begin working.
2. Plan your work in advance and know what you will do in case of a spill, fire, or exposure to a hazardous chemical.
3. Strictly follow the rules established by your supervisor.
4. Don't take shortcuts.
5. Never work alone.
6. Stay alert.
7. Watch for hazards and signs of trouble such as unusual sounds or odors (odor is an unreliable way to check for the presence of a chemical. The sense of smell gets tired quickly, causing you to be unaware of a substance's presence. Also, some dangerous chemicals are odorless). **NOTE:**
8. Never perform a task you aren't authorized to perform.
9. Don't use mouth suction to fill a pipette--use a pipette bulb or other pipette filling device.
10. Use the smallest amount of hazardous material possible.
11. Use hazardous material only as directed and for their intended purpose.
12. Make sure your work area is ventilated adequately.
13. Be especially careful when moving containers.
14. Check that hoses and containers are not leaking.
15. Keep containers closed when you aren't using them.

Storage and Cleanup

1. Close lids and cap tightly before storing containers.

2. Don't store chemicals in alphabetical order. Doing so might place chemicals together that shouldn't be next to each other. Separate chemicals according to their hazard classes before alphabetizing them.
3. Don't store materials in aisles or in front of exits.
4. Don't store flammable and combustible materials near source of heat.
5. Don't store liquids above eye level.
6. Store especially hazardous substances like carcinogens in secondary containers (one inside the other).
7. Follow your supervisor's rules for disposing chemicals and contaminated materials.

Find out what protective equipment you need and use it:

Personal protective equipment (PPE) is equipment you wear to block a hazardous chemical's route of entry into your body.

In some cases, your supervisor will place *administrative controls* on the way you work with a substance; he or she may substitute an non-hazardous or less hazardous material for a hazardous one, or arrange a worker rotation schedule that limit each worker's exposure. In other cases, your supervisor may use *engineering controls* such as ventilation, exhaust fans, blowers, tank lids, and fume hoods to protect you. But when administrative and engineering controls don't protect you sufficiently from hazards, you should use personal protective equipment.

MSDSs for the substances you work with will tell you what equipment you should use. The following is a list of commonly used personal protective equipment:

1. **Skin Protection:** chemical-resistant gloves, boots, full-body protective suits, hoods, face and neck shields, caps

The coating on the PPE and its thickness will be determined by the substance's ability to penetrate it. When you are working with corrosives make sure PPE is in good condition and that there are no tears or pinholes in it. You can use lab coats, coveralls, or aprons that stay at the worksite when you work with non-corrosive chemicals.

2. **Eye Protection:** safety glasses, splash goggles, face shields

Safety glasses protect you from dust and flying objects. Splash goggles protect you from spray and mist. Use face shields together with glasses or goggles.

3. **Nose Protection:** dust respirator, vapor respirator, atmosphere-supplying respirator

Dust respirators take particles out of the air and should be worn around corrosive or metal dusts. Vapor respirators protect you from toxic gases. Atmosphere-supplying

respirators give you a safe supply of oxygen when you are working in contaminated air. Always make sure that the respiratory you are using fits properly before entering the workplace and be alert for signs that the respirator is failing such as clogging or the breakthrough of an odor. **NOTE:** Use of respiratory protective equipment requires approval and training from Environmental Health and Safety.

4. **Mouth Protection:** masks

Poisoning by mouth usually results from poor personal hygiene.

KNOW WHAT TO DO IN AN EMERGENCY

The best way to be sure you will respond adequately to an emergency is to prepare yourself. Before you begin working at your job you should learn what to do in case of an emergency. You should know:

1. phone numbers to call in case of fires, spills, and accidents
2. where showers and eye wash stations are
3. where alarms are and how to use them
4. where emergency exits are
5. where fire extinguishers are
6. how to shut down equipment
7. how to clean up spills
8. how to use clean up equipment
9. what to do in case of fires--how to get out of the building, what extinguisher to use, etc.
10. what first-aid techniques to employ

SPILLS AND LEAKS

If a hazardous substance spills or leaks while you are working, you should alert all other people in the area. Don't endanger yourself, but shut down any equipment you are working on and do whatever you can to stop the flow of the chemical.

Then leave the area, tell your supervisor, and call the Security Office, X1292.

Only trained personnel should be allowed to participate in the cleanup of a hazardous chemical, so don't begin cleaning up unless you are one of the people authorized to do so. You should be

prepared to identify the hazardous material to emergency personnel when they arrive. If you aren't sure what to do in a situation, contact Environmental Health and Safety for assistance.

FIRES

If there is a fire while you are working, shut down equipment in the immediate areas (if possible) and evacuate immediately. You should use portable fire extinguishers only to help you or someone else evacuate or to control a small fire; don't try to fight fires larger than a wastebasket with them. As you are evacuating, close doors to isolate the fire area if you are sure that no one is inside. When you have evacuated, stay out of the building until someone tells you it is safe to return. Move upwind of the fire and stay away from driveways, sidewalks, and other access ways.

If your clothing catches fire, drop to the ground with your arms across your chest and roll, in a rug or blanket if possible. Use cool water or ice pack to treat your burns--never cover them with grease or butter. Chemical burns should be treated by a doctor as soon as possible.

FIRST AID FOR CHEMICAL CONTACT

First-aid procedures must be provided on the MSDS of the hazardous substance being used and are sometimes found on the container label. **IF SOMEONE BECOMES OVEREXPOSED TO A CHEMICAL, CHECK THE LABEL OR MSDS FIRST.** If no information is available, use the following first-aid guidelines for chemical contact:

Lungs:

1. Take victim into fresh air. Rescuers should be equipped with the proper personal protective equipment (respirator may be required).
2. If unconscious, maintain an open airway.
3. Restore breathing/heartbeat, if necessary.
4. Get medical attention ASAP, call X1270 or Security X1292.

Skin:

1. Remove soaked clothing.
2. Wash area of skin with large amounts of water.
3. Get medical attention ASAP, call X1270 or Security X1292.

Eyes:

1. Hold the eyelids open and rinse the eyes with warm water or eye wash for 15 minutes.
2. Get medical attention ASAP, call X1270 or Security X1292.

Swallowing:

1. Refer to MSDS.

2. Save the container for identification.
3. Call the Vermont Poison Center at (802) 658-3456.
4. Get medical attention ASAP, call X1270 or Security X1292.

MATERIAL SAFETY DATA SHEET

Material Safety Data Sheets (MSDSs) are a prime source of information on the hazardous properties of a chemical product. The OSHA Hazard Communication Standard requires that all chemical manufacturers and importers supply an appropriate MSDS to their customers. The MSDS is usually developed by the chemical manufacturer. Additionally, all users (employers) of the product must have an MSDS for every hazardous chemical used in the workplace.

While OSHA does not specify the format of the MSDS, it does require certain specific information. A sample form approved by OSHA for compliance with the Hazard Communication Standard is shown in the appendix sample form.

There are eight basic required sections of information on the MSDS:

Section I:--General Information

Manufacturer's Name and Address-- This applies to the originator of the MSDS.

Emergency Telephone Number-- A number that can be used in an emergency to contact a "responsible party" for information about the product.

Information Telephone Number-- To be used in non-emergency cases to contact the manufacturer.

Signature and Date-- The signature of the person responsible for the MSDS and the date it was developed or revised.

Section II--Hazardous Ingredients:

Common Name-- Any identification as used on the label, that is, code name or number, trade, brand, or generic name.

Chemical Name-- The scientific designation of a chemical in accordance with the nomenclature systems of the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CAS).

CAS Number-- The identification number assigned by the Chemical Abstracts Service, which is unique to a particular chemical.

Section III--Physical and Chemical Characteristics:

The physical and chemical data that indicate the potential for vaporization are listed in this section.

Section IV--Fire and Explosion Hazard Data:

The data that indicate fire and explosion hazard potentials and special fire-fighting procedures are found in this section.

Section V--Reactivity Data:

The stability of the product and the potential for hazardous polymerization and decomposition are outlined in this section. Materials and conditions to avoid during use and storage are also listed.

Section VI--Health Hazards:

The most common sensations or symptoms a person might expect to experience from acute and chronic overexposure to the material or its components are explained. Emergency and first-aid procedures are noted. Any TLV or PELs are listed. If the chemical is a carcinogen, the source of this designation must be noted.

Section VII--Safe Handling and Use:

Designated special handling and disposal methods, and storage and spill precautions are in this section.

Section VIII--Control Measures:

The manufacturer recommends the use of ventilation, personal protective equipment, and hygienic practices in this section.

All required sections must be covered. If the required information is not available or not applicable, this must be shown on the form. Additionally, if the ingredients of a chemical mixture are trade secrets, their identity can be withheld, however, their hazardous properties must be given.

These forms are required to be readily available to employees. Training in their use is included as part of the Hazard Communication Program.

It is highly advisable that the documentation and/or justification for the various limits or guides, be consulted for detailed information concerning mode of action and effect of exposure to a particular toxic material.

DEFINITIONS

Absorption: The movement of a hazardous chemical through the skin and into the bloodstream.

Acute: Short-term effect, usually of a temporary high-level exposure.

Boiling Point: The temperature at which a liquid boils at atmospheric pressure.

Carcinogen: A chemical that has been shown to cause a cancer in laboratory animals and/or man. A "suspect carcinogen" or "potential carcinogen" has been shown to cause cancer only in laboratory animals, and has not been linked with cancer in humans.

CAS Number: Chemical Abstract Service registry number.

Ceiling Value: A maximum level. No exposures should ever exceed this level.

Chronic: Long term effect. Low-level exposure over long periods gives rise to symptoms that develop over time.

Combustible: A liquid that becomes flammable when heated above 100 °F.

Corrosive: A chemical that causes a visible destruction of skin and other tissue.

Dermal: Referring to skin or through the skin.

Evaporation Rate: The time it takes a given amount of material to completely dry up, compared with an equal amount of a reference material.

Flammable (Explosive) Limits--LEL and UEL: A flammable material will burn in air when ignited. These materials are referred to as flammable, combustible, or explosive. The range of concentration in which these materials will burn is limited by the Lower Explosive Limit (LEL). When the gas or vapor is below this concentration, the mixture is too lean to burn. The Upper Explosive Limit (UEL) above this concentration is too rich for the mixture to burn.

Flash Point: The temperature at which a flammable liquid produces enough vapor to burn.

Ingestion: Taking a material by mouth; eating it.

Inhalation: Breathing in a material.

NPCN: The National Poison Center Network, a special service that you or your doctor can call in the event of an exposure to a chemical substance. Call collect (412) 681-6669.

Oral Dose (LD50): The amount, usually expressed in milligrams per kilogram, which when fed to a group of animals will cause 50% of them to die.

Oxidizer, Oxidizing Agents: A compound that evolves oxygen spontaneously at room temperature or with slight heat and therefore can cause fires in the presence of a burnable substance (straw, oils, wood, etc.). Examples are hypochlorites, peroxides, nitrites, and nitrates.

Reactivity: The ability of a material to undergo a reaction with release of energy or heat.

Solubility: The tendency of a material to dissolve in water or other solvent.

Specific Gravity: The weight per volume when compared to water.

Spontaneous Heating: The tendency of a material to heat up without any external heating.

Stability: The tendency of a material to resist undesirable chemical changes during storage or transportation.

Threshold Limit Value--TLV and PEL: The TLV is a safe exposure level set by the American Conference of Governmental Industrial Hygienists (ACGIH). A PEL is a similar level set by OSHA. Both signify a level at which you can be exposed day after day with no adverse effects.

Toxicity: The degree of injury or illness caused by a poisonous material.

Vapor Density: The density of a gas or vapor, compared with that of air. Higher than 1.0 means a gas is heavier than air.

Volatile Percent: The fraction by weight or volume of solvent, or evaporable content in a mixture.

HAZARD CLASSES

The Material Safety Data Sheet (MSDS) provides a detailed explanation of the hazards a chemical possesses. Because of the number of chemicals used throughout Vermont Technical College, reading each chemical's MSDS can be very time consuming. One method used to describe the hazards of a large number of chemicals is to group them into a hazard class. Each hazard class has a unique feature, either physical, health hazard, or usage characteristics, that separates them into that category. The hazard classes described here are:

1. Compressed Gases
2. Corrosives
3. Flammable Liquids
4. Non-Flammable Solvents
5. Reactive Materials
6. Metals and Metal Compounds
7. Solvent-Based Materials

CHEMICAL CLASS FACT SHEET

I. COMPRESSED GASES

DEFINITION OF HAZARD -Chemicals which, when unconfined at room temperature, exist in the vapor or gaseous state. Many gases are stored in specially designed and constructed containers at either high pressures (compressed); liquefied (cryogenic); or both.

PHYSICAL CHARACTERISTICS

All gases possess the ability to expand to several times their original volume when released from their containers. Because of this high energy potential, whenever they are dropped, crushed, or exposed to excessive heat or incompatible chemicals, gas cylinders may fail, resulting in an explosion or fragmentation of the container. Ruptured gas cylinders have been known to torpedo through concrete walls.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Chlorine: Coughing; tearing; labored breathing; a burning sensation in the nose, throat, and lungs; unconsciousness; and death.

Hydrogen Sulfide: Headaches, dizziness, staggering, nausea, diarrhea, unconsciousness, cessation of breathing, and death.

Ammonia: Tearing; headaches; salivation; burning of the nose, throat and lungs; perspiration; nausea; and vomiting.

Propane, Methane, Helium, Argon, Nitrogen, Carbon Dioxide: Simple asphyxiants which, when released in sufficient amounts, will displace the oxygen levels below the levels necessary to sustain human life.

METHODS OF DETECTION

Sight: Colored gases, vapor cloud, tearing or drying of the eyes.

Smell: Distinctive odors. **WARNING-** The sense of smell may be deadened by even a small amount of vapor (olfactory fatigue).

Sound: Hissing of leaking gas lines.

Touch: Skin may feel cool, air movement.

Taste: Some gases will leave a distinct taste in mouth.

Leak Detection Solution: Soap solution, commercially available leak detection solutions (SNOOP).

Lead Acetate Paper: Hydrogen sulfide.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS
- * Respirators or self-contained breathing apparatus (SCBA) may be required.
- * Protection from skin absorption may be needed from some gases.

SAFETY AND EMERGENCY PROCEDURES

- * Refer to MSDS.
- * Transport in special hand carts & store cylinders with valve cap on. Never drag or roll them.
- * Always keep cylinders upright and secured with straps or chains.
- * Use only proper fittings for cylinders.
- * If gas is leaking, be certain there is adequate ventilation or use SCBA; turn off all ignition sources; shut off the cylinder main valve.

II. CORROSIVES

DEFINITION OF HAZARD Corrosives are substances that will cause visible destruction of human skin tissue and/or severely deteriorate steel.

Acids: Corrosive substances that react with bases to form salts. Acids have a pH less than 7.

Caustics: Corrosive substances that react with acids to form salts. Caustics have a pH greater than 7. Also referred to as base or alkali. Example: sodium hydroxide.

PHYSICAL CHARACTERISTICS

Acids and bases may be either solids or liquids that may emit a corrosive mist when released in the air or water.

Usually soluble in water, but generate considerable heat when mixed.

Inorganic acids are non-combustible, but may cause combustion or explosions since they may also be oxidizers. Example: nitric acid.

Organic acids will burn (acetic acid and formic acid).

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Skin Contact: May result in burns, open sores, and scarring of the skin. Caustics react with body fats and oils.

Eye Contact: May cause irreversible damage to eyes. Caustics are more hazardous because they will continue to react in the eyes after initial contact.

Respiratory: Mist may cause scarring and damage to nose, throat, and lungs. Overexposure may result in pulmonary edema (filling of lungs with liquid).

Chronic Effects: Bronchitis, conjunctivitis (inflammation of the eye), and digestive disturbances.

METHODS OF DETECTION

pH or indicating paper: Acid-red; base-blue.

Skin: Acids-itching or burning, caustics-soapy feeling.

Eyes: Tearing or irritation.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS.
- * Rubber apron or splash suit.
- * Rubber gloves.
- * Respirator where ventilation is inadequate.
- * Full face shield.

SAFETY AND EMERGENCY PROCEDURES

- * Refer to MSDS for special handling procedures.
- * Always add acids & caustics to water, not water to acids or caustics.
- * Be certain area is well ventilated.
- * Clean up spills & leaks immediately. Use full protective clothing.
- * Neutralize spill or leak with commercially available spill clean-up kit or appropriate agent, as referred to in MSDS.

III. FLAMMABLE LIQUIDS

DEFINITION OF HAZARD - Flammable liquids are substances with a flash point less than 140°F. A flash point is the minimum temperature at which sufficient vapors are emitted to support a flame when a source of ignition is present.

PHYSICAL CHARACTERISTICS

Flammable liquids are liquids that may vaporize quickly at room temperature and can easily ignite.

Vapors emitted are heavier than air, migrating along the ground, settling in low-lying areas.

Solubility: Some flammable liquids are soluble in water (e.g., alcohol); others are insoluble (e.g., xylene).

Odor: Flammable liquids have a variety of odors (e.g., acetone-sweet).

Color: Pure flammable liquids are usually clear, but some have color additives.

Specific Gravity: Most flammable liquids have a specific gravity less than one and therefore will float on top of water.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Skin Contact: All flammable liquids may cause reddening, irritation, or drying.

Inhalation: Generally, flammable liquids may cause dizziness, nausea, uncoordination, and headaches.

Alcohol (Methanol, Ethanol, Isopropanol): Soluble in water, mild irritants, with the general signs and symptoms. Methanol ingestion may cause blindness.

Ketones (Acetone, Methyl Ethyl Ketone): Soluble in water, slightly more toxic than alcohol. In addition to general signs and symptoms, can cause lightheadedness and unconsciousness.

Aliphatic Hydrocarbons (Hexane, Gasoline): Insoluble in water. In addition to general signs and symptoms, overexposure may cause excitement, stupor, and confusion.

Amines (N-Butylamine, Ethanolamine): Soluble in water, "foul smelling." Overexposure may result in irritation, pulmonary edema (lungs filling with fluid), and liver, lung, and kidney damage.

Ether (Anhydrous Ether, Tetrahydrofuran): In addition to the general signs and symptoms, overexposure may cause drowsiness, unconsciousness, and pneumonia.

Aromatic (Benzene, Xylene, Toluene, Naphthalene): In addition to the general signs and symptoms of overexposure, aromatics may cause convulsions, coma, and death. Many are also suspected carcinogens.

METHODS OF DETECTION

Sight: Observation of the liquid, and tearing or redness of the eyes.

Smell: All flammable liquids have detectable odors. **WARNING-** The sense of smell may be deadened by even small amounts of vapors (olfactory fatigue).

Touch: As flammable liquids evaporate, they leave the skin feeling cool; also the initial splash of liquid may be felt.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS.
- * Wear an approved respirator as prescribed in the MSDS where ventilation is inadequate. In areas where the oxygen level is below 19.5% or the chemical vapor concentration is above the IDLH, use an air-supplied respirator or self-contained breathing apparatus (SCBA).
- * Wear splash goggles and full face shield.

* Weararubberapron.

SAFETY AND EMERGENCY PROCEDURES

- * Refer MSDS
- * Remove all sources of ignition.
- * Be certain the area is well ventilated.
- * Spills or leaks: Wear the proper personal protective equipment, use absorbent material. Do not use janitorial equipment to clean up spills.
- * Never pour or wash liquids into sewers or drains.
- * When transferring flammable liquids, bond and ground containers.
- * Fires: Use a Class B fire extinguisher. Notify emergency personnel.

IV. NON-FLAMMABLE SOLVENTS

DEFINITION OF HAZARD - Non-flammable solvents are liquids that often contain either fluorine, chlorine, bromine, or iodine compounds and have the ability to dissolve or put into solution other materials.

PHYSICAL CHARACTERISTICS

Non-flammable solvents will not burn because they have no flashpoint. Vapors may explode though. When exposed to high heat or fire, many will emit acid or toxic gases.

Solubility: Insoluble in water.

Odors: Solvents have a variety of odors.

Colors: Most pure solvents are clear in color. Some darken or become turbid when exposed to heat, air, or light.

Specific Gravity: Solvents are more dense than water (specific gravity greater than one).

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Fluorocarbons (Halon, Freon): Mild irritant to respiratory tract. At high concentrations may cause heart problems or narcotic effects.

Chlorocarbons (Carbon Tetrachloride, Trichloroethylene): Nausea, vomiting, abdominal pains, diarrhea, liver and kidney damage, coma, and death. Some have chronic effects such as cancer.

METHODS OF DETECTION

Sight: Observation of the liquid, and tearing or redness of the eyes.

Smell: Solvents have detectable odors. **WARNING-** The sense of smell may be deadened by even small amounts of vapors (olfactory fatigue).

Touch: Solvents may splash on the skin; some may vaporize, leaving the skin feeling cool.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS.
- * Wear appropriate respirator as prescribed in MSDS or where inadequate ventilation exists.
- * Wear splash goggles.
- * Wear solvent resistant gloves.

SAFETY AND EMERGENCY PROCEDURES

- * Refer to MSDS.
- * Wear full personal protective equipment.
- * Absorb spill or leak with absorbent material.
- * Wash down area with appropriate cleaner.
- * Do not flush or pour solvents down drains or sewers.

V. REACTIVE MATERIALS

DEFINITION OF HAZARD - Reactive materials include substances and materials that react violently when mixed with air (pyrophorics) or water; are oxidizers, are sensitive to heat, shock, or friction; or generate a toxic or explosive gas when mixed with water.

PHYSICAL CHARACTERISTICS

Majority of reactives are solids or liquids. Reactives may burn, explode, or cause combustible material to burn upon contact. Some reactives will burn or explode when in contact with air or water (pyrophorics), or release a toxic gas. Reactives may be sensitive to shock, friction, or heat.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Alkali Metals (Sodium, Lithium, Potassium): React with moisture on skin to cause severe burn to skin, eyes, nose, and throat. Reaction by products may be explosive, flammable, or corrosive.

Azides (Sodium Azide): Causes fall in blood pressure and symptoms resembling cyanosis. Many are mutagenic. Overexposure may cause dizziness, weakness, blurred vision, shortness of breath, abdominal pains, convulsions, unconsciousness, and death.

Fulminates (Mercury Fulminate, Silver Fulminate): Toxicity is primarily dependent upon metal in compound. Substance can be extremely shock sensitive.

Hydrazines: Irritating to the eyes, skin, and respiratory tract. Can be absorbed through the skin. Overexposure may result in lung congestion, bronchitis, pulmonary edema, anemia, weight loss, convulsions, dizziness, nausea, liver and kidney damage. Suspected carcinogen and mutagen.

Cyanides: Strong irritant to nose, eyes, throat, and skin. Absorbed through the skin. Overexposure may result in nausea, vomiting, convulsions, shock, unconsciousness, and death.

Sulfides: Strong irritant to nose, eyes, throat, and skin. Acute overexposure may result in immediate coma. Other signs and symptoms are pulmonary edema, bronchitis, pneumonia, convulsions, tremors, weakness, numbness of extremities, and death.

Metallic Nitrates (Sodium Nitrate): Overexposure may result in dizziness, abdominal pains, vomiting, bloody diarrhea, weakness, convulsions, collapse, and death. Chronic exposure may lead to weakness, general depression, headache, and mental impairment.

METHODS OF DETECTION

Sight: Unless absolutely certain otherwise, if the material begins to flame, fume, bubble, or hiss when exposed to the air or water, immediately evacuate area to a safe distance and notify emergency personnel.

Smell: Some reactives have odors (sulfide-rotten eggs, cyanides-sweet almonds, hydrazine-ammonia) that may be detected. **WARNING-** The sense of smell can be deadened by even small amounts of vapor (olfactory fatigue).

PERSONAL PROTECTIVE EQUIPMENT

- * The handling of many reactive chemicals requires special equipment. Refer to the MSDS.
- * Heat-resistant or impervious gloves should be worn when handling any reactive material.
- * Moisture from the skin can cause the material to react.
- * At a minimum, use splash goggles and full-face shield to protect the eyes.
- * Certain reactives require an air-supplied respirator or self-contained breathing apparatus (SCBA) when handling the material, e.g., hydrazine.
- * Fire-retardant or impervious clothing may be necessary for handling reactives.

SAFETY AND EMERGENCY PROCEDURES

- * **Spills:** If air or moisture reactive, evacuate area and allow to react out.
- * **Fire:** Use only a Class D fire extinguisher. Notify emergency personnel. If fire becomes larger or more violent, evacuate area. Follow all written procedures, especially those recommended in the MSDS.

VI. METALS AND METAL COMPOUNDS

DEFINITION OF HAZARD - Metals are chemical elements, which make up the majority of known elements. An element is a pure substance with unique properties. Examples of pure metals are lead, magnesium, iron, and sodium. A metal compound is a chemical combination of a metal and non-metal. Example: iron oxide.

PHYSICAL CHARACTERISTICS

Metals and metal compounds are primarily solid materials, but may be put into solution to be shipped, stored, or used as liquids. Some metals are combustible, requiring special extinguishing agents. (e.g., sodium). Pure metals conduct heat and electricity. Metal compounds may be corrosive (e.g. barium chloride). Metals, when heated, release toxic fumes. Metals can react with corrosives to form explosive hydrogen gas.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Iron: Lung damage, shortness of breath, and cough.

Lead: Fatigue, sleep disturbances, headache, aching muscles, abdominal pains, anemia, nausea, vomiting, severe constipation, severe kidney and nervous system damage, coma, and death.

Copper: Nausea, congestion, vomiting, diarrhea, "metal fume fever," discoloration of skin and hair, hemorrhage.

Chromium: Irritating to nose, throat, skin and eyes; coughing; headache; respiratory pain; fever; kidney damage; weight loss; and cancer.

Mercury: Chest pains, fever, headache, inflammation of mouth and gums, and damage to liver, kidney and brain.

Zinc: "Metal fume fever," nausea, profuse sweating, loss of energy.

Cadmium: "Metal fume fever," nausea, vomiting, choking, abdominal pains, diarrhea, uncoordination, ulcers, unconsciousness, chest pain, pulmonary edema, and cancer.

Manganese: Irritating to nose, throat, and skin; nose bleeds; sleepiness; weakness in legs; nocturnal leg cramps; pneumonia; emotional disturbances; impairment of speech; and symptoms similar to Parkinson disease.

Nickel: Asthma, fibrosis, pulmonary edema, pneumonia, dermatitis, cancer.

METHODS OF DETECTION

Sight: Observation of the solid, powder, or liquid.

Touch: Irritation of the skin.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS.
- * Wear eye protection prescribed in MSDS; safety glasses as a minimum protection.
- * Wear gloves appropriate to job (heat-resistant for welding).
- * Use a respirator as prescribed in MSDS or where inadequate ventilation exists.

SAFETY AND EMERGENCY PROCEDURES

- * RefertoMSDS.
- * Somematerialsmayrequireneutralizationbeforedisposal.
- * Mercuryspillsrequirespecialclean-upprocedures.
- * DisposalofmetalsandcertainmetalcompoundsareregulatedbyEPA.
- * Wearproperpersonalprotectiveequipmentwhencleaningspills.
- * KnowwhereaClassDfireextinguisher maybefoundandhowitisoperated.

VII.SOLVENT-BASEDMATERIALS

DEFINITIONOFHAZARD -Solvent-basedmaterialsaresubstancesintowhichasolventhas beenaddedinordertoallowthatsubstancetoflow,tobehandled,ortobeapplied.Example: paints.

PHYSICALCHARACTERISTICS

Solvent-basedmaterials maybeliquidsorpaste.
 Solvent-basedmaterials mayburnifthesolventisflammable.
 Solvent-basedmaterials may mixwithwater,especiallyiftheycontainalcohol.
 Somesolvent-basedmaterials willnotmixwithwater.
 Solvent-basedmaterialshaveavarietyofodors.

SIGNSANDSYMPTOMSOFOVEREXPOSURE

FlammableSolvents: Maycauseirritationtoskin,nose,andthroat,aswellasnausea,vomiting, headache,anddrowsiness.Aromaticsolventshavemoreseverehealtheffects.

HalogenatedSolvents(Fluoro-Chloro-orBromo-Compounds): Aremildirritants.

ChlorinatedSolvents: Havemoreseverehealtheffects,suchasnausea,vomiting,abdominal pains,diarrhea,liverandkidneydamage,coma,anddeath.Manychlorocarbonsmaycause cancer.

Solvent-BasedMaterials: Maycontainmetalsascolorants(pigments):lead,chromium,iron oxides,andtin.

Lead:Fatigue,sleepdisturbances,headache,achingmusclesandjoints,andstomachpains.

IronOxides: Lungdamage.

Chromium:suspectedcarcinogen,irreversiblehealtheffects.

LatexPaints: Containsoapsthatmaybeirritating.Smallplasticparticlesmaycauseminor healtheffects.

Resins:Maycauseepoxy poisoning:labeledbreathing,coughing,andpneumonia.

METHODSOFDETECTION

Sight: Observation of the liquid, paste, or spray.

Smell: All solvent-based materials have odors. **WARNING-** The sense of smell may be deadened by even small amounts of vapors (olfactory fatigue).

Touch: Sensation or irritation of the skin.

PERSONAL PROTECTIVE EQUIPMENT

- * Refer to MSDS.
- * Splash goggles or safety glasses, depending on use.
- * Wear some type of hand protection as prescribed in MSDS.
- * Wear respirator as prescribed in MSDS or wherever inadequate ventilation exists.

SAFETY AND EMERGENCY PROCEDURES

- * Be certain area is well ventilated.
- * If solvent is flammable, remove all sources of ignition.
- * Clean up all spills immediately.

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

HAZCOM TRAINING: Hazardous Communications Program

Job Class/Title

Academic Dean
Administrative Dean
Dean of the College
Director of K-12 & Outreach
Assoc. Academic Dean
Dir. of Computer Services & Staff
All Laboratory Technicians
All faculty: Agri. & Business
All faculty: Civil Dept.
All faculty: AB/BSAET
Dir.: Const. Practice/Mgt
Chair: Math/Sci./GenEd. Dept.
All Faculty: Science Dept.
All Faculty: Auto Tech.
Chair: Electrical/Electronics
Chair: Mechanical

Dir:Biotechnology
Dir:Rehab.Engineering
Dir:NursingPrograms&Faculty
Dir:ARAMARK&Staff
Dir:ofFacilities&Asst.Dir.
AllCustodialStaff
AllMaintenanceStaff
AllGroundsStaff
AllFarmsteadStaff
AllSecurityStaff
Cord.ofHealthServices
Dir.ofAthletics
Dir.ofAquatics
HeadCoach/IntraM.
Dir.StudentLife
AllResidentLifeDirectors

CHAPTER 8

LIFE SAFETY

INTRODUCTION

Vermont Technical College is committed to safeguarding the lives of all visitors and employees from the danger of fire. Buildings and surroundings shall comply with NFPA 101, Life Safety Code.

OCCUPANCY LOAD (LIMIT)

1. As a rule, occupancy limits are a function of the available floor area and exit capacity. The calculated load may be reduced under hazardous situations as determined by the Director of Facilities.
2. The occupancy limit for a given room, area, or building, must not be exceeded.
3. During normal public hours the Director of Security or the Director of Facilities shall ensure that established occupancy limits are not exceeded.
4. During special events, the Security Department staff are responsible for checking to see that occupancy limits are not exceeded.
5. The occupancy load of an auditorium shall be the total number of fixed seats and wheelchair spaces available. Viewing from the aisles is strictly prohibited.
6. For events where portable seating, bleacher-type seating or banquet-type seating arrangements are required for seating over 50 people, the Director of Facilities shall be contacted to approve seating and table arrangements.

MEANS OF EGRESS 1910.35.

Means of egress is the continuous way of exit travel from any point in a building to a public way or other safe place. The safe emergency evacuation of visitors and employees is a principle design feature of Vermont Technical College occupied spaces.

1. Security measures or incidental building activities shall not impede exit doors and passageways.
2. Exits shall be unobstructed and readily accessible at all times. New construction, renovation, or event temporary activities shall not inhibit exits in any way.
3. Storage shall not be permitted in or beneath stairwells.
4. Storage shall not be allowed in corridors unless approved by the Director of Facilities.

5. Exit doors shall be arranged so they can be readily opened from the egress side whenever the building is occupied. Locks, if provided, shall not require the use of a key, tool or special knowledge or effort for operation from the inside of the building, unless permitted by NFPA 101. Exit doors serving 100 or more people shall have panic hardware.
6. The minimum unobstructed width of any exit access shall be as follows, but in no case less than 32 inches:
 - a. An aisle through an exhibit hall shall be a minimum of 5 feet.
 - b. An aisle or corridor serving over fifteen people shall be a minimum of 44 inches.
 - c. An aisle in a warehouse shall be a minimum of 44 inches.
7. Approved illuminated exit signs shall be installed anywhere the exit or path to the exit is not immediately obvious to the occupants. Signs shall be highly visible and shall be such that at no point in the exit access is more than 100 feet from the nearest visible sign. Newly installed exit signs should be located within 4 feet of the floor to minimize obstruction from rising smoke of fires.
8. Internally illuminated exit signs that are not of the self-energized type shall be powered by batteries or wired to the emergency lighting circuit.

EMERGENCY LIGHTING

Emergency lighting, powered either by an emergency generator or by batteries, shall be provided in the following locations:

1. All means of egress serving more than six people.
2. Switchgear, mechanical equipment, and transformer rooms.
3. Security control rooms.
4. Emergency command centers.

EMERGENCY PROCEDURES

Each facility must have posted an updated emergency procedure that assigns and describes the roles of key personnel in the emergency organization during a fire or other emergency.

The following actions should be taken in order of priority in the event of a fire:

1. Should smoke be seen or smelled, contact community fire department.

2. When fire is discovered, call out, alert others in the area, sound the fire alarm by using a manual pull station, or summon help from the security office. Personal knowledge of the situation will aid those responding; be explicit on the phone and keep in contact with the security force.
3. When the fire is small and confined, attempts may be made to extinguish it, provided that personnel have training in firefighting. Otherwise the area should be evacuated immediately.
 - a. Never allow the fire to come between you and the exit.
 - b. Never go past a fire to get the extinguisher.
 - c. **DONOT TRY TO BE A HERO!!!**
4. Leave the building immediately on a general fire alarm. Isolate the area by closing all doors and windows. Shut down all electrical equipment, if possible.
5. Assemble in the pre-designated area outside, at least 200 feet from the building, and await instructions from the emergency coordinator or the fire chief.
6. Faculty and other supervisory personnel who note that individuals whom they may have been in the building are missing, should immediately inform Security.

MAINTENANCE

1. Monthly, the Physical Plant or Security Department shall inspect exit signs and emergency lighting to ensure that the lights are functioning properly. All failed illuminating elements shall be replaced.
2. Personnel from the Physical Plant shall be responsible for maintaining emergency generators, building emergency circuitry, exit doors and associated hardware.

CHAPTER 9

SAFETY PLAN

LOCK-OUT/TAG-OUT

29CFR1910.147

This program is applicable to the control of energy sources during servicing or maintenance of machines or equipment. Normal production operations are not covered by this standard. The purpose of the program is to prevent injuries to employees from the unexpected startup or release of stored energy from machines or equipment. This program does not apply to work on cord and plug connected electrical equipment.

DEFINITIONS

Affected employee - An employee whose job requires him/herto operate or use the machine or equipment on which the servicing or maintenance is being performed under the lock-out or tag-out or whose job requires performance of work in an area in which the lock-out or tag-out is in effect.

Authorized employee - An employee, qualified by training and authorized by the employer, who executes the lock-out or tag-out.

Lock-out - A padlock placed on a power source with a lock-out device that physically holds an energy control point, such as a switch, lever, or valve handle in the "off" position that makes it impossible to operate.

Tag-out - A written warning placed on a point of control that tells coworkers not to operate a switch, lever or valve that could release hazardous energy or set a machine in motion. The tag acts as a warning device and it does not physically prevent someone from releasing the energy.

Two Person Rule - A safety rule stating that two people must be present during the removal of any lock that was placed by someone else, and that no lock may be cut until all workers are known to be clear of the machine or system which is locked out.

Zero Energy State - the state of a machine or system in which residual energy in any form has been dissipated to a safe level, and lock-out has been installed and verified.

LOCK-OUT/TAG-OUT MANUAL

The Director of Facilities shall maintain a manual containing all of the information necessary to comply with provisions of this program. The contents of this manual includes:

1. Vermont Technical College Lock-out/Tag-out Plan.

2. Lock-out procedures for machines and equipment.
3. A list of applicable machines and equipment at the College.
4. Training Certification.

GENERAL ENERGY CONTROL PROCEDURE

This procedure establishes the minimum requirements for the lock-out/tag-out of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall also be used to insure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before any employees perform any servicing or maintenance where unanticipated energizing or startup of the machine or equipment or release of stored energy could cause injury. A specific lock-out procedure is required for each device that is covered under this program except when all of the following elements exist:

1. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shutdown which should endanger employees. (i.e., no capacitors to build up and store charge.)
2. The machine or equipment has a single energy source which can be readily identified and isolated.
3. The isolation and locking out of that single energy source will completely de-energize and deactivate the machine or equipment.
4. The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
5. A single lock-out device will achieve a locked out condition.
6. The lock-out device is under the exclusive control of the authorized employee performing the servicing or maintenance.
7. The servicing or maintenance does not create hazards for other employees.
8. There have been no accidents involving the unexpected activation or re-energizing of the machine or equipment during servicing or maintenance.

Most equipment at Vermont Technical College does not require specific written lock-out/tag-out procedures.

Sequence of Lock-out/Tag-out:

The eight (8) steps listed below shall be followed for all lock-out/tag-out. For equipment with specific procedures, authorized employees will refer to these procedures to determine the specific information needed.

1. Notify all affected employees that servicing or maintenance is required, and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.
2. The authorized employees must identify all energy/ power sources for the machine or equipment, must understand the hazards of those energy/ power sources, and must know how to control them.
3. If the machine or equipment is still operating, it should be shut down by the normal stopping procedures.
4. Operate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s). (i.e., open the circuit breaker)
5. Lock out the energy isolating device(s) with assigned individual lock(s) or lock-out hasp and padlock and then tie a tag on the padlock. The tag must include the date and time of the initiation of the lock-out and the worker's name and should be written in ink not pencil.
6. Dissipate or restrain stored or residual energy. (i.e., release pressure, block in position)
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the controls or by testing to make certain that the equipment will not operate.

(Please note : Return all operating controls to neutral or off position after verifying the isolation of the equipment.)

8. The machine or equipment is now locked out.

Any equipment that does require a specific lock-out procedure should be clearly identified in work orders. Supervisors will assure that, when necessary, specific procedures are available to employees and included with work orders. Questions concerning specific procedures should be referred to the Supervisor. If an employee is uncertain if a particular piece of equipment requires specific written procedures, he or she should check with the supervisor before starting work.

Compliance:

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lock-out. Only authorized employees are permitted, and required, to perform lock-out in accordance with this procedure. No one has the authority to tag or lock machines/equipment for another employee. All employees, upon observing a machine or a piece of equipment which is locked out to perform servicing or maintenance, **MUST NOT** attempt to start, energize or use that device. Failure to comply with this procedure will result in appropriate disciplinary action.

Restoring Machine/Equipment to Service:

1. Check the machine or equipment and the immediate area to ensure that non-essential items have been removed, and that the machine or equipment components are operationally intact. Restore all equipment guards and other safety devices.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify that the controls are in neutral or off.
4. Remove the lock-out/tag-out devices and re-energize the machine or equipment.
5. Notify affected employees that the servicing or maintenance has been completed, and the machine or equipment is back in service.

Alternative Release From Lock-out/Tag-out:

If the authorized employee who applied the lock-out or tag-out device is not available to remove it, that device may be removed under the direction of a supervisor provided that:

1. The supervisor has verified that the authorized employee who applied the device is not at the facility.
2. All reasonable efforts are made to contact the authorized employee to inform the person that the lock-out or tag-out device has been removed.
3. The authorized employee is notified of the above before resuming work at the facility.

Tag-out:

When energy isolation devices are not lockable, tag-out devices may be used. The tag will be placed at the point of power initiation. When tag-out is used, and the energy devices are lockable, full employee protection must be provided equivalent to that obtained by using a lock-out device. In such cases, additional training and more rigorous periodic inspections are required.

If a tag is used without a lock on fixed electrical equipment, at least one additional safety measure must be provided such as removal of an isolating circuit element, blocking of a control switch, or opening an extra disconnecting device.

PROTECTIVE MATERIALS AND HARDWARE

Locks, hasps, tags, and other hardware will be signed out from the Director of Facilities. Authorized personnel will carry locks and other LOTO devices in their toolboxes. Chains for the lock-out of valves will be available in the physical plant.

Authorized personnel shall use a new tag for each job. When the job is complete or at the end of the week in which the job was completed, the tags must be logged in with the locksmith. The lock

out/tag-out log will be kept in the locksmith's office. Once the tag has been logged in, the job information will be erased and the tag returned to service.

The lock-out/tag-out devices shall be numbered or otherwise singularly identified, and must be the only authorized devices used for locking out and tagging energy sources. The spare key for each lock will be kept in the locksmith's office. Supervisors are the only personnel who will have access to these keys. The use of spare keys is limited to situations covered in this program. LOTO devices must not be used for other purposes and must meet the following requirements:

1. **Durability:** The devices should be able to withstand the environment to which it is exposed for the duration of the procedure.
2. **Standardized:** The devices should be standardized in at least one of the following; color, shape, size, type or format.

Individual plug locks are available upon request.

PERIODIC INSPECTION

An inspection, at least annually, of each energy control procedure must be performed by an authorized employee other than the one implementing the energy control procedure being inspected. The purpose of the inspection is to correct any deviation or inadequacies identified. Certification of these inspections will identify the machine or equipment, the date of inspection, the names of the employees included in the inspection, and the person performing the inspection.

TRAINING AND COMMUNICATION

The Director of Facilities, or designee, shall conduct general training sessions for all employees. Supervisors shall conduct training on specific energy control procedures for authorized employees on specific machines and equipment. The supervisors will maintain the required records, using the approved form, to certify that employee training has been effected and is current. Re-training is required whenever there is a change in job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures. Additional training is also required when periodic inspection reveals, or whenever the supervisor has reason to believe, that there are deviations from, or inadequacies in the energy control procedures. The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

ADDITIONAL REQUIREMENTS

Testing or Positioning of Machines:

In situations in which lock-out or tag-out devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the device, the following sequence of actions shall be followed:

1. Clear the device of tools and materials.

2. Clear employees from the machine or equipment area.
3. Remove the lock-out or tag-out devices.
4. De-energize all systems and reapply energy control measures to continue the servicing and/or maintenance.

Outside Personnel:

Whenever outside servicing personnel are to be engaged in activities covered by the scope of this Standard, Vermont Technical College (the Director of Facilities) and the outside contractor shall inform the other of their respective LOTO procedures. VTC shall ensure that our employees understand and comply with the restrictions and prohibitions of the contractors' energy control program.

Group Lock-out/Tag-out:

When lock-out and tag-out devices are used by a crew, department, or other group, one authorized employee is charged with the primary responsibility for a set number of employees working under the protection of a group lock-out or tag-out device. The authorized employee shall ascertain the exposure status of individual group members. When more than one group is involved, the responsibility of the overall job associated with the lock-out or tag-out control shall be assigned to an authorized employee designated to coordinate affected work forces and to ensure the continuity of the project. Each authorized employee shall affix a personal lock-out or tag-out device to the group lock-out device at the beginning of work, and shall remove those devices when he or she stops working on the machinery or equipment being serviced or maintained.

Shift or Personnel Changes:

Specific procedures shall be developed for personnel changes to ensure the continuity of lock-out or tag-out protection, including provisions for the orderly transfer of lock-out or tag-out device protection between employees, to minimize exposure to hazards from unexpected energizing or start of the machine or equipment, or the release of stored energy.

Classifications:

Classifications of equipment and machines which must be locked and tagged including but not limited to:

1. Heating, ventilation, refrigeration, and air conditioning equipment, including electrical heat:

If the device is not lockable at the machine/equipment, it must be locked out at the appropriate breaker panel.

2. Elevators:

All are lockable. The lighting fixtures need not be tagged or locked, simply turn the circuit off at the wall switch.

3. Lighting and branch circuits:

The majority will be locked and tagged at the breaker panel.

4. Miscellaneous:

Dishwashers, and compactors.

A list of specific equipment and machines subject to Lock-out/Tag-out at Vermont Technical College by department and building will be attached to this plan.

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

LOCK-OUT TAG-OUT TRAINING

Job Class/Title

Director of Facilities
Assoc. Director of Facilities
All Maintenance Personnel
All Lab. Technicians

CHAPTER 10

DEFENSIVE DRIVING TRAINING

MANDATORY SAFETY TRAINING REQUIREMENTS

Training Matrix by Position

Vermont Technical College has identified the following Safety Training Requirements for:

DEFENSIVE DRIVING TRAINING (SEE Chapter 10)

Job Class/Title

All VTC personnel & students who drive college vehicles.

APPENDIX

CHAPTER1

HEPATITIS B VACCINATION-EMPLOYEE INFORMATION AND DECLINATION

The following information shall be shared with employees indicated to receive the HBV vaccination.

Hepatitis B virus (HBV) is a potentially life-threatening bloodborne pathogen. Centers for Disease Control estimates there are approximately 280,000 HBV infections each year in the United States. Approximately 8,700 health care workers each year contract hepatitis B, and about 200 die as a result. Some who contract HBV will become carriers, passing the disease on to others. Carriers also face a significantly higher risk of other liver ailments which can be fatal, including cirrhosis of the liver and primary liver cancer. HBV is transmitted through exposure to blood and other infectious body fluids and tissues. Anyone with occupational exposure to blood is at risk of contracting the infection. The best defense against Hepatitis B is vaccination prior to exposure.

The Hepatitis B vaccination is a non-infectious, yeast-based vaccine administered with three injections in the arm. It is prepared from recombinant yeast cultures, rather than human blood or plasma. Thus, there is no risk of contamination from other bloodborne pathogens nor is there any chance of developing HBV from the vaccine. These second injections should be given one month after the first, and the third injection six months after the initial dose. More than 90% of those vaccinated will develop immunity to the Hepatitis B virus. To ensure immunity, it is important for individuals to receive all three injections. At this point it is unclear how long the immunity lasts, so booster shots may be required at some point in the future. The vaccine causes no harm to those who are already immune or to those who may be HBV carriers.

FOR EMPLOYEES WHO ELECT TO DECLINE THE HBV VACCINE:

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination at no charge to me.

NAME OF EMPLOYEE* _____

SIGNATURE OF EMPLOYEE _____

DATE _____ WITNESS _____

*Employee includes student workers when their paid position has been determined to be at risk for exposure. Students working in positions determined to be at risk must be at least eighteen years of age.

**INCIDENT REPORT FOR BLOOD BORNE PATHOGEN EXPOSURE
EVALUATION**

Confidential Medical Record

DATE: _____

EMPLOYEE: _____ S.S.#: _____

DESCRIPTION OF THE EXPOSURE AND CIRCUMSTANCES OF THE OCCURRENCE:

DESCRIPTION OF THE EMPLOYEE'S DUTIES DURING EXPOSURE:

REMEDIAL ACTIONS THAT WERE TAKEN AT THE TIME OF EXPOSURE:

BLOODBORNE PATHOGENS POST EXPOSURE EVALUATION

**Confidential Medical Form
Employee/Health Care Professional**

EVALUATED BY: _____

EXPOSURE EVALUATION DATE/TIME: _____

NAME: _____ SS#: _____

DATE/TIME OF EXPOSURE: _____

DESCRIPTION OF THE EXPOSURE INCIDENT--CIRCUMSTANCES--ROUTE

HAS THE EMPLOYEE RECEIVED HBV VACCINATIONS?

YES _____ DATE COMPLETED _____ NO _____

CONSENT WAS GIVEN/REFUSED FOR HBV/HIV TESTING _____

BLOOD WAS DRAWN AND SENT FOR EVALUATION (Date) _____

BLOOD TO BE PRESERVED AT THE LAB FOR 90 DAYS _____

RESULTS OF THE SOURCE INDIVIDUAL'S TESTING MADE

AVAILABLE TO THE EMPLOYEE

(Date) _____

EMPLOYEE GIVEN STATEMENT PROHIBITING

DISCLOSURE _____

IDENTIFICATION OF THE SOURCE PERSON _____

CONSENT GIVEN FOR HBV/HIV TESTING _____

IF TESTED, RESULTS: HBV _____ HIV _____

OR SOURCE PERSON IS UNKNOWN _____

This form is for use by the evaluating health care professional. It is to be kept with the health care professional's records and must be made available if requested from VOSHA. Do not return this form to VTC. Medical records relevant to the treatment of the employee shall be provided to the evaluating health care professional by Vermont Technical College with written permission from the employee.

**HEALTHCARE PROVIDER'S WRITTEN OPINION
POST EXPOSURE EVALUATION**

Confidential Medical Record

NAME: _____ SS#: _____

DATE/TIME OF EXPOSURE: _____

**THE EXPOSED EMPLOYEE SHALL BE PROVIDED A COPY OF THE
EVALUATION WITHIN 15 DAYS OF ITS COMPLETION.**

THE EMPLOYEE HAS BEEN DIRECTLY INFORMED OF THE RESULTS OF THIS
EVALUATION (Date): _____

THE EMPLOYEE HAS BEEN TOLD ABOUT ANY MEDICAL CONDITIONS
RESULTING FROM EXPOSURE TO BLOOD OR OTHER POTENTIALLY INFECTIOUS
MATERIALS WHICH REQUIRE FURTHER EVALUATION OR TREATMENT

DATE

The employee has been provided with those services required under Bloodborne Pathogens
Standard, 29 CFR 1910.1030(f)(3).

SIGNATURE OF THE HEALTHCARE PROVIDER

APPENDIX

CHAPTER2

APPENDIX A

LABORATORY SAFETY EQUIPMENT INSPECTION SCHEDULE

APPENDIX B

RESISTANCE TO CHEMICALS OF COMMON GLOVE MATERIALS

APPENDIXC

NEWCHEMICALPURCHASINGREQUEST

APPENDIXD

CHEMICALHAZARDAUDITSHEET

APPENDIX
AIR SAMPLING DATA RECORD

APPENDIX

**NEWEMPLOYEECHEMICALHYGIENEORIENTATIONAND
TRAININGCHECKLIST**

APPENDIXG

TRANSFERCHEMICALHYGIENETRAININGCHECKLIST

APPENDIXH

NEWCHEMICALTRAININGCHECKLIST

APPENDIX

CHEMICALHYGIENEPERMIT

APPENDIX J

**OSHA HAZARDOUS CHEMICALS IN LABORATORIES STANDARD
COMPLIANCE CHECKLIST**

APPENDIX

CHAPTER3

VERMONT TECHNICAL COLLEGE CONFINED SPACE ENTRY PERMIT

PERMIT APPLICATION DATE: _____ TYPE OF ENTRY: _____
 (circle one) Emergency Scheduled Maintenance Reactive Maintenance

GOOD ONLY ON THIS DATE: _____ TIME ISSUED: _____ TIME
 EXPIRES _____

LOCATION: _____ SUPERVISOR: _____
 (Building/Area)

ALTERNATE: _____

WORK PROCEDURE TO BE PERFORMED: (The exact task(s) to be performed with a
 description of work method, maintenance equipment, tools, or other necessary
 activity/equipment.)

BESPECIFIC _____

SAFETY PRECAUTION CHECKLIST: Complete all spaces; Initial, Date, Time, Results.
 Any Not Applicable (NA) must be explained.

PRECAUTION	DATE	TIME	RESULTS	INITIALS
Space/Vessel Cleaned/Flushed	_____	_____	_____	_____
Space/Vessel Air Quality O ₂ LEL _____	_____	_____	_____	_____
Toxic Vapors	_____	_____	_____	_____
Periodic Monitoring Required*	_____	_____	_____	_____
Continuous Monitoring Required	_____	_____	_____	_____
Lines to Space/Vessel Blanked	_____	_____	_____	_____
Disconnected, Locked/Tagged out	_____	_____	_____	_____
Steam	_____	_____	_____	_____
Hot Water	_____	_____	_____	_____
Cold Water	_____	_____	_____	_____

HotAir	_____	_____
AllElectrical/Mechanicalcircuit drivemechanismslocked/taggedout	_____	_____
SafetyLights	_____	_____
HotWorkPermitCutting	_____	_____
Welding	_____	_____
Grinding	_____	_____
Other	_____	_____
Communications	_____	_____

*ATTACHREALTIMEMONITORINGRESULTS